From: **The Royal Aero Club of the United Kingdom** **ANNEX 4**

20 April 2007

Dear CASI Delegates,

Proposals for the 2008 edition of the General Section of the Sporting Code

A UK paper on amendments to the GS was part of the 2005 CASI Plenary agenda but was postponed for consideration in 2006. Due to an oversight it was not included in the 2006 CASI agenda and was postponed to the 2007 CASI Plenary. This paper updates the previous ones and adds the more complete paragraph wording that was asked for by the last CASI President and mentioned in the October 2005 CASI minutes.

The UK view is that the General Section should be a "living document" and we should not hesitate to update it. If regular amendments are made to keep the GS up-to-date, this will avoid the need for a major re-write at a later date. In the past, a major re-write had to be made between 1994 and 1995 that needed the formation of a sub-committee to co-ordinate the drafting. This took a large amount of time and work and resulted in a certain amount of disagreement because of the magnitude of the task and the changes that had to be made. This work produced a completely new1996 version of the GS that, together with annual amendments since that date, forms the basis of the current edition. The UK suggests that this policy of regular updating should continue.

The following proposals are thought to have particular merit and are therefore proposed to CASI. Some are the result of ocurrences in Air Sports that would benefit from more specific guidance. Others are concerned with the application of systems such as GPS and Galileo to air sports. On that point, it is suggested that the General Section should reflect the application of modern technology, not only for our own benefit but to demonstrate to influential outsiders that FAI is up-to-date in these matters. Top level guidance should be given, as usual, in the General Section and the application in more detail, in the Specialist sections of the Code that are the responsibility of the Air Sport Commissions. In our view, it would not be appropriate to omit general guidance in the General Section on the grounds that the Specialist Codes can cover it. A common FAI approach is needed in these matters, not divergence between air sports unless this can be shown to be essential. Air Sports can learn from each other how best to apply modern technology and rules and procedures generally, indeed we believe that this is an important function of CASI and the General Section of the Code.

In this spirit, the following proposals are made for GS 2008 in the order of GS paragraphs:

GS Para Comment/New Wording

4.3.2.6.2 (new para). There was an incident in 2006 where a Jury over-ruled a regulation about cloud flying and gave points to pilots who had flown in cloud, despite a written rule in that sport and in that competition that proof of cloud flying would result in no points for the day. This Jury decision indicated that dangerous flying that was banned, could still result in the award of points. The decision was later criticised on grounds of flight safety. The following words are suggested: "4.3.2.6.2 <u>Powers of the Jury</u>. Juries are not empowered to make decisions that could be seen as changing rules that have been agreed with the organisers and circulated before the event, particularly if there could be safety implications."

6.1.2 World record eligibility. Wording is proposed that eliminates the need to quote a list of exceptions, avoids the present situation where flights that appear to be eligible for World Records are not being put forward to FAI, and strengthens guidance on what the NAC has to submit to FAI for a World Record claim. We propose:

"6.1.2 The NAC sending a World Record claim dossier to FAI must check and certify that the rules for the appropriate World Record have been complied with. In claims where the rules and conditions for the National Record are the same as for the World Record, before the dossier is sent to FAI for validation, the performance must have been validated as a National record by the NAC concerned. If there is a delay in National validation such as for seeking further evidence, FAI must be informed. (AL9)"

Reason: The existing wording states that a National Record must be validated for the performance concerned before it can be submitted to FAI for consideration as a World Record. However, FAI has no control over rules and procedures for National Records, which are the responsibility of the relevant NAC. Indeed, in the past, provisions for National Records in some Sporting Codes were withdrawn for that reason (SC3 for Gliding was an example). There are already exceptions written in to para 6.1.2 such as for multi-person parachuting records and space records. The present 6.1.2 wording is therefore rather complex and could become more so in the future if more exceptions are added. We believe that it would be better to reflect the true position between NACs and FAI in 6.1.2 rather than continue to add exceptions.

For instance, in 2006, difficulties were found in validating high performances by multi-crew aircraft that included people from several different nationalities. Some Airsports in some Nations have a rule that all operating flight crew have to be of that nationality. A multi-national crew is therefore excluded, which is understandable at National level but clearly not in the case of a World record.

For a World Record, the main NAC function should be to check the evidence before it is sent to FAI and should not be to avoid forwarding the evidence on grounds specific to the NAC that are nothing to do with the World Record environment. **Some potential world records have already been turned down at for this reason, but at National level rather than after forwarding to FAI**. We regard this as a major anomaly and quite unfair to the pilots concerned.

In addition to the points of detail above, a general principle is involved. Because of terrain, the size and shape of National boundaries, weather and other conditions relevant to a particular Airsport in a particular nation, it is not unreasonable that National Rules may differ in some respects from World Record rules. For instance, it would be understandable if an NAC took the view that a National Record should be flown taking off and landing or entirely flown over the National territory, considerations not relevant to a World Record.

Conclusion. Therefore, on grounds of principle, fact and practicality, we propose that 6.1.2 be simplified as we propose above by recognising the fact that some National Record rules may be different to World Record rules. Furthermore, this must be no barrier to World Record claims where the World Record rules have clearly been fulfilled. If CASI wishes, encouragement could be given to NACs to use the FAI rules, such as by inserting words in the middle of 6.1.2 such as:

"Rules and procedures for National Records should only be different from those of FAI if there are very good reasons for any differences."

7.1 Units. There is no reference to the geographical co-ordinates that are used as end-points in calculating leg distances. It is therefore proposed to add Latitude and Longitude to 7.1 under "Other units":

Other Units
Latitude and Longitude..... ……..... Degrees, Minutes, Decimal Minutes,
...or Degrees, Minutes, Seconds (decimal seconds if necessary) (AL9)

7.3.1.1 Distances on the Earth's Surface. Correct and accurate distance calculations depend on the shape of the earth used in the calculation of distance between two points, but also on the Earth Model (Geodetic Datum) used in obtaining the accurate numerical co-ordinates for each of the two points that are used in calculating a distance. These are not necessarily the same. For the distance calculation, FAI currently allows either the internationally-accepted WGS84 Ellipsoid Earth Model or a sphere of radius 6371km. The latter is approximately the same volume as the WGS84 ellipsoid.

For the co-ordinates of the points used in the distance calculation, figures shown in the grid that is overlaid on maps are frequently with respect to a local Geodetic Datum rather than WGS84 (although official ICAO maps use WGS84 lat/longs). Worldwide, there are over 200 of such local mapping Datums based on slightly different ellipsoids.

It is fundamental to the accuracy of distance calculations that the same Geodetic Datum is used for the co-ordinates that are used for the start and end points of a leg. Otherwise, the distance calculated will be wrong by an amount varying from metres to kilometres depending on the differences between the different ellipsoids used for the start and end points of a leg. It is therefore proposed that these distinctions should be clearly expressed in the GS in a re-worded 7.3.1.1. In the draft below, 7.3.1.1.1 contains the existing wording, the other wording is extra:

7.3.1.1 Distances on the earth's surface. In calculating exact FAI distances, two stages must be considered before calculations are made. First, the mathematical model of the shape of the earth that is used in the distance calculation program used with the two points on the surface of the earth that make up a leg of the course claimed. Second, the co-ordinate system used in defining the accurate position of the point at the beginning and end of a leg, such co-ordinates then being inserted in the distance calculation program appropriate to the earth model used. (AL9)

7.3.1.1.1 Earth Model for Distance Calculations. For FAI distance calculations, the earth model used may either be the WGS84 ellipsoid or a sphere of radius 6371 km exactly. For accurate measurement and calculation of distance, Air Sport Commissions shall choose which model is to be used in their area of activity. The WGS84 ellipsoid is very close to the real shape of the earth, the sphere is an approximation. For further details on the WGS84 ellipsoid and the FAI Sphere, see the Glossary. A short PC-based distance calculation program for both earth models is available is available on the FAI web site.

7.3.1.1.2 Co-ordinates of Geographic Positions. For exact geographic positions used for distance calculations, the same Earth Model (Geodetic Datum) must be used for all co-ordinates used in the calculations. For short distances where the beginning and end points of a leg are on the same map, co-ordinates taken from an accurate map will automatically be with respect to the same Geodetic Datum. For longer legs where a different map or co-ordinate system is used for the beginning and end points, before distance calculations are made it must either be ensured that the Geodetic Datum used for

the co-ordinates is the same, or the co-ordinates must be converted to a common datum such as WGS84. Mapping Datum Transformation (MADTRAN) programs that convert lat/longs from one Geodetic Datum (ellipsoid model) to another are available on the web. The number of decimal places in co-ordinates such as latitude and longitude should be specified by the ASC depending on the accuracy required for the performance concerned. (AL9)

7.3.1.2 Time and speed. There is no mention of the accurate time that is an integral part of a recorded GPS fix, now in common use for timing in air sports that use GPS recorders. Also, speed is not mentioned at all and is fundamental to most air sports. So that the GS reflects what is already happening, the following revision is proposed:

"7.3.1.2 Measurement of time may be by clocks, chronometers, the accurate time that is part of a recorded GNSS fix, or other time recording equipment approved by the relevant FAI Air Sport Commission. Calculation of speed shall be by dividing the appropriate distance by elapsed time, distance being obtained from Latitudes and Longitudes (7.1) or other geographic reference system that uses the same Earth model (Geodetic Datum) for co-ordinates of positions for the start and end points of all legs of a course (7.3.1.1). (AL9)"

8.1.2 Sporting Licences. In a recent world record, there was uncertainty over the status of crew members in a multi-seater and in particular, who was pilot-in-command. The following is suggested and is understood to reflect FAI policy. It also avoids the gender that is in the present wording:

"8.1.2 HOLDER'S RESPONSIBILITY. The sporting licence shall be signed by the holder. In doing so, the holder certifies knowledge and understanding of the relevant sections of the FAI Sporting Code and agrees to abide by their provisions. Only holders of a valid FAI Sporting Licence as defined in 8.1.5 are permitted to be competitors in FAI sporting events or to have records validated by FAI as pilot-in-command (or equivalent). In the case of multi-crew performances, the pilot-in-command (or equivalent) must be named. For other crew members, FAI record lists will only name individuals who hold a valid Sporting Licence at the time of the performance concerned. (AL9)"

ANNEX A TO THE GS

This annex is advisory and is published as a guide. It is also so that existing Air Sport Commissions can take note of what is done in some other air sports and also the application of relatively new technologies such as GPS. The following are suggested:

A7.3. Free (undeclared) flights. This type of flight is in use in gliding and maybe in other Air Sports. It is proposed that an example should be in Annex A so that other sports can consider it. It is suggested that this is one of the useful functions of Annex A. The following addition is proposed:

"A7.3 Free Course. A course selected by the pilot after flight for the purpose of submitting a claim. No pre-flight declaration is required. Where such "free flights" are allowed by the relevant ASC, this enables a pilot while in flight to exploit the weather and other conditions to maximise the Performance that can be claimed. (AL9)"

A8.4.1 Start Lines. Using GNSS evidence instead of human Observation, the exact time and place of crossing can be measured very accurately. Start lines longer than 1 km are already used in several air sports. The following re-draft is suggested:

> A8.4.1 Crossing a Start Line. A start line is crossed when the nose of the aircraft cuts the line. Time measurement is from the precise time of crossing. For start lines up to 1 km in length, distance measurement is from the centre point of the start line. For start lines longer than 1 km, distance meansurement is from the exact point of crossing the line such as by the use of evidence from a GNSS recorder". (AL9)

A12.4 Finish Lines. As for A8.4.1, to allow for GPS finishes:

> A12.4.1 Crossing a Finish Line. A finish line is crossed when the nose of the aircraft cuts the line unassisted by any force external to the aircraft. Time measurement is from the precise time of crossing. For finish lines up to 1 km in length, distance measurement is from the centre point of the finish line. For finish lines longer than 1 km, distance meansurement is from the exact point of crossing the line such as by the use of evidence from a GNSS recorder". (AL9)

A13.1 Observation Zones. There is a need to allow for the circular zones that are used with GPS evidence in some air sports such as gliding and hang gliding. Add the appropriate words and a diagram:

> A13.1 Turn Point. For a Turn Point, the Observation Zone may be based on a 90° quadrant on the ground with its apex at the exact Point and orientated symmetrically to and remote from the two legs of the course at the Turning Point. A circular Observation Zone may also be used, centred on the Point, of a radius decided by the ASC concerned. In this case, the leg distances that can be claimed to and from that Point shall be the distance to or from the Point minus the Observation Zone radius. (AL9)"

GLOSSARY

Para headed "Other Documents", between Numerical and Alphabetical, add reference to a Spherical Earth Model. This is a factual correction. To read:

Other Documents Available

In addition to the sections of the Sporting Code (table, para 1.4), other Documents are available from FAI on request: FAI Distance Calculations for a Spherical Earth Model (Ex GS Annex B). (AL9)

FAI Sphere. Add at the beginning "This is an approximation, the WGS84 Ellipsoid is a more accurate earth model (GS7.3.1.1)." Also, the end to read: "A short paper titled "FAI Distance Calculations for a Spherical Earth Model" giving the appropriate formulas and methodology, is available on the FAI web site. In addition, a small PC-based distance calculation program is available on the FAI web site. (AL9)"

Add Galileo: Galileo - The future European GNSS system, equivalent to the Russian GLONASS and the US GPS satellite navigation systems. (AL9)

GNSS, add Galileo To read: GNSS - Global Navigation Satellite System. A Generic term for all systems such as the European Galileo, Russian GLONASS and US GPS systems. (AL9)

Add Good Standing, a term often used in FAI documents but not currently defined: Good standing - An FAI member (NAC) in good standing is one that has fulfilled its obligations to FAI. Obligations are listed in FAI Statute 2.4.2.2. (AL9)

The term "Waypoint" is used in Gliding and maybe in other airsports. Add: WP, Waypoint. A generic term for either a start, turn, control or finish point claimed as part of a flight performance. (AL9)

EDITORIAL ITEMS

These are relatively minor changes of wording with no policy implications. The aim is to improve clarity and use better wording than at present.

3.2.1 Terminology. For consistency with the rest of the para, the last word should be changed from "applicants" to "entrants".

4.2.4.2 Witnesses. In line 2, replace "of" by "or" (factual correction). Also, the first sentence is very long. It would read better by inserting a full-stop after "competence it is.", and continuing: "Such witnesses should be asked to give their names, addresses and other contact details and to state in writing the information required by the relevant section of the Sporting Code."

4.3.2.2, Representative Jury. Change "governing" to "relevant to" to remove any ambiguity between the role of the organisers, NAC and ASC. Also, change "pertinent" to "relevant" for consistency with the other paras in the GS.

4.3.2.4. Jury President. The last two sentences are not about the President and should be transferred to the end of 4.3.2.1. Also, the last words to read: " ... that entry fees be returned, partially returned, or not returned." Reason, clarification.

4.3.2.5. Jury Members. First sentence after "Codes", add "(General Section and the relevant Specialist Section(s))", reason, clarification. Second sentence to end: " .. from FAI, if its procedures are relevant to the ASC concerned.", reason, better English.

4.3.2.6.2. Recording of Jury Evidence. In line 2, add the word "Jury" before "President". Reason, clarification, there are several other President positions in FAI.

4.3.3.1. Terminology. The last words should read: "in the relevant section of the Sporting Code." Reason: same terminology as in 4.3.2.

4.3.4.1.1. Terminology. In the second sentence, delete the word "Technical". Reason: If we are to use the term "Technical Official", it should be defined. The word "Technical" does not seem to be necessary.

7.3.1.1. Distances on the earth's surface. Change the last words in this para to read: " ... is available through the FAI web site." Reason, factual correction. This is not needed if the main proposal about 7.3.1.1 above is agreed.

10.1. Amendments. Better wording: "The General Section is maintained and amended by the FAI Air Sport General Commission (CASI). Each of the numbered Sections of the Sporting Code (1.4) is maintained and amended by the appropriate FAI Air Sport Commission."
