SSA SPORTING CODE SUMMARY

Valid Through 1 October 2010

Chapter 1, GENERAL RULES and DEFINITIONS

1.1.1 **OFFICIAL OBSERVER ("OO")**: The person having control of an FAI badge or record attempt and of the data gathered to prove the SOARING PERFORMANCE.

1.1.2 **DECLARATION**: The official pre-flight data and description of a SOARING PERFORMANCE (details in 4.2).

1.1.3 **GNSS / GPS**: A navigation system using multiple satellites operating with receivers to create position data.

1.1.4 **FLIGHT RECORDER ("FR")**: An electronic device that has been approved by the IGC to record GPS flight data.

1.1.5 **GPS POSITION RECORDER**: A GPS device that can record time and horizontal position. (See the Appendix to Chapter 4)

1.1.6 **BAROGRAPH**: A recording barometer incorporated into an FR or a stand-alone mechanical or electronic device.

1.1.8 **MEANS OF PROPULSION ("MoP") RECORDER**: A device that records noise level or other data indicating MoP use; failure must register as MoP use or as data with a numeric value of 000.

1.2.2 **WAY POINT**: A Start, Turn or Finish point precisely specified by a word description and/or a set of coordinates.

1.2.3 **LEG**: The straight line between two successive WAY POINTS. The claimed length of a LEG may be reduced as given in 1.3.9.

1.2.4 **COURSE**: All the LEGS of a SOARING PERFORMANCE. A CLOSED COURSE has START and FINISH at the same WAY POINT.

1.2.5 **OBSERVATION ZONE ("OZ")**: The airspace entered to attain a WAY POINT. A CYLINDER (1.3.6) is used for TURN POINTS only; a SECTOR (1.3.8), may be used for all WAY POINTS. A START LINE or FINISH LINE has no OZ.

1.2.6 **RELEASE POINT**: The point on the ground vertically below where the glider releases or ceases using a MoP.

1.2.8 **START POINT**: The WAY POINT that marks the beginning of a SOARING PERFORMANCE at either:

a. the RELEASE POINT,
b. a declared START POINT,
c. the midpoint of a START line, or
d. for free records: a FIX chosen post-flight as a START POINT

1.2.9 **START LINE**: A line 1 km in length, centered on the START POINT and perpendicular to the first LEG.

1.2.10 **TURN POINT**: A way point between 2 legs of a flight

1.2.11 **FINISH POINT**: The WAY POINT that marks the end of a SOARING PERFORMANCE at either:

a. the landing, where the nose of the glider comes to rest without external assistance, or
b. a declared FINISH POINT, or
c. the midpoint of a FINISH line, or
d. a FIX selected post-flight as a FINISH POINT, or established by starting a MoP.

1.2.12 **FINISH LINE**: A line 1 km in length, centered on the FINISH POINT and oriented perpendicular to the last LEG.

1.2.13 **GOAL FLIGHT**: A SOARING PERFORMANCE that requires a declared START and FINISH POINT. (1.4.4 and 1.4.6 refer.)

1.3.1 **START TIME & ALTITUDE**: The time and altitude (msl) at which the SOARING PERFORMANCE begins, both determined by the type of performance and the START POINT claimed:

a. When a declared START POINT is not required for a given performance, START TIME and ALTITUDE may be taken at the RELEASE POINT or, for a free distance performance, at a FIX selected post-flight as the START POINT.
b. When a declared START POINT is claimed for a distance performance, START TIME and ALTITUDE may be taken at:
(i) the exit from the START OZ SECTOR,
(ii) the crossing of a START LINE, or
(iii) the most favourable FIX in the START OZ SECTOR.

NOTE: SECTOR radius for GOAL & CLOSED COURSES is 1000m.

c. For speed performances, a declared START / FINISH POINT is required; START TIME and ALTITUDE must be taken at an exit from the START OZ SECTOR with a 1000 metre radius or on crossing a START LINE.

1.3.2 **FINISH TIME & ALTITUDE**: The time and altitude (msl) at which a SOARING PERFORMANCE ends, both determined by the type of performance and the FINISH POINT claimed:

a. For a finish at landing (1.2.11a), FINISH TIME is the time of landing, FINISH ALTITUDE is landing site elevation msl.
b. For an airborne finish at a declared FINISH POINT, FINISH TIME and ALTITUDE may be taken at:
(i) the glider's entry into the FINISH OZ SECTOR,
(ii) the crossing of a FINISH LINE, or
(iii) a FIX within the FINISH OZ SECTOR.

NOTE: SECTOR radius for GOAL & CLOSED COURSES is 1000m.

c. When a declared FINISH POINT is not claimed, FINISH TIME and ALTITUDE may be taken at landing, starting of the MoP, or any FIX selected as the FINISH POINT.

See Paragraph A.7 to the Chapter 4 Appendix for start and finish altitudes and times when a GPS position recorder is used.

1.3.3 **DURATION**: The elapsed time from START to FINISH.

1.3.4 **LOSS OF HEIGHT**: START ALTITUDE less FINISH ALTITUDE (See 4.3.3 for penalties)

1.3.5 **GAIN OF HEIGHT**: The greatest altitude difference between a recorded high point and a previous low point at or after release.

1.3.6 **CYLINDER OZ**: The airspace within a vertical cylinder of 500 metres radius centred on a TURN POINT.

1.3.7 **OZ CORRECTION**: Each time a LEG crosses a CYLINDER OZ boundary, 500 metres shall be subtracted from the length of that LEG. This correction does not apply where a FIX is used as a WAY POINT in free record performances.

1.3.8 **SECTOR OZ**: The airspace above a quadrant having its apex at the WAY POINT. Except as limited by 1.3.1 and 1.3.2 for GOAL and CLOSED COURSE flights, the radius of the OZ is unlimited; its orientation is:

a. For a **TURN POINT**, symmetrical to and remote from the bisector of the inbound and outbound LEGS,
b. For a **START POINT**, symmetrical to and remote from the outbound LEG,
c. For a **FINISH POINT**, symmetrical to and remote from the inbound LEG.

1.3.9 **OFFICIAL DISTANCE**: The sum of the LEGS, less OZ CORRECTION and LOSS OF HEIGHT penalties. This distance is to be used in any calculation of COURSE speed.

1.4.1 **Soaring Performance Types & Requirements - General**

a. A SOARING PERFORMANCE may be claimed for any flight that meets the requirements of proof for that performance.
b. A DECLARATION and electronic flight data are required except where specifically exempt (4.2 refers).
c. WAY POINTS must be declared & used in that sequence, except where specifically not required in these rules.
d. No more than three TURN POINTS may be declared and no more than four LEGS may be claimed.

1.4.3 **STRAIGHT DISTANCE (for badges only)**: A COURSE having one LEG, with distance measured from the RELEASE POINT or a declared START POINT to any type of FINISH POINT. If no WAY POINTS are declared, data recording by a stand-alone barograph is sufficient.

1.4.4 **DISTANCE TO A GOAL (for records only)**: A COURSE having one LEG, with OFFICIAL DISTANCE measured from a declared START POINT to a declared FINISH POINT. The OZ radius at each of these WAY POINTS is 1000 metres.

1.4.5 **DISTANCE USING UP TO 3 TURN POINTS (for badges and records)**: A COURSE with distance measured from the RELEASE POINT or a declared START POINT to any type of FINISH POINT, via at least one and not more than three declared TURN POINTS. TURN POINTS may include the START POINT and/or FINISH POINT if desired. The TURN POINTS must be at least 10 kilometres apart, and each may be claimed only once in the sequence attained.

1.4.6 **CLOSED COURSES (for badges and records):** One of following must be used for speed records and Diamond Goal flights. All WAY POINTS must be declared, and the OZ SECTOR radius at the START and FINISH is 1000 metres.

a. OUT & RETURN FLIGHT: A CLOSED COURSE with two LEGS.
b. TRIANGLE FLIGHT: A CLOSED COURSE with three LEGS. The geometry may be either:

(i) A triangle having two TURN POINTS, or

(ii) A triangle having three TURN POINTS independent of the position of the START/FINISH POINT. Distance is given by the sum of the LEGS of the triangle formed by the TURN POINTS. The minimum OFFICIAL DISTANCE (1.3.9) is 300 kilometres.

For triangle records of 750 km or more, the length of each LEG shall be 25% to 45% of OFFICIAL DISTANCE. For shorter records, no LEG may be less than 28% of OFFICIAL DISTANCE.

1.4.7 **FREE DISTANCE PERFORMANCES (for records only)**
Free distance WAY POINTS may be selected from FIXES claimed post-flight. The free distance record types are:

a. FREE STRAIGHT DISTANCE: A COURSE having one LEG.
b. FREE DISTANCE USING UP TO THREE TURN POINTS: A COURSE via at least one, and not more than three TURN POINTS. TURN POINTS may include the START POINT and/or FINISH POINT if desired. TURN POINTS must be at least 10 km apart and each may be claimed only once.

1.4.8 **FREE DISTANCE CLOSED COURSES (for records only)**
The START POINT is a FIX chosen by the pilot to suit the record being claimed. This location also marks the apex of a 1000 metre radius FINISH OZ SECTOR the pilot must enter to complete the course. The free distance closed course record types are:

a. **FREE OUT & RETURN**: A CLOSED COURSE with two LEGS.
b. **FREE TRIANGLE**: A CLOSED COURSE having three LEGS. The restrictions on triangle geometry given in 1.4.6b apply. The pilot may fly either:

(i) A triangle using two TURN POINTS, or

(ii) A triangle using three TURN POINTS independent of the position of the START/FINISH POINT. In this case, the triangle distance is given by the sum of the LEGS of the triangle formed by the TURN POINTS.

Chapter 2, FAI BADGE REQUIREMENTS

2.0.1 The pilot must be alone in the glider, and the OO must certify that this was the case.

2.0.2 Each NAC should keep a register of badge flights validated.

2.0.3 In addition to the use of IGC-approved FRs, position for the Silver and Gold badges may be verified with NAC-approved GPS position recorders for flights made within that NAC's area of authority. See Appendix, Chapter 4.

2.1.1 The Silver badge requires:

a. a straight distance flight of at least 50 km or any leg of 50 km or more in a longer pre-declared course, subject to loss of height over the whole course flown.
b. a DURATION flight of at least 5 hours.
c. an ALTITUDE GAIN of at least 1000 meters.

Silver Distance should be flown without assistance given over the radio, except as required for Air Traffic Control

2.1.2 The Gold badge requires:

a. a DISTANCE flight of at least 300 km
b. a DURATION flight of at least 5 hours,
c. an ALTITUDE GAIN of at least 3000 meters.

2.1.3 Diamonds may be earned individually for:

a. a DISTANCE flight of at least 500 km.
b. DIAMOND GOAL flight of at least 300 km over an out-and-return or triangular course (See 1.4.6a & b)
c. an ALTITUDE GAIN of at least 5000 meters.

2.1.4 Diplomas for flights of 750 km and more, achieved for flights of 750 km and longer, in increments of 250 kilometres (ie. 750 km, 1000 km, 1250 km, etc.). One badge is awarded per flight, for the incremental distance immediately less than the distance flown.

Chapter 3: WORLD GLIDING RECORDS

See SC3 at http://www.fai.org/igc-documents

~~Chapter 4: VERIFICATION REQUIREMENTS~~

4.2 DECLARATION REQUIREMENTS: A completed pre-flight declaration is required for all badge and record flights *except those recorded by barograph alone*. The most recent declaration is the valid one. (See Annex C para 6.3 on IGC file format.)

a. **For (World) record flights**, the declaration must be recorded in an .igc file from an FR. Items 4.2.1 a - d are required; 4.2.1e is not required for gain of height, absolute altitude, or any free distance record flight.

b. **For badge flights**, the declaration must include items 4.2.1 a - d and may be recorded in an .igc file from an FR or written on a single sheet of paper; 4.2.1e is not required for gain of height, duration, or straight distance claimed from release to landing or a finish fix. 4.2.1 f & g are required for written declarations, to be retained by the OO and submitted with claim materials.

c. Where more than one FR is used, they must have identical flight task data input, and if one fails, the other becomes the direct replacement.

NOTE: Consult the FR manufacturer's user manual to determine which method a particular FR uses to record declaration date and time. Date and time for a written declaration are as specified by the OO when signing the document.

4.2.1 Declaration content

a. Date of flight.
b. Name of the pilot-in-command, and the flight crew if any (see Annex C, para 6.3c).
c. Glider type, and its registration or serial number or unique NAC-assigned contest number.
d. The make, model and serial number of the FR used (as recorded in the .igc file for the flight). For any barograph or GPS position recorder used, the make, model and serial number as verified by the OO before flight.

Additional content for distance and speed flights:

e. Way points; for a closed course, the sequence to be flown.

Additional content in written declarations

f. Pilot-in-command signature.
g. Official Observer signature, with date and time.

4.2.2 Declaration analysis

a. When any way point is declared using a word description, abbreviation or code and coordinates, the coordinates are definitive. When a word description, abbreviation or code alone is used to declare any way point, its coordinates must be taken from a published source designated by the NAC.

b. When more than one FR is carried on the flight, data files from each FR must be submitted (4.5.6e refers). A difference in the declaration among FRs carried could be grounds for refusal to accept any claim from that flight.

4.3.1 Flight data recording and sampling rate: Barograph pressure data must be recorded throughout the flight, with the exceptions allowed in 4.3.2. The flight data must indisputably verify flight continuity and all altitudes critical to the soaring performance. When data is recorded at intervals, the data sampling rate setting must be no slower than once per minute.

4.3.2 Flight continuity: There must be evidence the glider did not land and no MoP was used during the claimed performance. An interruption in barograph-recorded data will not compromise flight continuity provided the OO and NAC are convinced no critical data is missing and flight continuity remains indisputable. In the event of failure of the pressure altitude recording by a FR or by a barograph used in conjunction with a GPS position recorder, evidence of flight continuity may be assessed from a time plot of GPS calculated altitudes.

The five-hour duration flight does not require a barogram to prove flight continuity if the flight is made under the continual attention of an OO.

4.3.3 Landing data: The evidence of the actual landing must be by one or more of the following:

a. By recorded GPS position data that is independently confirmed (4.5.6b refers).
b. By an OO arriving soon after the event and there is no doubt about the position of landing.
c. By two witnesses (5.2.3d refers).

4.4.1 Calculations for distance and speed
SSA uses the FAI Distance Calculator online at:
http://www.ssa.org/members/badgesandrecords/greatcirclecalc.asp
Set WGS 84 datum and compute in kilometers.

4.4.3 Limits to the loss of height

a. *For distance flights of more than 100 kilometres*, where the loss of height exceeds 1000 metres, a height penalty equal to 100 times the excess over 1000 metres loss of height shall be subtracted from the length of the course to give the official distance.

b. *For distance flights of 100 kilometres or less*, a loss of height exceeding 1% of the length of the course will invalidate the soaring performance.

c. *For speed and duration flights*, a loss of height exceeding 1000 metres will invalidate the soaring performance.

4.4.4 Barograph calibration time limits: The recording barometer functions of both flight recorders and stand-alone barographs must be calibrated as follows:

a. PRIOR TO FLIGHT Calibration is required within 12 months prior to the flight or, for IGC-approved electronic barographs and FRs, 24 months.

b. AFTER FLIGHT Calibration is required within one month after the flight or, for IGCapproved electronic barographs and FRs, two months.

For altitude records, both (a) AND (b) above are required, and the less favourable shall be used for record calculations. Either (a) OR (b) is required for all other records and badges.

4.5.1 Time evidence: GPS time data is used when substantiated by independent evidence confirming take off and landing times and locations. When a stand-alone barograph is used to record altitude and relative times, pertinent time evidence must be determined by an OO based on his or her observations and reconciled with barograph data. The time at which a glider crosses the boundary of a start or finish OZ is determined by linear interpolation between the last fix before crossing and the first fix after crossing.

4.5.2 Position evidence: For records, and badge flights at Diamond or higher level, position data shall be recorded by a flight recorder. For badge flights, position data for a Silver or Gold badge distance flight may also be recorded by a GPS position recorder. Confirmation of position at specific locations is done by the following:

a. **POINT OF RELEASE** Point of release shall be taken from FR data or, when a GPS position recorder is used for a badge flight, release position shall be reconciled with the "notch" recorded by a stand-alone barograph (the appendix to this chapter refers). If a notch is not evident, the release position may be estimated by the OO or the person who served as the tow pilot or ground launch operator for the flight.

b. **WAY POINTS:** GPS evidence must show indisputable proof that the glider crossed a start or finish line, a fix was recorded either exactly on the way point coordinates or within its OZ, or a straight line drawn between two consecutive valid fixes crosses the OZ boundary.

4.5.3 Altitude evidence: Except as provided in paragraph 4.3.2 regarding continuity of flight, in-flight altitudes are calculated from pressure data recorded by an FR, or a stand-alone electronic or mechanical barograph as given in the Appendix to this chapter and SC3 Annex C. The altitudes at which a glider crosses a start or finish line or the boundary of a start or finish OZ are determined by linear interpolation between the altitudes at the last fix before crossing and the first fix after crossing.

4.5.4 Means of propulsion evidence and MoP recorder procedures: The OO must certify the means used to determine the MoP recorder functioned correctly.

a. An MoP recorder incorporated within an FR is required for record attempts and the OO must complete Record Form D.

b. When a MoP recorder that is not incorporated within an FR is used for badge flights, the device must be installed in the aircraft out of the pilot's reach and a seal shall be applied to the MoP in such a way that the generation of forward thrust by the MoP will break the seal.

4.5.5 Stand-alone barograph procedures (Appendix to this Chapter refers): When a stand-alone barograph is the only means of data recording or is carried to supplement separately-recorded GPS position data, the following procedures shall be used:

a. **BEFORE FLIGHT** For mechanical barographs, the OO shall make an identification mark on the barogram paper or foil. For any barograph, the OO seals the barograph and supervises its installation in the aircraft, out of the pilot's reach and free of any cable or mechanism that could alter or adversely affect accurate data recording.

b. **TAKE OFF and LANDING** The OO shall ensure there is evidence of the times and locations of take off and landing, either by witnessing these events or consulting other witnesses and/ or soaring site flight logs.

c. **DURING FLIGHT** As soon as possible after release, the pilot should establish a low point and make a steep turn so the barogram and position data (if any) clearly indicates the release point. Any marking of a barogram during flight shall be done by remote control, not by direct access to the barograph.

d. **AFTER FLIGHT** For mechanical barographs, the OO shall take control of the barograph and ensure its seal is secure, and confirm that the barogram has the identification mark that was placed on it prior to take off. The information required in 5.3.3b to 3i shall then be added to the barogram. For electronic barographs, an OO must either supervise the transfer or printing of the barographic data while the instrument is in the glider, or supervise its removal from the glider and take charge of it until the flight data is downloaded or printed, then make note of the date and time the flight data was downloaded or printed.

e. **DATA ANALYSIS** An OO shall determine if the barograph-recorded altitude data confirms relevant aspects of the claimed performance, considering events witnessed or verified by the OO. Where used to supplement GPS position recorder data, its satellite derived altitude data must compare favorably overall to barograph-recorded pressure altitude data.

4.5.6 GPS recording procedures: IGC FR approval is discussed in Annex B Chapter 1. The Appendix to this Chapter outlines the minimum standards for NAC approval of GPS position recorders. The OO shall be familiar with the applicable terms of approval, and:

a. **BEFORE FLIGHT** The OO shall verify the installation, set-up, and sealing of each recorder used. When a GPS position recorder is used, a written declaration is required.

b. **TAKE OFF and LANDING** An OO shall use evidence independent of the GPS recorder(s) to confirm the times and points of take off and landing, pilot name(s), glider type and registration, and the make, model, and serial number of each GPS recorder used.

c. **DURING FLIGHT** As soon as possible after release, the pilot should make a steep turn so that the GPS data clearly indicate the release point and altitude. Any pilot inputs into any GPS recorder must be confined to functions not critical to the validation of the flight, such as entering a pilot event marker or changing the sampling rate in flight.

d. **AFTER FLIGHT**, the OO shall check any seals applied to each GPS recorder before flight, perform or supervise the transfer of flight data from each device, and perform a security check on each resulting data file using the appropriate validation program. The OO shall review the flight data, and if it is to be sent to another person for complete analysis, the following shall be forwarded:

(i) The original data on the memory device (the first copy) storing the flight data for each GPS recording device. This must include the data file in .igc format, and the file in its original format (if different) as transferred from each device immediately after landing.

(ii) The appropriate claim form(s), including OO's evidence that manually recorded times and exact locations correspond to the equivalent recorded data.

e. **DATA ANALYSIS** shall be performed by a person approved by the NAC. The analyst shall ensure that the appropriate evidence is present to verify the soaring performance. For free record claims, the achieved way points shall be determined from the FR evidence and specified in the record claim. Analysis guidance is in Annex C.

Chapter 5 OFFICIAL OBSERVERS & FLIGHT CERTIFICATION

Per SC3 5.1, SSA requires that OOs be familiar with Sporting Code rules and provisions. An OO must be –

- an SSA "B Badge" holder or
- the holder of any FAI badge leg, or
- airport manager at the take off or landing site;

For World Records, the OO must be specifically appointed by SSA

5.2.2 Official Observer presence at the event: OOs may certify actions such as sealing and breaking seals, installation and removal of equipment, take off, timing at start and finish, landing, etc. if they were present at the action for which certification is required, or are able to satisfy themselves with evidence from witnesses or other reliable sources.

5.2.3 Certification by non-OOs:

a. Certification of actions by people other than OOs must be countersigned by an OO after verifying the statements.

b. Air traffic controllers on duty may certify observations of take off, turn and control points and landing time.

c. Tow pilots or the person supervising another type of launch may certify the point of release from launch.

d. Two independent witnesses may certify an outlanding. They shall provide their names and addresses and, if possible, other contact information such as telephone numbers and/or e-mail addresses.

5.3.1 CERTIFICATES - General

All certifications must clearly relate to the flight and include the date of the certification, the signature of the person providing the certification and, where applicable, the OO's signature.

5.3.2 Certificates

a. **PILOT CERTIFICATION OF REGULATORY COMPLIANCE:** The pilot must certify that the soaring performance was conducted in accordance with the FAI Sporting Code, was flown in compliance with all the glider manufacturer's and national operating limitations, and in accordance with national flight regulations respecting airspace use, night flight, etc. (For records, this certification is on the IGC Record Forms A, B, and C.)

b. **BAROGRAPH CALIBRATION CERTIFICATE:** The barograph calibration certificate shall include:

(i) Type, serial number, and altitude range of barograph
(i) Date of calibration
(iii) Calibration trace, graph or table
(iv) Date, name & signature of calibration laboratory official

c. **LANDING CERTIFICATE**: A landing certificate shall state precisely the location and time of landing and be signed by an OO, if present soon after the landing, or by two witnesses who shall give their names and addresses.

5.3.3 Barograms: Except as permitted for flight recorders and electronic barographs (see 4.5.5 and 4.5.6), a barogram shall have the following information clearly registered on it:

a. Identification mark of OO before take off
b. For altitude and gain of height records, ground level pressure (QFE) at time of take off
c. Date of flight
d. Name of pilot
e. Type, serial number and altitude range of barograph
f. Type and registration of glider
g. Altitude of release (or MoP stop for motor gliders)
h. Proof of no intermediate landing
i. Date and signature of OO after landing

Additionally, if the barograph also provides motorglide MoP recording:

j. MoP was stopped prior to leaving the start point
k. MoP was not used between start and finish points

This summary containsSC3 wording edited for clarity and brevity; seek clarification as needed in the following RELATED REFERENCES ONLINE

Available at: http://www.fai.org/igc-documents

. SPORTING CODE GENERAL SECTION; 53 pages

. SPORTING CODE SECTION 3, complete; 32 pages

. SC3 ANNEX C, OO & PILOT GUIDE; 40 pages

. SC3 ANNEX B, Technical Specs for Equipment used in the Validation of Flights; 31 pages

. SC3 ANNEX A, Int'l & Cont'l Competition; 50 pages

. World Record Forms: (4 pages each, unless noted)

Form A (Altitude)
Form B (Distance)
Form C (Speed)
Form D for Motorgliders (1 page)

. Flight Recorder Technical Specs; 74 pages

. Flight Recorder IGC Approval Documents

Available at http://www.ssa.org , via "Soaring Achievement", "Info & Resources" and/or "Forms" Links:

Badge & Record FAQ

SSA Guide to Badge & Record Procedures

FAI World Distance Calcultor

SSA Badge & Record Worksheet

State & US National Record Rules

SSA Award Program Rules

SSA Award Application

Questions?

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As of 1 September 2009, neither SSA nor any other country's National Airsport Control ("NAC") organization for soaring has approved a GPS Position Recorder for use on Silver and Gold Badge flights; many or most provisions & requirements in SC3 Chapters 1 through 5 and the following Appendix apply to any such devices approved in the US or elsewhere in the future.

CHAPTER 4 APPENDIX
The use of GPS position recorders for Silver and Gold badge flights

A-1 General Many Global Positioning System devices can record the coordinates of their position at intervals. If this data can be downloaded in the same format as an .igc file, NACs may allow suitable GPS position recorders to be used to validate the horizontal position of the glider for Silver or Gold badges ONLY. Altitude data must be produced from a separate record of pressure altitude throughout the flight, to normal IGC standards (see A-7 below). This Appendix may duplicate some rules within Chapters 1 and 4, but only covers GPS units that are not IGC-approved flight recorders (FRs), and their use for Silver or Gold badges.

Each NAC is to determine the specific types of GPS position recorders approved for use within their jurisdiction and to maintain a current list of them. A copy of the operating manual for each model together with any additional procedures needed to comply with this Appendix must be sent to the chairman of the IGC GFA Committee, who will comment if necessary on whether an individual NAC's proposal does comply. The GFAC will maintain a list of all NAC-approved units and their operating procedures and make it available on the IGC GNSS web pages. Further guidance is given in Annex C, para 6.1.

A-2 Earth Model The GPS position recorders must use the WGS 84 Earth Model and it must not be possible to change this during flight.

A-3 Averaging and predicted positions Any GPS position recorder that can produce fixes both derived from real time satellite lines of position and estimated fixes produced through averaging or predicting based on past fixes is acceptable only if the estimation functions are disabled. The OO must supervise the disabling process or verify that it was completed before flight and certify that this was done.

A-4 Frequency of fixes Fix frequency must be at least once per minute.

A-5 Declaration A written declaration including all appropriate items listed in 4.2.1 is the only acceptable form.

A-6 Downloading and verification Downloaded data from the GPS position recorder must be converted as closely as possible to the .igc format. Any download and conversion program must be approved by the NAC and include a validation system that will identify any changes to the .igc format file made after the initial download.

A-7 Altitude Evidence must be provided by a pressure altitude record that conforms to IGC rules and procedures for barographs (these include electronic pressure altitude recorders), and include calibration to the ICAO Standard Atmosphere (SC3 Annex C, Appendix 5). The profile of GPS-derived altitudes from a GPS position recorder must correspond to the profile of the pressure altitude record, but GPS altitude may only be used to prove continuity of flight. Where altitude measurement is required, pressure altitude is used in the normal way.

A-8 Presence of GPS position recorder in the glider. There must be incontrovertible proof, independent of the recorded data, that the recorder was in the glider flown by the pilot claiming the soaring performance.

A-9 Before flight The OO must ensure the GPS position recorder is installed, configured, or sealed in such a way that switches and buttons that could affect the downloaded flight data or allow connection to devices that could alter the data, cannot be used.

A-10 Takeoff and landing The OO must ensure that there is evidence of the position and time of take off and landing. This evidence must be independent of the data produced by the recorder.

A-11 After flight As soon as possible the OO shall check any seals applied before the flight, supervise the download of data from the GPS position recorder and perform a preliminary analysis of the flight claim. Both the .igc format data file and any other data file (if applicable) from the recorder shall then be sent, using NAC-specified methods, to a NAC-approved person to analyse the data.

A-12 Analysis The analysis of the data must be done in the same manner as the data from an IGC-approved FR, including the validation process. See A-7 regarding altitude.