INTERNATIONAL GLIDING COMMISSION (IGC) - PROPOSAL FORM

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Proposal to the 2024 IGC Plenary

Date: 28-12-2023

Proposal submitted by: IGC

Title: Change of Earth Model for scoring

Type: Year-1 proposal

Type the text changes in the space below *(show deletions as ~~strike-through~~ and additions as* **bold underlined***):*

Change the Earth Model used in Scoring IGC Sanctioned Competitions from the FAI Sphere to the WGS84 Ellipsoid used on all other sections of the Sporting Code SC3 by amending the first line of the Table in SC3 Annex A page 5, Preliminary Remarks (f)

Earth Model	The Earth Model to be used for all calculations specified in this Annex shall be ~~a sphere of radius 6371.0 kilometers.~~ **the WGS84 Ellipsoid with an Equatorial radius of 6378,137.0 metres and a Polar radius of 6356,752.3142 metres.**

Type the reasons in the space below:

The position information supplied by GNSS systems (principally GPS) is based on coordinates on the WGS84 Ellipsoid. This Earth Model is used in all other sections of the Sporting Code SC3 D (Gliders and Motor Gliders). It is also used by the main suppliers of in-cockpit navigation devices for pilots to check compliance with the Sporting Code, since it presents accurate locations, geodesic lines and distances between points. SC3 Annex A currently uses the obsolete FAI Sphere of constant radius, which introduces inaccuracies in areas used for IGC Competitions where the earth radius is significantly different; for example, Mafeking (25 degrees S, radius 6374 Km) and Rayskala (60 degrees N, radius 6361 Km). The errors are measurable, particularly for long geodesic lines such as Assigned Area Task (AAT) Area Boundaries on a radial from a waypoint, or airspace boundaries and also the boundaries of AAT circular areas.

The suppliers of software approved for scoring IGC Sanctioned Competitions (Naviter) inform GFAC that calculations can be carried out with equal accuracy on either a spherical Earth Model or the WGS84 Ellipsoid. While their software is proprietary, the first reference below (C F F Karney, J Geod (2013) 87:43–55) shows algorithms and methods for accurate, robust, and fast calculations of the direct and inverse geodesic problems on an ellipsoid earth model. The second and third show that analytic soloutions are practical on an ellipsoid such as the WWGS84 Earth Model, and describe methods..

It is essential for fairness in scoring that the navigation information used for scoring should be identical to that available in flight to pilots. The proposal is supported by the ANDS committee.

Provide supporting data or reference to external documents for the proposed technical amendments in the space below:

https://link.springer.com/content/pdf/10.1007/s00190-012-0578-z.pdf
https://en.wikipedia.org/wiki/Geodesics_on_an_ellipsoid
https://tinyurl.com/Karney-2011-SRI

The proposal should be applicable from: 1 April 2024
Sporting Code Volume: SC3D Annex A
Version/Edition: 2024
Heading of section: Preliminary Remarks
Number & heading of the paragraph: (f)
Page number(s) if appropriate: Page 5

Continue on the next page(s) if necessary