Recommendation for Committee Decision (WG-D # 22)

Prepared by: Working Group D

Date of Submission: 13 November 2014

Issue Title: ICG support for the UN General Assembly Resolution on the Global Geodetic Reference Frame

Background/Brief Description of the Issue:

Considering

- The importance of geodesy and the global geodetic reference frame for scientific and societal applications;
- The important contribution of GNSS to location-based services in general and to the International Terrestrial Reference Frame in particular;
- The ICG mission and vision;

Discussion/Analyses:

The Committee of Experts of the United Nation Global Geospatial Information Management (UN-GGIM) has established a Working Group on the Global Geodetic Reference Frame (GGRF), tasked to draft (1) a text of a UN General Assembly Resolution, (2) an associated Concept Note, (3) Terms of Reference of the WG, and (4) establish a geodetic roadmap. At its 4th session held in New York in August 2014, the UN-GGIM Committee of Experts has adopted the draft text of the resolution prepared by the WG on GGRF and submitted it to ECOSOC for further referral to the General Assembly of the United Nation for adoption.

Recommendation of Committee Action:

The ICG WG-D recommends that the ICG Providers' Forum consider supporting the approval by the UN-GGIM Committee of Experts of the draft resolution on Global Geodetic Reference Frame for Sustainable Development and its submission to the UN General Assembly.

Recommendation for Committee Decision (WG-D # 23)

Prepared by: Working Group D

Date of Submission: 13 November 2014

Issue Title: Improving the accuracy of multi-GNSS orbits determination by the IGS

Background/Brief Description of the Issue:

Considering

- several global navigation satellite systems (GNSS) exist and that each is continuously expanding and improving,
- the importance of improving the ITRF defining parameters for earth science and positioning applications
- the importance of the GNSS contribution to the ITRF from the IGS,
- the importance of the accuracy of the GNSS orbits determined by the IGS and their impact on the IGS products, and subsequently on the ITRF;
- the necessity of improving the orbit dynamics modelling of GNSS satellites by the IGS

Discussion/Analyses:

The knowledge of GNSS satellite structure, geometry, dimensions, among other satellite data is fundamental to improving orbit modeling and accuracy.

Recommendation of Committee Action:

The ICG WG-D recommends that the GNSS Providers consider the possibility of making available the following list (or a sub-set) of satellite data for better orbit dynamics modeling:

***Primary list**:*

- *Surface geometry and dimensions*
- *Surface optical properties (or material types)*
- *Nominal attitude model*
- *Transmitted power in all signals (and direction if relevant)*
- *Solar panel construction information (thickness, conductivity, power draw)*
- *Position and power output of radiators*
- *Thermal properties of multi-layered insulation*

***More detailed list**:*

- *Structural data/drawings of the satellite, with dimensions (surface only – we don't need the internals)*
- *Optical properties (reflectivity, specularity) of the surface materials*
- *Identification of what is covered in multi-layered insulation (MLI) or 'thermal blankets'*

- *Attitude model of the satellite*
- *Power of all transmitted signals (note we don't need to know anything about function of the signals, only which way they are pointed, and how much power is transmitted)*
- *Construction data of the solar panel (material types, thickness, conductivity, surface properties – reflectivity, specularity, emissivity, power draw from the panel)*

***Other necessary information**:*

- *Centre of mass location*
- *Change of centre of mass over time (manoeuvres)*
- *Location of antenna reference point*
- *Phase centre offset for all frequencies w.r.t. antenna reference point*
- *Phase centre variation as function of azimuth and elevation*
- *Knowledge about the epoch of change of the attitude mode (e.g. for QZSS and BeiDou that switch from Yaw-steering to normal-mode)*
- *Attitude of the satellite as measured/computed on board (i.e. those values used by the attitude control system)*
- *Differential group delays between the different signals (on board of the satellite): can be measured pre-launch*