Explanatory Statement

National Measurement Act 1960 (Cth)

National Measurement (Recognized-Value Standard of Measurement of Position) Determination 2017

Issued by the Authority of the Chief Metrologist, Dr R. Bruce Warrington

Purpose

The National Measurement (Recognized-Value Standard of Measurement of Position) Determination 2017 (the determination) is made by the Chief Metrologist, National Measurement Institute, under subsection 8A(1) of the National Measurement Act 1960 (Cth) (the Act). The determination is a legislative instrument for the purposes of section 5 of the Legislative Instruments Act 2003 (Cth).

The purpose of the determination is to formalise units of measurement through the development and maintenance of standards of measurement, reference materials and reference techniques and to promote uniformity in national measurement policy and practice.

The *Recognized-value standard of measurement of position 2012 (No. 1)* (the 2012 determination), made by the Chief Metrologist, dated 4 April 2012, is repealed in this legislative instrument pursuant to subsection 8A(2) of the Act.

The position of Chief Metrologist is established, and the functions of the Chief Metrologist identified, in section 18A of the Act. Subsection 8A(1) of the Act gives the Chief Metrologist the power to determine that magnitudes of physical quantities specified in the determination and magnitudes of physical quantities as ascertained in accordance with a formula set out in the determination shall be recognized-value standards of measurement.

Subsection 8A(4) of the Act provides that a recognized-value standard of measurement is not subject to verification. This means that the magnitude of the physical quantity of the recognized-value standard is deemed to be that which is determined by the Chief Metrologist. A recognized-value standard of measurement is not determined by reference to, comparison with, or derivation from another standard of measurement.

The determination specifies the magnitudes of physical quantities of the recognized-value standard measurement of position in the Australian Fiducial Network (AFN) as specified in Schedule 1 of the determination.

The Australian Plate is moving in a north-easterly direction at a rate of about 70 millimetres per year. As a result, improvements are required in the way spatial data are managed to support applications that use global navigation satellites systems (GNSS) such as global positioning system (GPS). This is important in applications that rely on accurate satellite data for real-time positioning such as in-vehicle navigation; smartphone location services; automated mining operations; precision agriculture; and surveying.

The purpose of the determination is to align with the most recent realisation of the International Terrestrial Reference Frame (ITRF). The ITRF is realised from space geodesy observations and has been iteratively updated with better estimates of coordinates and velocities of global stations over time. The determination will support surveyors and other users of legally traceable measurements of position by ensuring consistency between the most up-to-date systems and infrastructure and the recognized-value standard of measurement of position.

The costs associated with incorporating the revised values of the AFN positions into the operations of surveyors and other users of precise legally traceable measurement of position are minimal, and form part of the normal cost of maintaining up-to-date capabilities for these stakeholders.

Consultation

The Spatial Information Council, ANZLIC, is the peak government body in Australia and New Zealand responsible for spatial information. ANZLIC was originally established in January 1986 by agreement between the Australian Prime Minister and the heads of the State and Territory governments. The Commonwealth Government and the Australian States and the Territories are represented on ANZLIC. At its July 2015 meeting, ANZLIC unanimously resolved to undertake datum modernisation.

The Intergovernmental Committee on Surveying and Mapping (ICSM) is responsible for the technical elements of modernising Australia's datum. In September 2015, the ICSM formed a dedicated working group to oversee the implementation of the modernisation of the Geocentric Datum of Australia. The GDA Modernisation Implementation Working Group (GMIWG) has government representatives from the Commonwealth, States and Territories who have a broad range of knowledge and experience in the surveying and spatial sciences industry. The group has consulted widely with users and has developed tools and technical resources needed to assist with the datum transition. It has worked to ensure that the practical implementation of the datum occurs seamlessly and with minimal disruption to existing systems and processes.

In response to the work achieved by ICSM and the GMIWG, Geoscience Australia recommended that the 2012 determination be repealed and replaced with an updated determination reflecting the most recent realisation of the ITRF.

Geoscience Australia, as the Commonwealth Government agency with responsibility for developing and maintaining the AFN, were consulted in the development of the determination and support that the updates contained in the determination that formalise the positions in the Australian Fiducial Network (AFN), reflecting the most recent realisation of the ITRF, as developed by ICSM.

Notes on Clauses

Clause 1—Name

This clause provides that the name of the determination is the *National Measurement* (*Recognized-Value Standard of Measurement of Position*) Determination 2017.

Clause 2—Commencement

This clause provides that the determination commences the day after registration.

Clause 3—Authority

This clause provides that the authority for the making of the determination is subsection 8A(1) of the *National Measurement Act 1960* (the Act).

Clause 4—Definitions

This clause provides definitions relevant to the determination. It also identifies terms used in the determination that have the same meaning as in the Act.

The term Reference Ellipsoid means the Geodetic Reference System 1980 (commonly abbreviated to GRS80) which is a geodetic reference system consisting of a global reference ellipsoid and a gravity field model. The Geodetic Reference System 1980 was adopted at the XVII General Assembly of the International Union of Geodesy and Geophysics (IUGG) in Canberra, Australia, 1979. The resolution is freely available at the IUGG website (http://www.iugg.org/resolutions) by reference to Canberra 1979, Resolution 7.

The term Reference Frame means the Geocentric Datum of Australia 2020 (commonly abbreviated to GDA2020) realised by the coordinates of the Australian Fiducial Network (AFN) geodetic stations. The Geocentric Datum of Australia 2020 is the most modern geodetic datum for Australia and is freely available at the Intergovernmental Committee on Surveying and Mapping's website (http://www.icsm.gov.au/gda/tech.html).

The International Terrestrial Reference Frame 2014 (commonly abbreviated to ITRF2014) is maintained by the International Earth Rotation and Reference Systems Service (IERS). The International Terrestrial Reference Frame 2014 is an international spatial reference system co-rotating with the Earth in its diurnal motion in space and can be freely accessed at the IERS website (https://www.iers.org/TN38).

Clause 5—Schedules

This clause is a machinery clause that gives effect to the provisions in the Schedules to the determination.

Clause 6—Recognized-value standards of measurement in the Australian Fiducial Network

This clause specifies the recognized-value standard of measurement of position with reference to the network of geodetic stations in the AFN, as listed in Schedule 1, and in the stated Reference Ellipsoid and Reference Frame.

Clause 7—Calculation of global Cartesian coordinates at an epoch t years

This clause provides the formula to express the Global Cartesian coordinates of the AFN at any epoch *t* (years) within the stated period of validity.

Schedule 1—Recognized-value standards of measurement in the Australian Fiducial Network

Schedule 1 contains the table of coordinates and velocities for the network of geodetic stations in the AFN, together with uncertainties estimated to give a 95% confidence interval.

Schedule 2—Repeals

Item 1 repeals the Recognized-value standard of measurement of position 2012 (No. 1).

STATEMENT OF COMPATIBILITY WITH HUMAN RIGHTS

Prepared in accordance with Part 3 of the Human Rights (Parliamentary Scrutiny) Act 2011

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This Legislative Instrument is compatible with the human rights and freedoms recognised or declared in the international instruments listed in section 3 of the *Human Rights* (*Parliamentary Scrutiny*) Act 2011.

Overview of the Legislative Instrument

The National Measurement (Recognized-Value Standard of Measurement of Position) Determination 2017 supports the national measurement system by formalising the positions in the Australian Fiducial Network (AFN) as specified in Schedule 1 of the determination.

Human rights implications

This Legislative Instrument does not engage any of the applicable rights or freedoms.

Conclusion

This Legislative Instrument is compatible with human rights as it does not raise any human rights issues.

Chief Metrologist, Dr R. Bruce Warrington