

P1.02 | Next Generation Australian & New Zealand Datum

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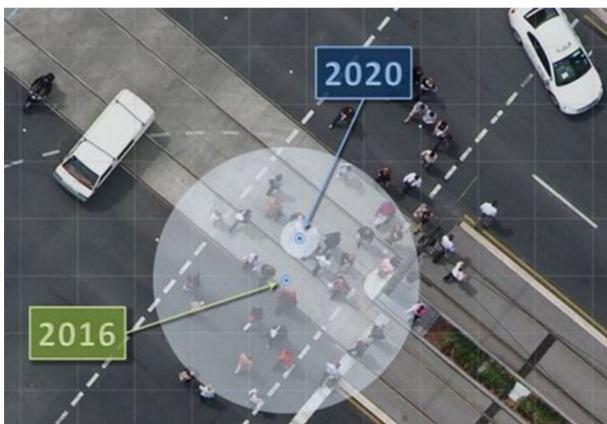
Objectives To develop the theory, concepts, geodetic techniques, tools, guidelines and standards required to implement the next generation geodetic datum underpinning the National Positioning Infrastructure in support of a spatially-enabled Australia and New Zealand.

Outcomes A modernised geodetic datum for Australia and New Zealand that takes into account crustal dynamics, developed and maintained using the latest geodetic methodologies, supporting real-time, centimetre-level positioning and navigation services.

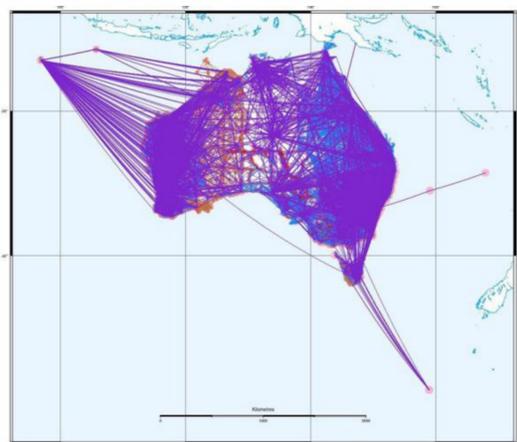
The Importance of an Accurate Datum

A geodetic datum consists of a coordinate system and a set of reference points that are used to locate positions on the Earth. The current Australian datum, the Geocentric Datum of Australia 1994 (GDA94), has been in use for 20 years.

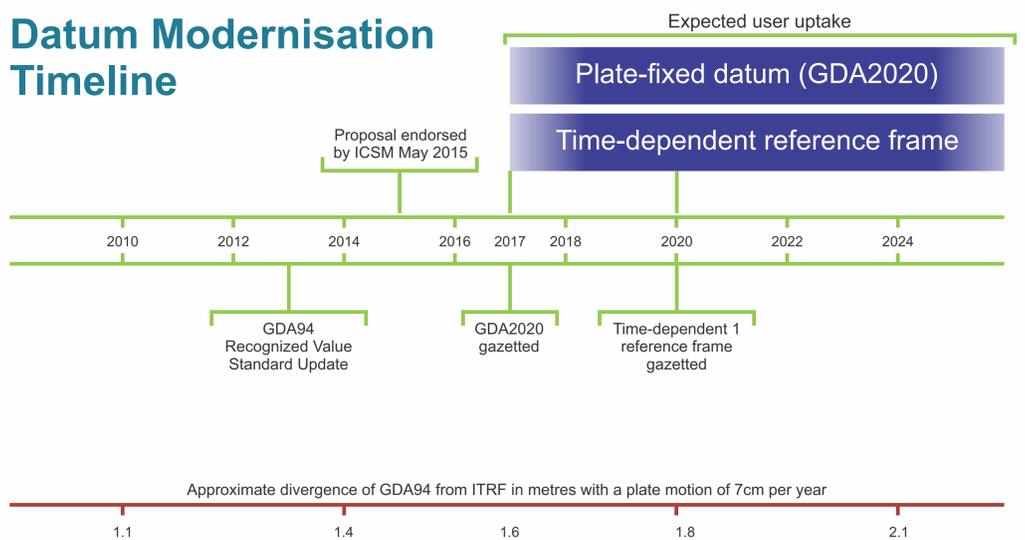
During this time the Australian continent has moved, which has resulted in positions in GDA94 being offset by 1.5 metres from the International Terrestrial Reference Frame (ITRF) used by Global Navigation Satellite Systems (GNSS), such as GPS. By 2020 this offset will be approximately 1.8 metres.



Positioning information has always been important for the mapping and surveying community but, now, technologically advanced societies are becoming increasingly reliant on precise, national-scale location information in a wide range of industry sectors. Areas including: business (construction, agriculture, insurance), safety (police, emergency services, landscape mapping), modernising our transport and tourism industry (navigation via GNSS enabled maps), automated vehicles, telecommunications and entertainment. Such needs require an accurate and reliable reference frame, which GDA94 is not.



Datum Modernisation Timeline



Modernising the National Datum

To address this, the ICSM has developed a two-stage plan for datum modernisation. The first stage corrects the offset to the ITRF and removes any existing distortions, while the second stage involves the implementation of a time-dependent reference frame that will prevent the offset from reoccurring.

Stage 1 will deliver a new plate-fixed datum with the defining coordinates projected to a reference date of 1 January 2020. This new datum will be known as GDA2020. By January 2017 the transformation products (GDA94 to GDA2020), tools, software and support documentation and education resources will be available, so that users are able to manage and build data on GDA2020.

In Stage 2, with development activity commencing from 2018, it is proposed to transition from a conventional plate-fixed datum to a time-dependent reference frame. This national reference frame will accommodate dynamic coordinate locations that can change over time and that will be highly accurate with respect to ITRF.

Current Status

Development of GDA2020 is nearing completion. For the very first time, the Australian datum will be the product of a

least-squares adjustment of the entire national geodetic network (see image left). This network consists of 1,972,357 measurements to 245,114 stations, and it can be adjusted in half a day using the DynaNet software. Preparations for the adjustment that will produce GDA2020 v1.0 are underway and refinements are being made to the GDA2020 transformation parameters and distortion grid ahead of implementation that begins 1 January, 2017.