



Question and Answer from Slido

Joel Haasdyk +14

Many users treat WGS84 as if it is a static datum even though it is time-dependent as you show.

We need to get used to recording the epoch of data!

Agreed. Record the realisation of a reference frame (e.g. ITRF2014) and the epoch (e.g. ITRF2014@2019.57)

Richard Stanaway +8

How will ATRF accommodate large plate boundary earthquakes which can cause mm-cm deformation across the Australian continent?

ICSM are investigating the use of a deformation model which may be an option at some point in the future. This is less of an issue in Australia than New Zealand who are currently dealing with this problem due to earthquakes. New Zealand are collaborating with Australia on this research.

Anonymous +6

When will our devices be able to receive position accuracy of 3-10cm?

2023-24. Please have a look at <https://www.ga.gov.au/scientific-topics/positioning-navigation/positioning-australia/understand-positioning-australia> for more information.

Anonymous +4

Rock Star Geodesist Nick, do you have any professional feeds we can follow for updates or tips?

I find Twitter very useful to get a broad range of information. It may only be a snippet but it least I know what is going on. I can then dig deeper when I find things that interest me. If you have a look at the people I follow, you might get some ideas.

Anonymous +4

Will there be GDA 2025?

We don't have any plans yet for further updates of Australia's static datum. We will continually be assessing the requirements of users and update it, if and when, it is required.

Anonymous +4

What do the GIS organisations such as Google, Bing and Esri use as their WGS84 reference?

It is my understanding they use WGS84. Here is a link to documentation from Google (<https://developers.google.com/maps/documentation/javascript/coordinates>)

Anonymous +4

Are you working closely with for example, ESRI Au. to pass on the correct spatial trans. calcs, so we can fix & distribute to our enterprise data spatial staff?

Yes we are. We have engaged ESRI and other software companies from an early stage to make the transformation parameters and tools available to them.

Anonymous +3

You mention access to 250,000 stations as part of the national adjustment. Are these documented for reference?

These 250,000 stations are predominantly survey marks which are managed by the states and territories. We don't have a central resource from which you can download information about all 250,000.

Jane Cooke +3

How will SBAS relate to ATRF?

Geoscience Australia intends to make ATRF coordinates available via its real-time positioning service. This would involve establishing a data stream from each CORS site with ATRF coordinates used as the reference. Providing ATRF coordinates as opposed to ITRF coordinates enables a legally traceable solution.

Satellite Based Augmentation System (SBAS) corrections, which are to be supplied via internet / satellite, will be generated from CORS throughout Australia and will therefore also be in ATRF.

Anonymous +3

For a country with several plates, do you suggest using ITRF directly or developing a national geodetic datum such as GDA?

This is a situation the USA and Canada are dealing with at the moment. They are replacing a static datum (North American Datum 83) with four plate-fixed terrestrial reference frames. The tectonic plate for each frame may be inferred from their names, which are:

- North American Terrestrial Reference Frame of 2022 (NATRF2022)
- Pacific Terrestrial Reference Frame of 2022 (PATRF2022)
- Mariana Terrestrial Reference Frame of 2022 (MATRF2022)
- Caribbean Terrestrial Reference Frame of 2022 (CATRF2022)

Each plate will have its own plate motion model.

Anonymous + 3

Are there any plans to educate other professional users of coordinated data sets such as engineers, planners, etc. about the implications of time dependent data?

We are trying to engage with these audiences through a range of industry talks and magazine articles. If you have any ideas on who would benefit and how we could connect with them, please let me know on Nicholas.Brown@ga.gov.au

Anonymous +2

What happens if the IERS realize a new reference frame, say ITRF2020, or if WGS 84 (G1762) is updated a seventh time?

I fully expect reference frame updates to continue. ITRF2020 is likely to be made available in 2021/2022 (using data up to the end of 2020). When this happens, ATRF will be updated from ATRF2014 (ITRF2014 realisation) to ATRF2020 (ITRF2020 realisation). We as an industry need to be prepared for continuous improvement of our reference frame. As we want to measure things more accurately, we need a reference frame that is more accurate as well.

Kim Rose +2

What software does GA use to process GNSS baselines and also complete Least Squares Adjustments of the processed baselines?

For GNSS baseline processing we use the Bernese software. For least squares adjustments, we use DynAdjust (<https://github.com/icsm-au/DynAdjust>)

Anonymous +1

Hey Nick, was that Residual Crust Deformation plot done in GMT software?

Yes it was.

Anonymous +1

Are/will GA and other map data be in ITRF or ATRF?

From mid next year, map products from GA will be made available in GDA2020. Online maps can however be served up to users in ATRF using the Australian plate motion model.

Anonymous +1

Just confirming - will atrf be based on itrf2014 until our overall datum is derived or will its legal definition change if there is a new itrf released?

Great question. Thanks for clarifying.

When it is released, ATRF will be known as ATRF2014 and be aligned to ITRF2014. When ITRF2020 is realised, ATRF will be updated and aligned to ITRF2020 and known as ATRF2020. The differences in coordinates between updated realisations of ITRF/ATRF is expected to be submillimetre and therefore have a negligible impact on the vast majority of users.

Anonymous

Can we be sent a copy of the FABULOUS title page back-ground image of Australia in situ - for our professional use?

It's great isn't it! We purchased a licence for the photo, so sorry, we can't share it. Here is a link to the place we got the licence from (<https://www.istockphoto.com/au/photo/glowing-blue-earth-australia-and-new-zealand-gm175544212-21364369>).

Anonymous

Where are the accuracy statements for different EPSG codes?

Here is an example for the GDA94 to GDA2020 transformation parameters. The accuracy of the transformation is listed as 0.01 m.

Coordinate Transformation [GDA94 to GDA2020 (1)]

Code: [EPSG::8048](#)
Name: [GDA94 to GDA2020 \(1\)](#)

+ Aliases

Operation Version: ICSM-Aus
Operation is Reversible: yes
Accuracy: 0.01 [metre](#)

+ Area of Use [Australia - GDA]

+ Source CRS [GDA94]

+ Target CRS [GDA2020]

Parameter Values

Warning: *CARE! Ensure application uses this method! See Guidance Note 7-1*

Parameter Name	Parameter Value or Parameter File
X-axis translation	61.55
Y-axis translation	-10.87
Z-axis translation	-40.19
X-axis rotation	-39.4924
Y-axis rotation	-32.7221
Z-axis rotation	-32.8979
Scale difference	-9.994

+ Method [Coordinate Frame rotation (geog2D domain)]

Anonymous

Will GDA2020 coordinates always indicate the true (or at least best known) location of a feature, as it was at epoch 2020.0?

GDA2020 coordinates will be continually refined as new data become available. The expectation is that coordinates won't change a great deal, however, the uncertainty of the coordinates will get less and less over time.