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Dear GPSnet Tier 2 VAR and GPSnet Users

GPSnet CORS GDA2020 IMPLEMENTATION

GPSnet will soon implement the new Geocentric Datum of Australia (GDA2020). At this time, GPSnet will adopt **new GDA2020** Regulation 13 coordinates certified by Geoscience Australia for all Victorian and some New South Wales Continually Operating Reference Stations (CORS) currently contributing to the Victorian GPSnet CORS network.

WHEN is the implementation happening

The implementation of **new GDA2020** coordinates for most national, state and private CORS operators (including AUSCORS, CORSNet-NSW, AllDayRTK, SmartNetAUS and VRSNow) will take place over the weekend of **Saturday the 9th** and **Sunday the 10th** of **February 2019** respectively.

For GPSnet, work to implement the new GDA2020 datum will take place during the following times:

7:00am to 5:00pm (AEDT) on **Saturday February 9th 2019**

and

7:00am and 5:00pm (AEDT) on **Sunday February 10th 2019**

(Note that GPSnet will endeavour to keep services running, however there will be periods of time (up to 2-4 hours) during the above dates and times where Network RTK and/or Single Base Data streams maybe unavailable.)

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WHAT is happening during the implementation

GPSnet will be making changes to the **current GDA94** coordinates being used at both GPSnet Primary (PR) MCP and Disaster Recovery (DR) IBM data centres.

As such GPSnet will perform the following 4 steps to transition to GDA2020:

1. Configure GDA2020 as the default datum

(Note that only the GPSnet PR (MCP) data centre will be updated to the **new GDA2020** datum. The GPSnet DR (IBM) data centre will continue to operate with GDA94 as the default datum as it always has.

2. Update the coordinates at both the PR and DR data centres

(Note that only the GPSnet PR (MCP) data centre will be updated to the **new GDA2020** coordinates. The GPSnet DR (IBM) data centre will be updated to operate with **equivalent GDA94** coordinates (transformed from GDA2020).

3. Configure all Victorian GNSS CORS receivers with GDA2020 coordinates.

4. Make available both GDA94 and/or GDA2020 Network RTK and Single Base mountpoints.

To implement this change, GPSnet will update the coordinates at the Primary (MCP) data centre and the Disaster Recovery (IBM) data centre, as indicated in Table 1 and Table 2 below.

Table 1: Current Data Centre Datum and Coordinates

Data Centre	DNS	IP Address	Datum and Coordinates
MCP (PR)	http://gnss.vicpos.com.au	168.128.52.108	GDA94 datum and current GDA94 coordinates
IBM (DR)	http://www.gpsnet.com.au	121.200.232.45	GDA94 datum and current GDA94 coordinates

Table 2: Data Centre Datum and Coordinates after GDA2020 Implementation

Data Centre	DNS	IP Address	Datum and Coordinates
MCP (PR)	http://gnss.vicpos.com.au	168.128.52.108	GDA2020 Datum and new GDA2020 Coordinates
IBM (DR)	http://www.gpsnet.com.au	121.200.232.45	GDA94 Datum and equivalent GDA94 Coordinates

Primary (PR) MCP Data Centre Datum and Coordinates after GDA2020 Implementation

For the Primary **MCP** data centre the following ports and data streams will be available with the vast majority being updated to utilise the new GDA2020 datum and coordinates. New NRTK GDA2020 mountpoints will also be made available via port 2020.

Current NRTK and some Single Base mountpoints will continue to operate in GDA94, via the same mountpoints and ports as they always have.

- **Ports 8080 and 2101 for Network RTK data streams**

These Network RTK data streams will continue to operate in GDA94 as they always have. However, it should be noted that these Network RTK data streams will be based on a transformation back from the **new GDA2020** coordinates and datum and therefore small transformational differences of +/- 2 millimetres maybe experienced.

- **Port 2020 will be dedicated to new GDA2020 Network RTK data streams**

New GDA2020 Network RTK data streams will be available and will be output in the **new GDA2020** datum. Therefore, users wishing to adopt will need to change to port 2020. Users should ensure that they are operating in the GDA2020 datum or that they are transforming into their preferred datum via transformation tools either within their rovers or software packages.

- **Port 2102 for Single Base data streams in the RTCM3.1 format**

Single Base RTCM3.1 data streams will be updated to output the **new GDA2020** coordinates. Therefore, users wishing to continue to use these should ensure that they are operating in the GDA2020 datum or that they are transforming into their preferred datum via transformation tools either within their rovers or software packages.

- **Port 2103 for Single Base data streams in the RTCM3.2 (MSM7) format**

Single Base RTCM3.1 data streams will be updated to output the **new GDA2020** coordinates. Therefore, users wishing to continue to use these should ensure that they are operating in the GDA2020 datum or that they are transforming into their preferred datum via transformation tools either within their rovers or software packages.

- **Port 2104 for Single Base data streams in the CMR+ or CMRx format**

Single Base CMR+ and/or CMRx data streams will continue to operate in GDA94 as they always have. However, it should be noted that the Single Base CMR+ or CMRx corrections will be based on a transformation back from the **new GDA2020** coordinates and datum and therefore small transformational differences of +/- 2 millimetres maybe experienced.

- **Port 2105 for Single Base data streams rebroadcasting the RAW receiver data in the same format it is received from the individual GNSS receiver. Port 2105 will also broadcast some specialised single base BINEX data streams.**

Single Base RAW and/or BINEX data streams will be updated to output the **new GDA2020** coordinates. Therefore, users wishing to continue to use these should ensure that they are operating in the GDA2020 datum or that they are transforming into their preferred datum via transformation tools either within their rovers or software packages.

- **Port 2106 for Single Base data streams in the DGPS (RTCM2.3 or RTCM2.4) format (if they are required)**

Single Base DGPS data streams will be updated to output the *new GDA2020* coordinates. Therefore, users wishing to continue to use these should ensure that they are operating in the GDA2020 datum or that they are transforming into their preferred datum via transformation tools either within their rovers or software packages.

For further information relating to individual **MCP** data centre mountpoints, ports, datum and coordinates, please refer to Table 4 in Appendix 1.

WHAT to do prior to the GDA2020 implementation

To prepare for the transition to GDA2020, VAR's and users alike are asked to take note of the *new GDA2020* coordinates contained in the attached spreadsheet.

The attached spreadsheet provides comprehensive details of both the *new GDA2020 (red)*, and *equivalent GDA94 (blue)* coordinates that will be adopted on the 9th and 10th of February at the **MCP** and **IBM** data centres respectively.

The spreadsheet also provides details of the *current GDA94 (green)* coordinates in use, and the differences (see second tab) between the *current GDA94 (green)* and the *equivalent GDA94 (blue)* coordinates (transformed from GDA2020).

WHAT to do after the GDA2020 implementation

Several of the GPSnet CORS coordinates have shifted when comparing the *current GDA94* coordinates to the *equivalent GDA94* coordinates. These shifts vary by approximately 20-25mm due to a number of factors including antenna changes, localised ground movement, and/or building movement, on which the CORS are mounted. The differences between the *current GDA94* and *equivalent GDA94* can be seen in the second tab of the attached spreadsheet.

Network RTK and Single Base Users

Real-time users wishing to continue to use Network RTK and/or Single Base data streams that are to remain in **GDA94** should not have to do anything other than to check the data streams on known marks or reference points, to ensure there is no coordinate variation (outside normal tolerances).

Real-time users wishing to use Network RTK or Single Base data streams that have transitioned to **GDA2020** should ensure that they are operating in the GDA2020 datum or that they are transforming into their preferred datum via transformation tools either within their rovers or software packages. Users should ensure that they check the data streams on known marks or reference points, to ensure there is no coordinate variation (outside normal tolerances).

Note that Real-time users wishing to adopt the new GDA2020 Network RTK data streams will need to change the port on their rovers to port 2020. Once having done so users will be able to select the GDA2020 Network RTK mountpoints accordingly.

Web, Reference Data Shop and FTP users

After GDA2020 is implemented, RINEX Files and other associated CORS data files downloaded from the GPSnet website (gnss.vicpos.com.au) manually or automatically for post processing using 3rd party software packages, will be in GDA2020 and will be delivered with or referenced to the *new GDA2020* coordinates.

Users who currently download post processing data manually or automatically via 3rd party software packages are advised to contact their software provider(s) to determine the best way to process GDA2020 RINEX and/or CORS files

Data being delivered via the GPSnet **FTP** servers will be delivered in either GDA2020 or GDA94 and is dependent upon which FTP server is being used. The **MCP** FTP server will output CORS data in GDA2020, whilst the **IBM** FTP server will continue to output GDA94 however these will be the **equivalent GDA94** coordinates (transformed from GDA2020).

Height determination in GDA94 and GDA2020

For ALL mountpoints and data streams that continue to use the GDA94 coordinates and datum, real time users **MUST** continue to use **AUSGeoid09** to obtain compatible AHD heights from their GNSS observations.

For ALL mountpoints and data streams that are being updated to the **new GDA2020** coordinates and datum, real-time users **MUST** use **AUSGeoid2020** to obtain compatible AHD heights from their GNSS observations.

Further Information

Whilst all steps have been taken to try and ensure a smooth implementation of GDA2020, GPSnet will be available to assist any VARs or users if problems occur once the GDA2020 Implementation has been completed.

If VARs do require assistance they can contact GPSnet via one of the following options:

Email: GPSnet.Support@delwp.vic.gov.au

Phone: Kris Halewood – (03) 9194 0265

Hayden Asmussen – (03) 9194 0261

Additional terms, references and links relating to GDA2020 and AUSGeoid2020 are available on the following page.

Yours sincerely



Hayden Asmussen

Manager GPSnet

24 / 01 / 2019

TERMS and REFERENCES

Current GDA94 – means the current GDA94 coordinates and/or datum in use by GPSnet (prior to February 9th, 2019). These are displayed in **Green** in the attached spreadsheet,

New GDA2020 – means the new GDA2020 coordinates and/or datum being adopted and implemented on the 9th and 10th of February 2019. These are displayed in **Red** in the attached spreadsheet,

Equivalent GDA94 – means the equivalent GDA94 coordinates transformed from the GDA2020 coordinates. These are displayed in **Blue** in the attached spreadsheet,

GDA2020 and AUSGeoid2020 INFORMATION

The following links provide further details relating to GDA2020, including fact sheets, transformation products and tools and technical manuals.

What is GDA2020

<https://www.icsm.gov.au/what-we-do/geocentric-datum-australia>

Transformation Products and Tools

<https://www.icsm.gov.au/datum/gda-transformation-products-and-tools>

GDA2020 Fact Sheets

<https://www.icsm.gov.au/datum/gda2020-fact-sheets>

GDA2020 and GDA94 Technical Manuals

<https://www.icsm.gov.au/datum/gda2020-and-gda94-technical-manuals>

Australian Height Datum

<http://www.ga.gov.au/scientific-topics/positioning-navigation/geodesy/ahdgm/ahd>

AUSGeoid2020

<http://www.ga.gov.au/scientific-topics/positioning-navigation/geodesy/ahdgm/ausgeoid2020>

<http://www.ga.gov.au/ausgeoid/>

Differences between AUSGeoid09 and AUSGeoid2020

<http://www.ga.gov.au/scientific-topics/positioning-navigation/geodesy/ahdgm/differences>

APPENDIX 1:
GPSnet Data Centre Port, Data Stream, Datum and Coordinate Tables

Table 4: MCP Data Centre Datum and Coordinates after GDA2020 Implementation

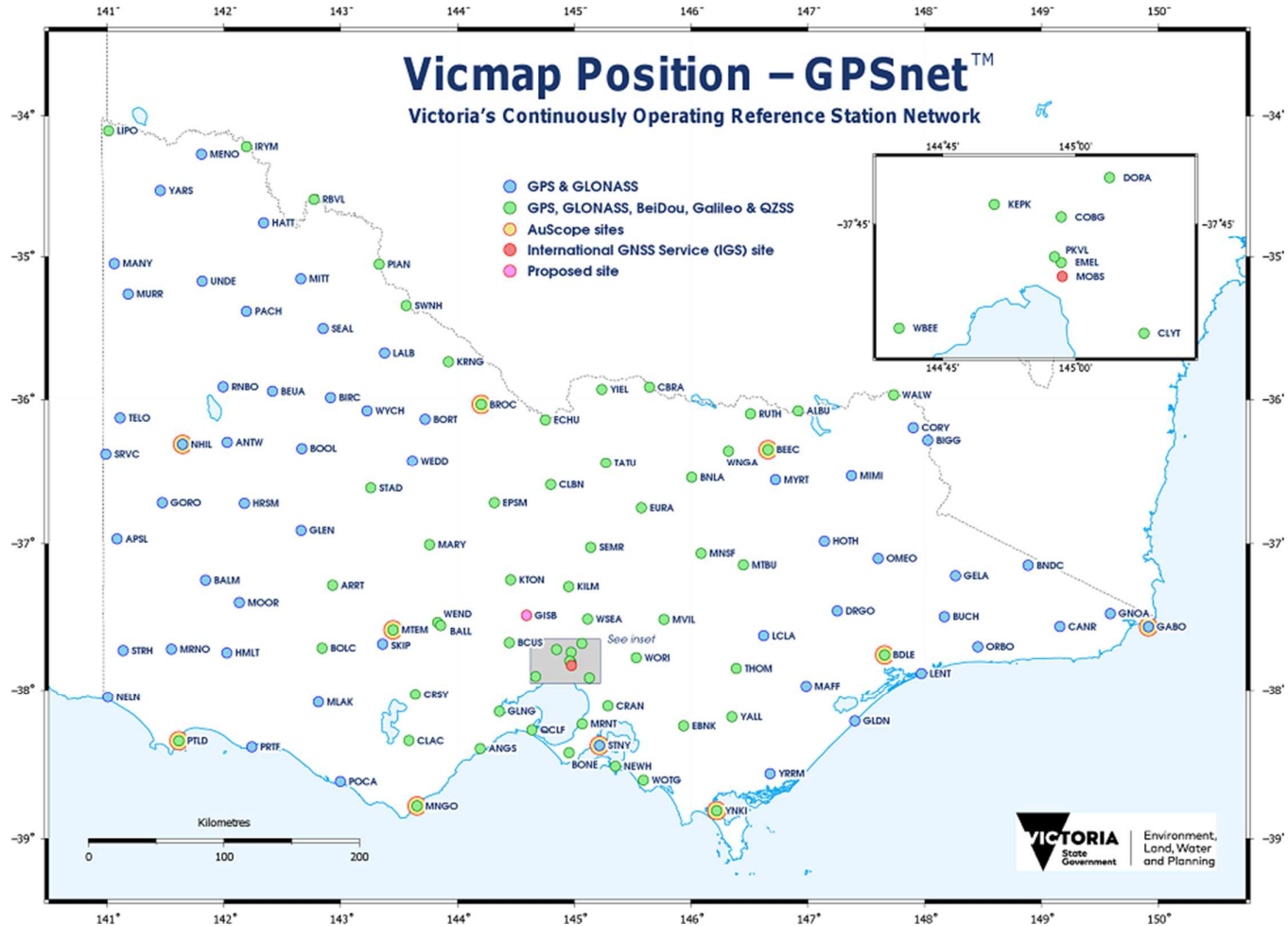
Data Centre	Data Stream Type	Data Stream Formats	Data Stream Port(s)	Data Stream (Mountpoint) Name	Datum/Coordinates
MCP	Network RTK	Multiple	8080 & 2101	RTKNet-CMRplus RTKNet-CMRx RTKNet-RTCM3 DGPSNet DGNS5_HP NearestCORS-CMRplus NearestCORS-CMRx NearestCORS-RTCM3 NearestCORS-RTCM32 CMRplus-G CMRplus-GG CMRx-GG RTCM3-G RTCM3-GG (The Data Stream format is dependent on Data Stream selected)	GDA94 Datum (Transformed from GDA2020)
		Multiple	2020	GDA2020-CMRplus GDA2020-CMRx GDA2020-RTCM3 GDA2020-DGPSNet GDA2020-NC-CMRplus GDA2020-NC-CMRx GDA2020-NC-RTCM3 GDA2020-NC-RTCM32 RTXNet-CMRx RTXNet-RTCM32	GDA2020 Datum and <i>new</i> GDA2020 Coordinates
	Single Base	RTCM3.1	2102	XXXX-RTCM3	GDA2020 Datum and <i>new</i> GDA2020 Coordinates
		RTCM3.2 (MSM 7)	2103	XXXX-RTCM32	GDA2020 Datum and <i>new</i> GDA2020 Coordinates
		CMR+ & CMRx	2104	XXXX-CMR+ Or XXXX-CMRx (only select CORS output the CMR+ and CMRx formats)	GDA94 Datum (Transformed from GDA2020)
		RAW & BINEX	2105	XXXX-Rx-RTCM31 Or XXXX-Rx-RTCM32 (The RTCM format is dependent on receiver capability) Or XXXX-BINEX (only select CORS output the BINEX formats)	GDA2020 Datum and <i>new</i> GDA2020 Coordinates
		DGPS	2106	XXXX-DGPS (only select CORS output the DGPS formats)	GDA2020 Datum and <i>new</i> GDA2020 Coordinates

- -G = GPS only & -GG = GPS and Glonass
- NC = Nearest CORS
- XXXX represents the CORS 4-character ID (eg Albury = ALBU)
- The RTXNet-CMRx and RTXNet-RTCM32 mountpoints output multi GNSS corrections (GPS-GLN-GAL-BeiDou-QZSS) in GDA2020. These mountpoints are currently being tested and if users wish to use them then they should do so with caution.

The attached map (See Appendix 2) indicates the GPSnet CORS (circled green) that are currently outputting RTCM3.2 MSM7 data streams. The GPSnet CORS circled in blue only output RTCM3.1.

APPENDIX 2

GPSnet CORS outputting RTCM 3.2 MSM and RTCM3.1



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