PRODUCT DATA SHEET

ID: GA-SNX-01 Version 01 Dated 15 Jun 2022

Contact: clientservices@ga.gov.au

Continuously Operating Reference Station (CORS) – Coordinates (SNX file)

Summary

Geoscience Australia's (GA) Ginan Analysis Centre Software (ACS) precisely calculates the position of GA's continuously operating reference stations (CORS) across Australia, New Zealand, and the South Pacific, as well as stations in other parts of the world. The station position calculation is based on the GNSS observables captured by a station, the position of the GNSS reference satellites, adjustments to receiver and transmitter clocks and various physical models. This precise CORS position data is available from GA as a SNX file.

SNX stands for Solution Independent Exchange and was suggested by Blewitt et. al. (1994) [1] as common file format that would allow solutions to be shared across various groups.

The current version of the format is 2.02 with the standard defined in [2]. Historical release documents for the standard and the most recent standards are published at [3].

Access

Geoscience Australia offers precise station data in the form of an SNX file.

Users can freely access these files at https://data.gnss.ga.gov.au/docs/home/index.html with documentation on how to obtain them at https://geoscienceaustralia.github.io/ginan/resources/GinanProductsStreamsAccess20220422.pdf

Methods include sftp and AWS s3.

Technical details

Positioning Australia SNX Station Coordinate Products	
Versions	Rapid and Ultra-Rapid
Products Released	One Rapid Product daily Four Ultra-Rapid Products daily
Release Times	Rapid: 1700 UTC Ultra-Rapid: 0300, 0900, 1500, 2100 UTC
Constellations Used in Solution	GPS (in future will include Galileo, GLONASS, BeiDou and QZSS)
Data Source	RINEX format Phase and Pseudorange observations from a globally distributed network of GNSS receivers soured from Geoscience Australia's (GA) CORS stations and others from the International GNSS Service (IGS) network [4].

	Earth orientation data from the International Earth Rotation and Reference Systems service's (IERS) daily final values [5].
Filenames	The SNX products follow the IGS Long Product Filename convention, detailed in this document: http://acc.igs.org/repro3/Long_Product_Filenames_v1.0.pdf An example of a filename is given below: GAG0OPSULT_20221501200_01D_30S_CRD.snx Use the table below for a break-down of this filename:

GAG0OPSULT_20221501200_01D_30S_CRD.snx		
Code	**Meaning**	**Value**
GAG	Analysis Centre	Geoscience Australia Ginan
0	Version Number	Version 0
OPS	Campaign Type	Operational
ULT	Solution Type	Ultra-Rapid (RAP: Rapid, FIN: Final)
20221501200	Datetime of Initial Epoch YYYYDOYHHmm	Year: 2022, Day-of-year: 150, Time: 1200 UTC
01D	Length from Initial Epoch in File D-Day, H-Hour, M-Minute, S-Second	1 Day (24 hours)
30S	Epoch Length – Amount of Time between each record	30 Seconds
CRD	File / Product Type	Station Coordinates
.snx	File Extension	SNX file

Continuously Operating Reference Stations (CORS) area covered

The product uses data from the GNSS network run and operated by Geoscience Australia. The network consists of approximately 150 Continuously Operating Reference Stations (CORS), which span Australia, the South Pacific, and Antarctica. These stations stream real-time data directly back to GA's data centre. In addition to this network, data from a set of stations owned and operated by various institutions, universities and organisations around the world is also used. A subset of the CORS stations in the GA network is shown in Figure 1, and Figure 2 shows a typical distribution of CORS used in processing solutions using the Ginan ACS.

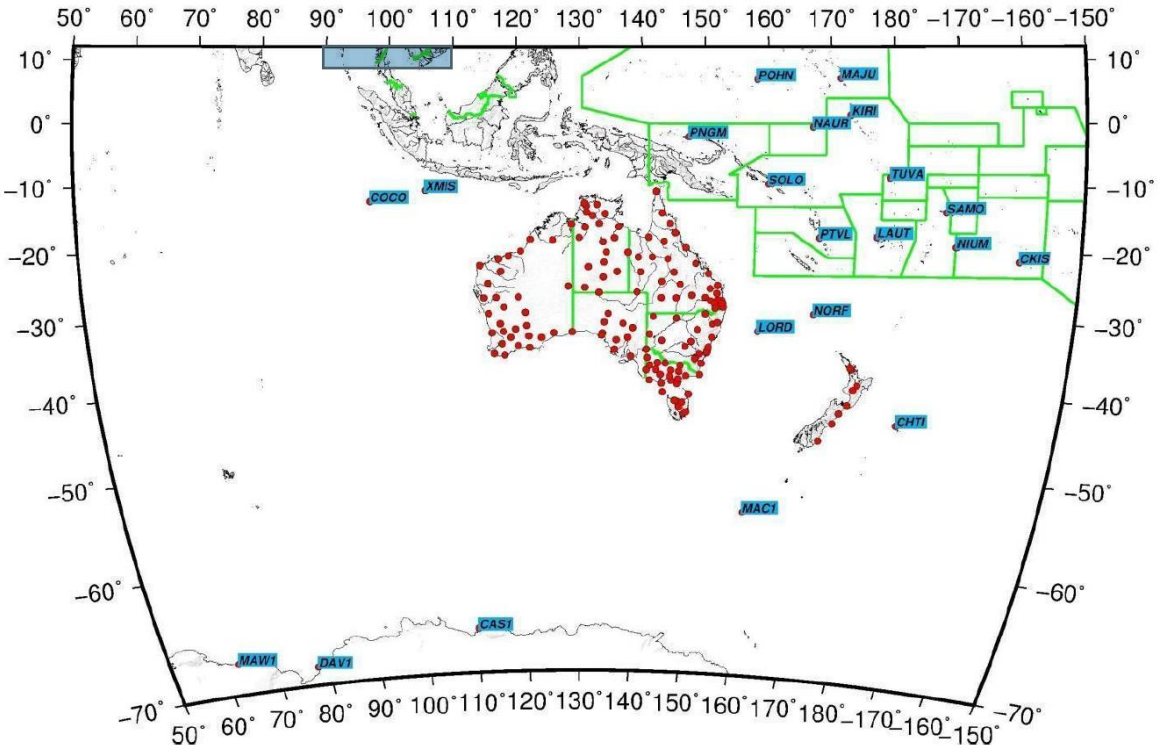

Figure 1 – Red dots indicate GA CORS

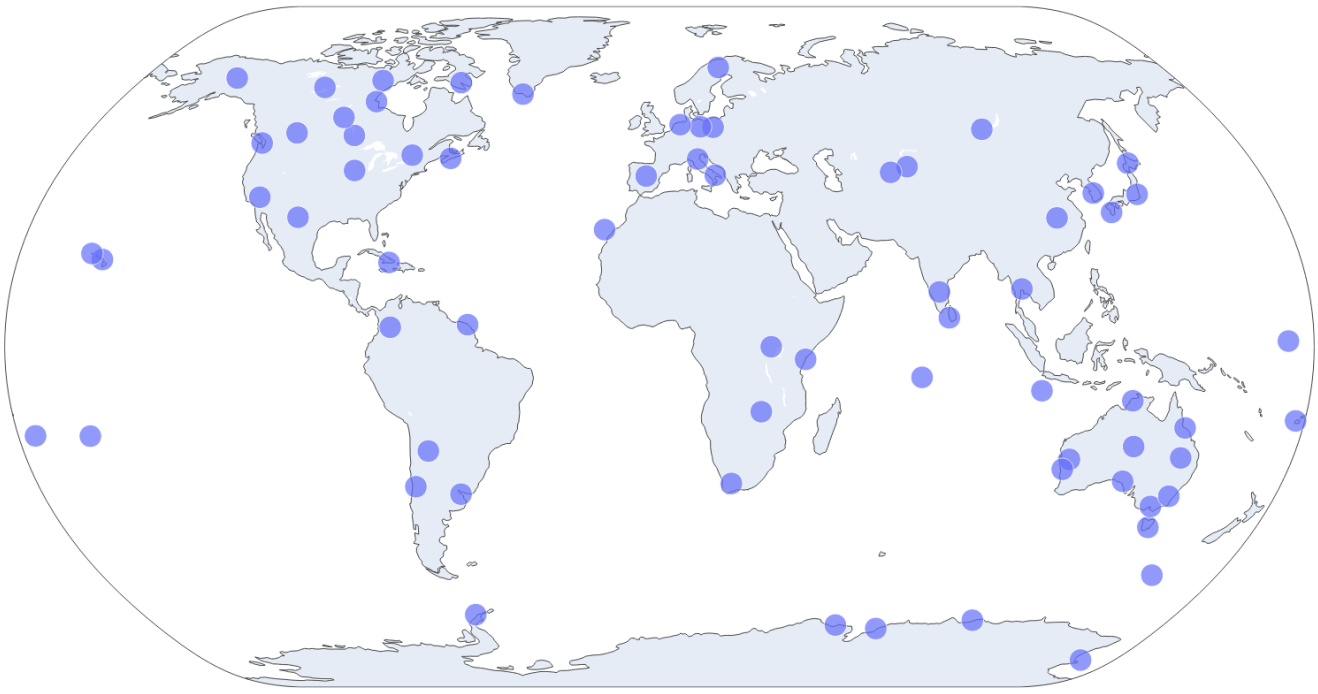

Figure 2 – Example of a network of CORS stations used to produce the station coordinate SNX file

File Specification History

SNX stands for Solution Independent Exchange and was suggested by Blewitt et. al. (1994) [1] as common file format that would allow solutions to be shared across various groups.

The data within any given SNX file varies as the format allows not only solutions from GNSS processing but also Very Long Baseline Interferometry (VLBI), Satellite / Lunar Laser Ranging (SLR / LLR) and Doppler Orbitography and Radio-Positioning by Integrated Satellite (DORIS) processing. However, precise station coordinates are the main solution that are common amongst them all (tropospheric solutions may also be stored in SINEX)

The International GNSS Service (IGS) has used it for their weekly solutions since mid 1995 [2]. Since then, the International Laser Ranging Service (ILRS) and International VLBI Service (IVS) have adopted it as a standard for their solutions as well.

Over the years, various additions have been made to the standard including the inclusion of:

- Tropospheric data (including gradients)
- Nutation values
- Precision values
- Various rates including radio source declination, right ascension

For more information on the SNX standard, please see reference [2] and [3].

Quality Assurance

On a daily basis GA assesses the quality of the calculated CORS position data by comparison with reference position data. For further details on quality monitoring please contact GA at clientservices@ga.gov.au.

Terms of Use

GA provides calculated CORS position data in SNX format free of charge but on an “as is” and “with all faults” basis without any warranty whatsoever. GA does not warrant that the position data shall meet any requirements or expectations or be fit for any intended purposes.

GA assumes no responsibility for errors or omissions in the contents of the Service and reserves the right to make additions, deletions, or modification to the contents on the Service at any time without prior notice.

GA does not guarantee the accuracy, relevance, timeliness, or completeness of any information or data available through the Service or on linked external websites.

References

[1] Blewitt, G., Y. Bock and J. Kouba: "Constraining the IGS Polyhedron by Distributed Processing", workshop proceedings : Densification of ITRF through Regional GPS Networks, held at JPL, Nov30-Dec 2, 1994, pp. 21-37.

[2] https://www.iers.org/SharedDocs/Publikationen/EN/IERS/Documents/ac/sinex/sinex_v202_pdf.pdf?__blob=publicationFile&v=2

[3] https://www.iers.org/IERS/EN/Organization/AnalysisCoordinator/SinexFormat/sinex.html

[4] https://igs.org/network/

[5] https://datacenter.iers.org/data/latestVersion/finals.daily.iau2000.txt

