GDA2020: In theory & In practice

Dr Jane Cooke, CR Kennedy

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PART OF HEXAGON

Content

GDA2020: In Theory

What is it?

Why are we changing GDA94

Impact on survey & spatial industry

Ausgeoid2020

GDA2020: In Practice

Network rover

Using your own base

Infinity

Troubleshooting

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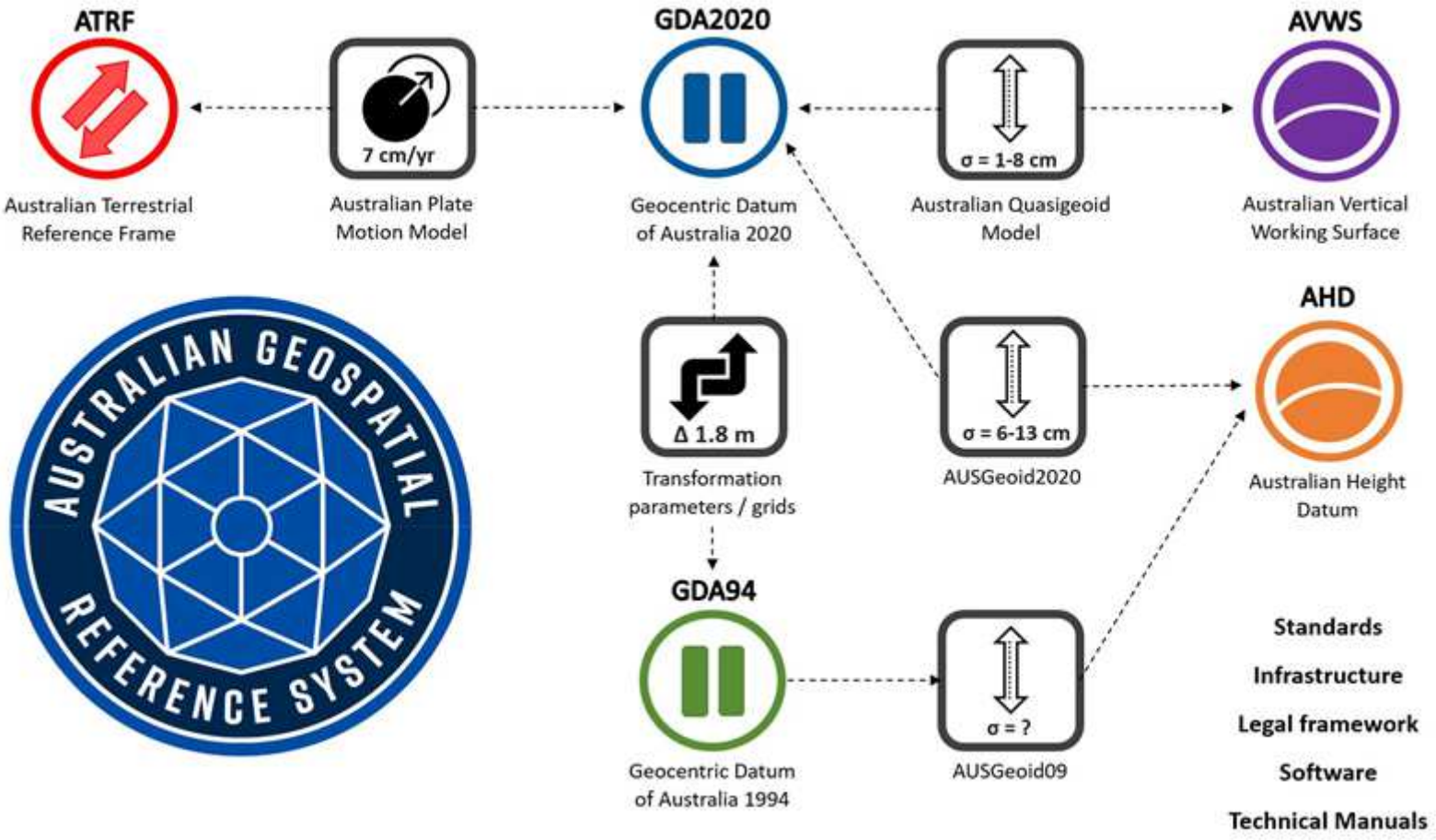
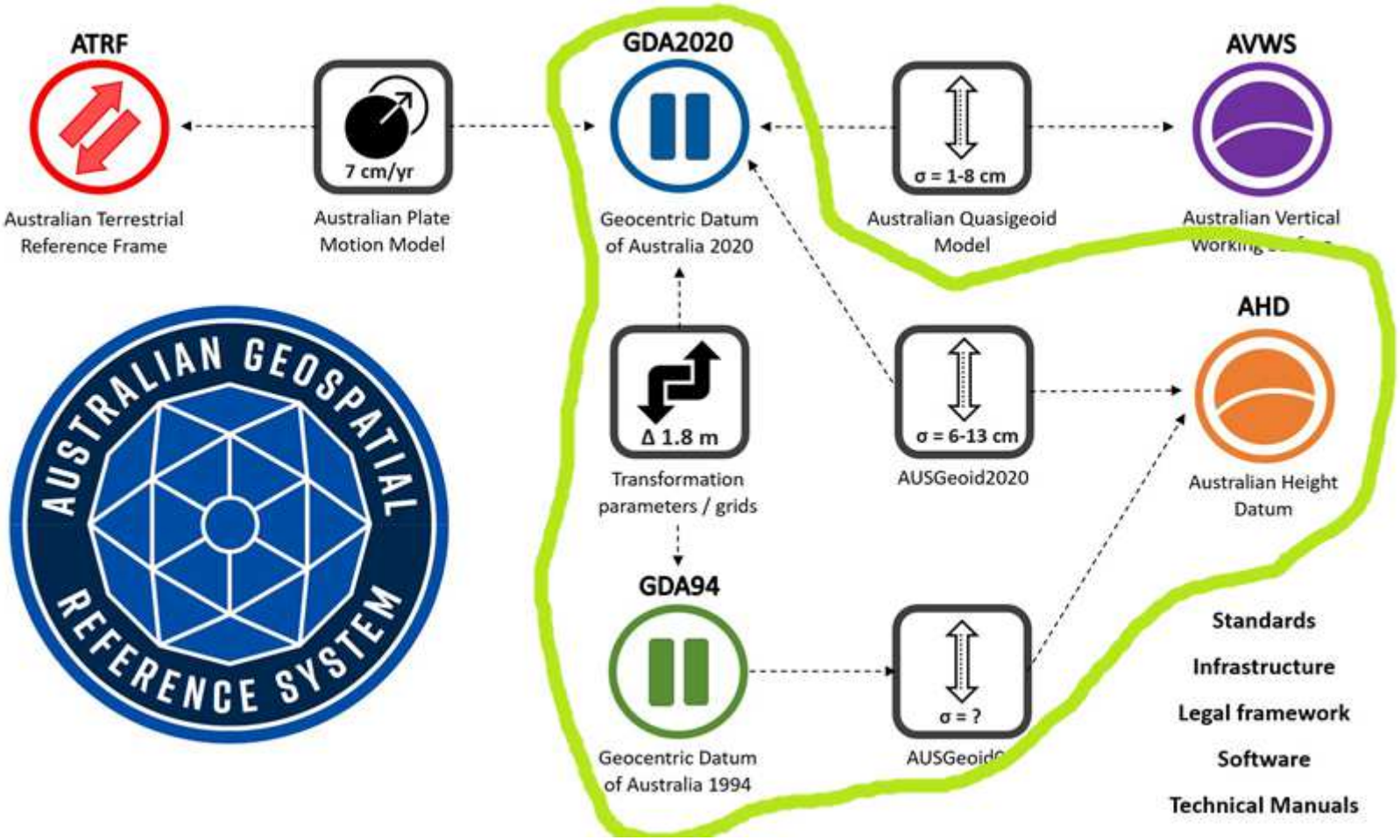
https://www.icsm.gov.au/webinar-series-australian-geospatial-reference-system



Australian Geospatial Reference System Webinar Series – Nicolas Brown, Director of Geodesy, Geoscience Australia

https://www.icsm.gov.au/webinar-series-australian-geospatial-reference-system



GDA2020 – did we move?

(Image courtesy of GDA2020 Technical Manual)

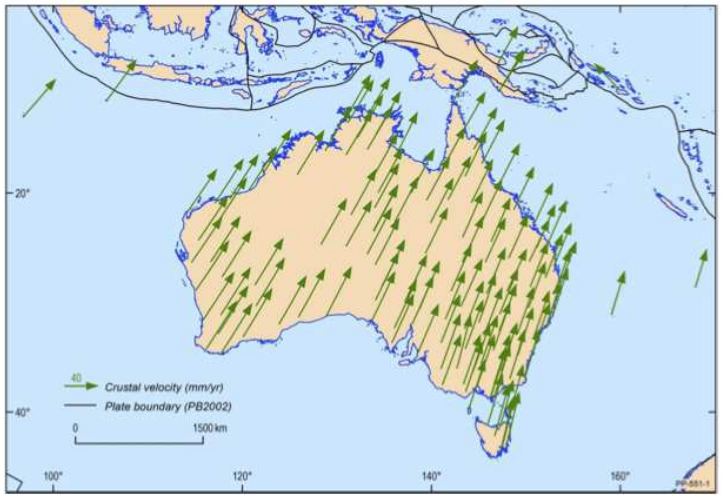


Figure 3.1: The difference between GDA94 and GDA2020 coordinates is primarily due to plate tectonic motion.

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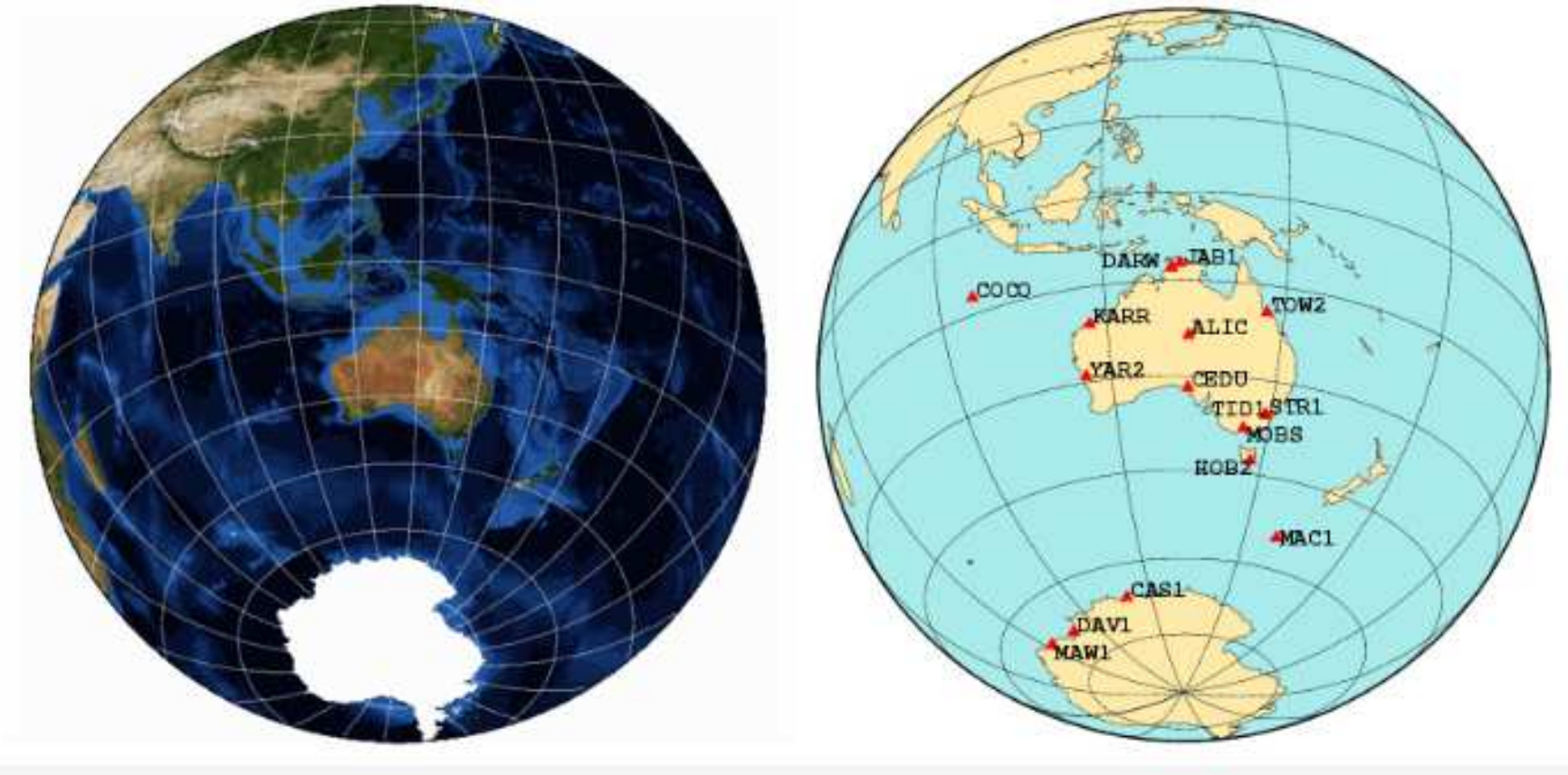
GDA94

UTM GRS1980 (ITRF92 1994.0)



https://www.icsm.gov.au/education/fundamentals-mapping/projections

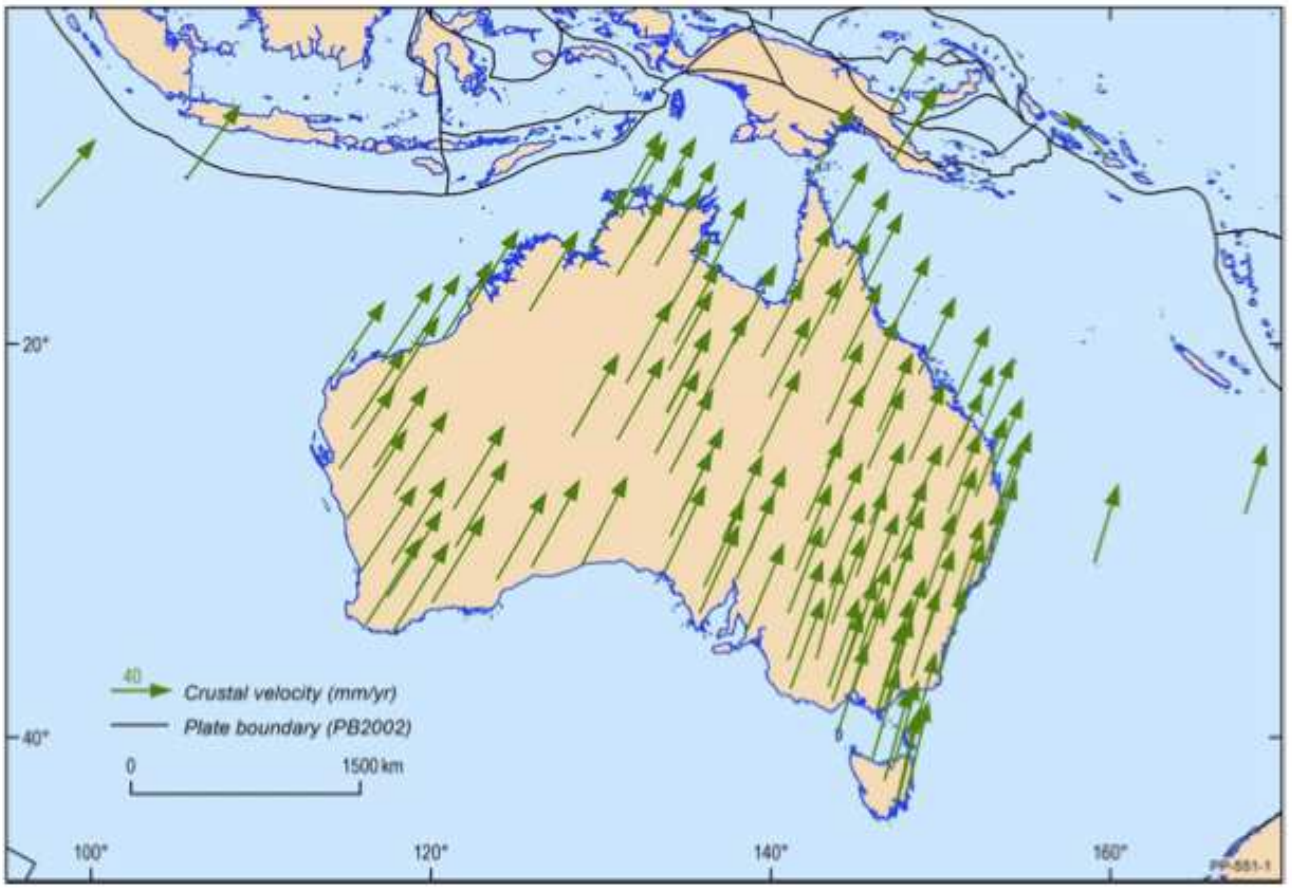
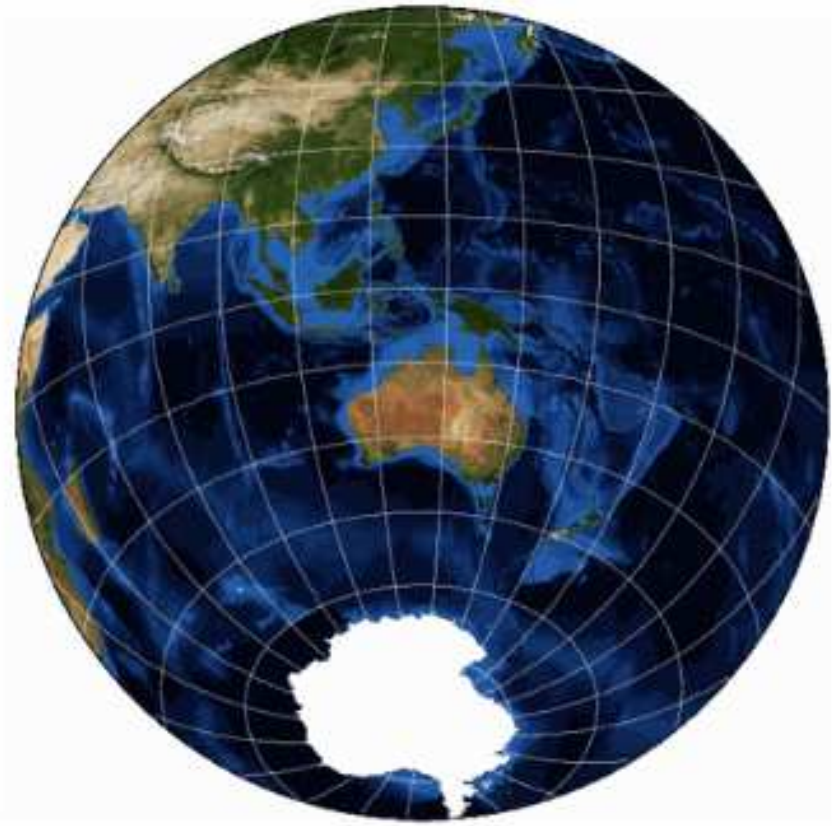


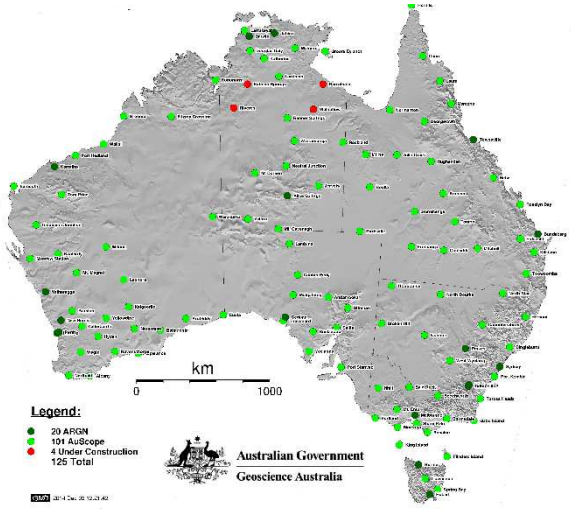
Figure 3.1: The difference between GDA94 and GDA2020 coordinates is primarily due to plate tectonic motion.

(Image courtesy of GDA2020 Technical Manual)

GDA2020

UTM GRS1980 (ITRF14 2020.0)

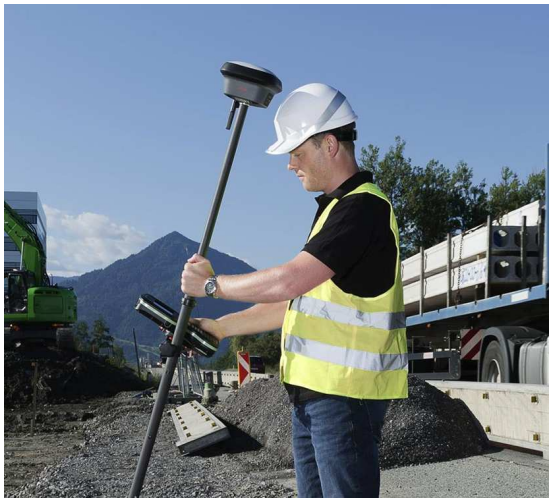


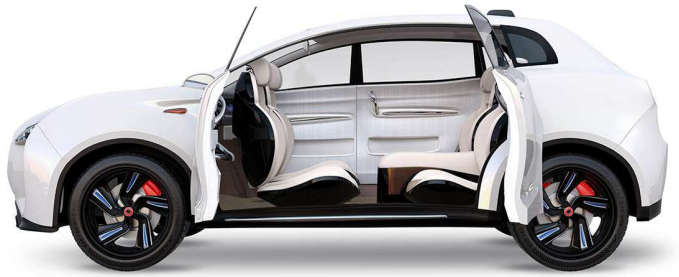


Operational:		JLCK	Julia Creek	STHG	Stonehenge
ALBY	Albany	KALG	Kalgoorlie	STNY	Stony Point
ALIC	Alice Springs	KARR	Karratha	SYDN	Sydney
ANDA	Andamooka	KATI	Katherine	TMBO	Tambo
ARMC	Aramac	KELN	Kellerberrin	THEV	Thevenard
ARUB	Arubiddy	KILK	Kilkivan	TSVB	Tibooburra
BDLE	Bairnsdale	KGIS	King Island	TIDI	Tidbinbilla
BROC	Bald Rock	KUNU	Kununurra	TOMP	Tom Price
BALA	Ballidonia	LAMB	Lambina	TOOW	Toowoomba
BEEC	Beechworth	LKYA	Lamrakyah	TOWS	Townsville
BING	Bingleberra	LARR	Larrimah	TURO	Tuross Heads
BDVL	Birdsville	LURA	Laura	WAGN	Wagia
BMAN	Bilinman	LONA	Leonora	WLAL	Wallal
MRO1	Booladdy	LIAW	Lawaweave	WARA	Warakarna
BULA	Boulia	LORD	Lord Howe Is	WMGA	Warranunga
BKNL	Broken Hill	MAIN	Mainoru	WWLG	West Wyalong
BROI	Broome	MRBA	Mareeba	WILU	Wiluna
BBOO	Beckleboo	MNGO	Marongo	YNKI	Yanakie
BNDY	Bundaberg	MEDO	Meadow Station	YAR2	Yatharagga
BURA	Burakin	MOBS	Melbourne	YEEL	Yeelanna
BUR2	Barnie	MCHL	Mitchell	YELO	Yellowtine
CEDU	Ceduna	MTCV	Mt. Cavenagh	YULA	Yulara
XMIS	Christmas Island	MTDN	Mt Doreen		
COCO	Cocos Island	MTEM	Mt. Emu		
COEN	Coen	MTIS	Mt Isa		
COOB	Coober Pedy	MTMA	Mt. Magnet		
COOL	Cooladdi	STR1	Mt. Stromlo		
CNBN	Coonabarabran	MULG	Mulgetheing		
DARW	Darwin	NEBO	Nebo		
DOOA	Douglas Daly	NTJN	Neutral Junction		
EDSY	Eldesvold	NNOR	New Norcia		
EROM	Eromanga	NHIL	Nhill		
ESPA	Esperance	NORF	Norfolk Island		
UCLA	Eucla	NMTN	Normanton		
EXMT	Exmouth	NORB	Nornerup		
FROY	Fitzroy Crossing	NBRK	North Bourke		
FLND	Flinders Island	NCLF	Northcliff		
GASO	Gabo Island	NSTA	North Star		
GASC	Gascoyne Junction	PARK	Parkes		
GGTN	Georgetown	PERT	Perth		
GROT	Groote Eylandt	PTHL	Port Hedland		
HERN	Hernani	PTKL	Port Kembla		
HIL1	Hillarys	PTLD	Portland		
HOB2	Hobart	PTSV	Port Stanvac		
HRIS	Horn Is	RAVN	Ravensthorpe		
HUGH	Hughenden	RNSP	Renner Springs		
HYDN	Hyden	RKLD	Rockland		
IHOE	Ivanhoe	RSBY	Rosslyn Bay		
JABI	Jabiru	SAAS	Sylvia		
JERV	Jervois	SPBY	Spring Bay		

https://www.icsm.gov.au/education/fundamentals-mapping/projections

Why we are changing to GDA2020





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State	Date official launch	Surveyors using in the field	Online PM in GDA2020 & GDA94	CORS in GDA2020 (& GDA94)
Victoria	June 2018	Yes, field surveyors starting to use it	yes	Feb 9th 2019
Queensland	**30th June 2020**	**not really**	**no..**	**Feb 9th 2019**
New south wales / ACT	1st July 2019	Yes, field surveyors starting to use it	yes	Feb 9th 2019
Tasmania	Not yet…	Non-government yes but GDA94 is still the official coordinate system	yes	Feb 9th 2019
Western Australia	30 June 2020*	Not yet waiting for gov agencies to go ahead	yes	Feb 9th 2019

* ICSM has agreed that 30 June 2020 will be the date by which ANZLIC member agencies in Australian states and territories will be ready to deliver and receive foundation spatial data on the GDA2020 datum

Process for adoption

ANZLIC target National Adoption Date is 30 June 2020

Enabled

- Cadastral and Geodetic environment is enabled
- GDA94 remains the default datum
- Department assesses when a reasonable number of stakeholders are ready to adopt
- Stakeholders are able to access real data and tools to start testing.

Adoption Date

Qld officially adopts GDA2020 when a sufficient number of stakeholders are ready.

Transition

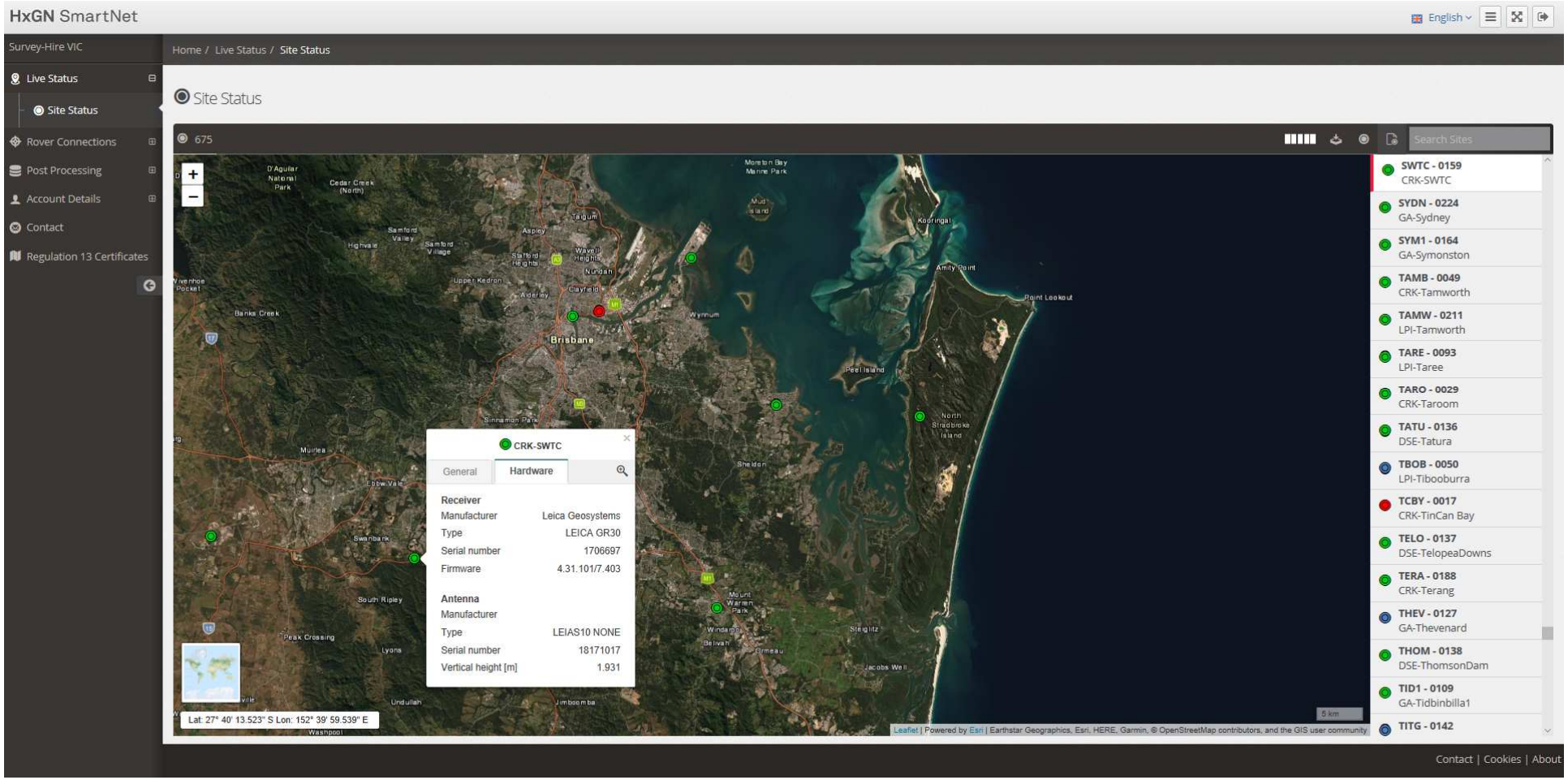
Department supports both GDA94 and GDA2020 with a sunset period.

GDA2020 Enabled		GDA94	GDA2020
Downloadable datasets	Survey Control, DCDB in Q-Spatial	✓	Option
View datasets	Spatial data in Qld Globe	✓	×
Web services live	Web services from Spatial Information Resource (SIR)	✓	Option
Reporting	Survey Control Data Report via Qld Globe	✓	✓
Legislation, regulations and policies	SMIA Legislation, Cadastral Survey Standards, Registrar of Titles Directions	✓	×
Submitted data	Survey data submitted by surveyors	✓	×

DNRME aiming to be enabled no later than 1 January 2020

Matt Higgins

CORS & GDA2020



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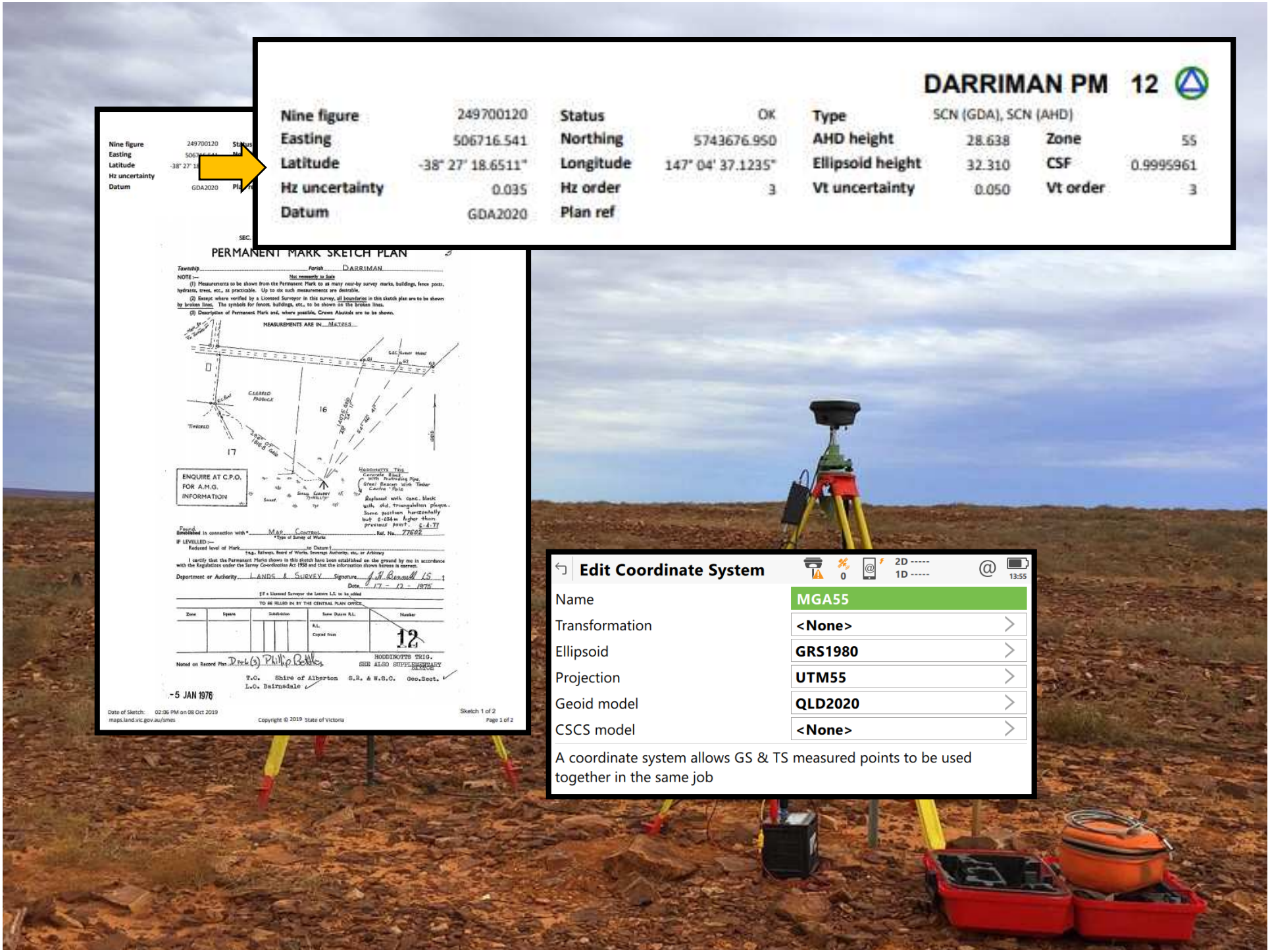
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Nine figure 249700120
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Northing 5743676.950
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Zone 55
Latitude -38° 27' 18.6511"
Longitude 147° 04' 37.1235"
Ellipsoid height 32.310
CSF 0.9995961
Hz uncertainty 0.035
Hz order 3
Vt uncertainty 0.050
Vt order 3
Datum GDA2020
Plan ref
PERMANENT MARK SKETCH PLAN
Township
Parish DARRIMAN
NOTE —
(1) Measurements to be shown from the Permanent Mark to as many near-by survey marks, buildings, fence posts, hydrants, trees, etc., as practicable. Up to six such measurements are desirable.
(2) Except where verified by a Licensed Surveyor in this survey, all boundaries in this sketch plan are to be shown by broken lines. The symbols for fences, buildings, etc., to be shown on the broken lines.
(3) Description of Permanent Mark and, where possible, Crown Abutals are to be shown.
MEASUREMENTS ARE IN Metres
CLEARED PADDOCK
TIMBERED
16
17
ENQUIRE AT C.P.O. FOR A.M.G. INFORMATION
Replaced with conc. block with old triangulation plaque. Same position horizontally but 0.034 m higher than previous point. 6.4.77
Found / Established in connection with * MAP CONTROL Ref. No. 77602
*Type of Survey of Works
IF LEVELLED :—
Reduced level of Mark to Datum
e.g., Railways, Board of Works, Sewerage Authority, etc., or Arbitrary
I certify that the Permanent Marks shown in this sketch have been established on the ground by me in accordance with the Regulations under the Survey Co-ordination Act 1958 and that the information shown hereon is correct.
Department or Authority LANDS & SURVEY Signature J.H. Bennell LS
Date 17 - 12 - 1975
If a Licensed Surveyor the Letters L.S. to be added
TO BE FILLED IN BY THE CENTRAL PLAN OFFICE
Zone | Square | Subdivision | Some Datum R.L. | Number
R.L. Copied from
12
Noted on Record Plan D.P.6(3) Phillip Bolte
HODDIN/TTG TRIG. SEE ALSO SUPPLEMENTARY SKETCH
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L.O. Bairnsdale
-5 JAN 1976
Date of Sketch: 02:06 PM on 08 Oct 2019
maps.land.vic.gov.au/smes
Copyright © 2019 State of Victoria
Sketch 1 of 2
Page 1 of 2
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1D -----
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Projection UTM55
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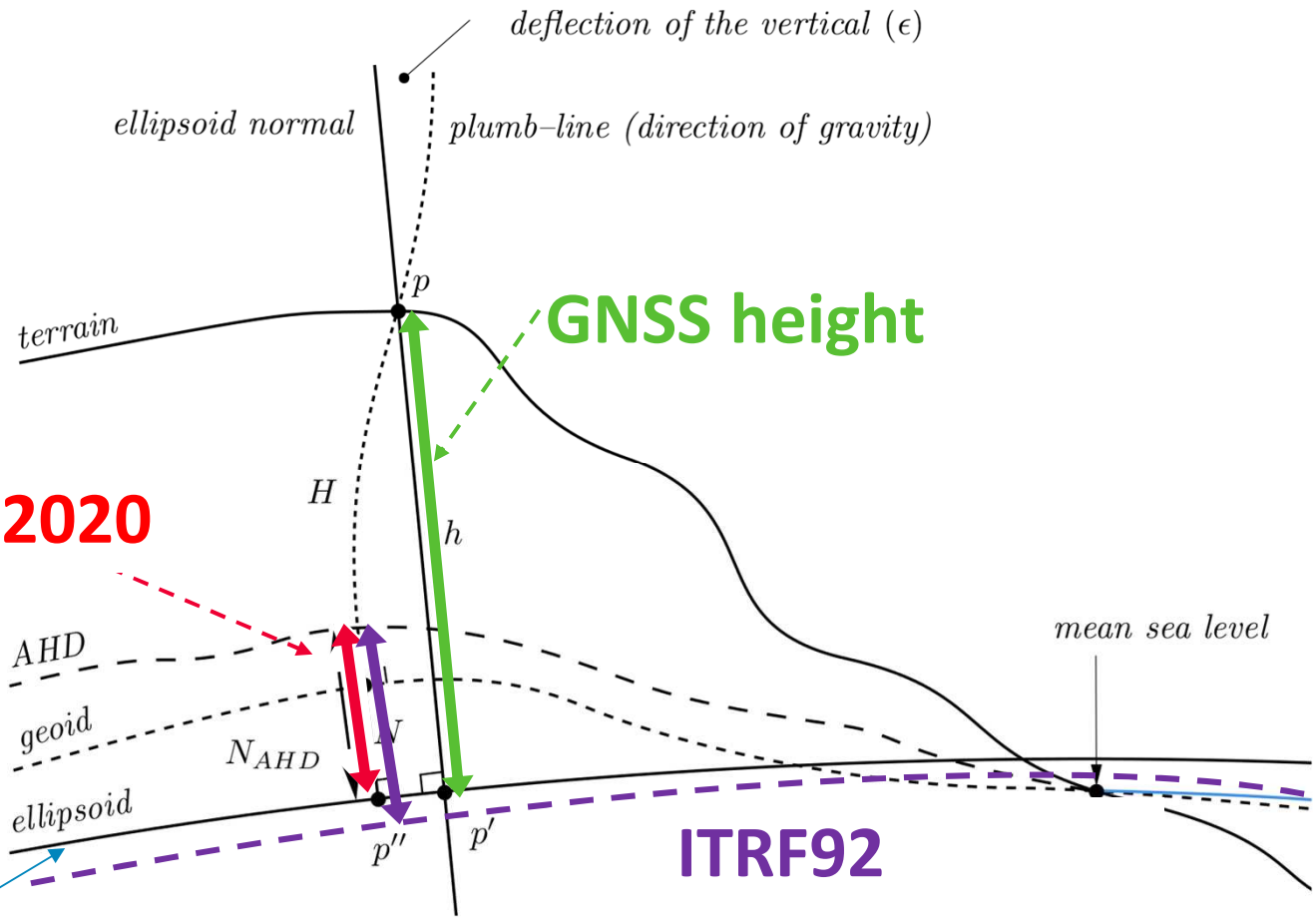
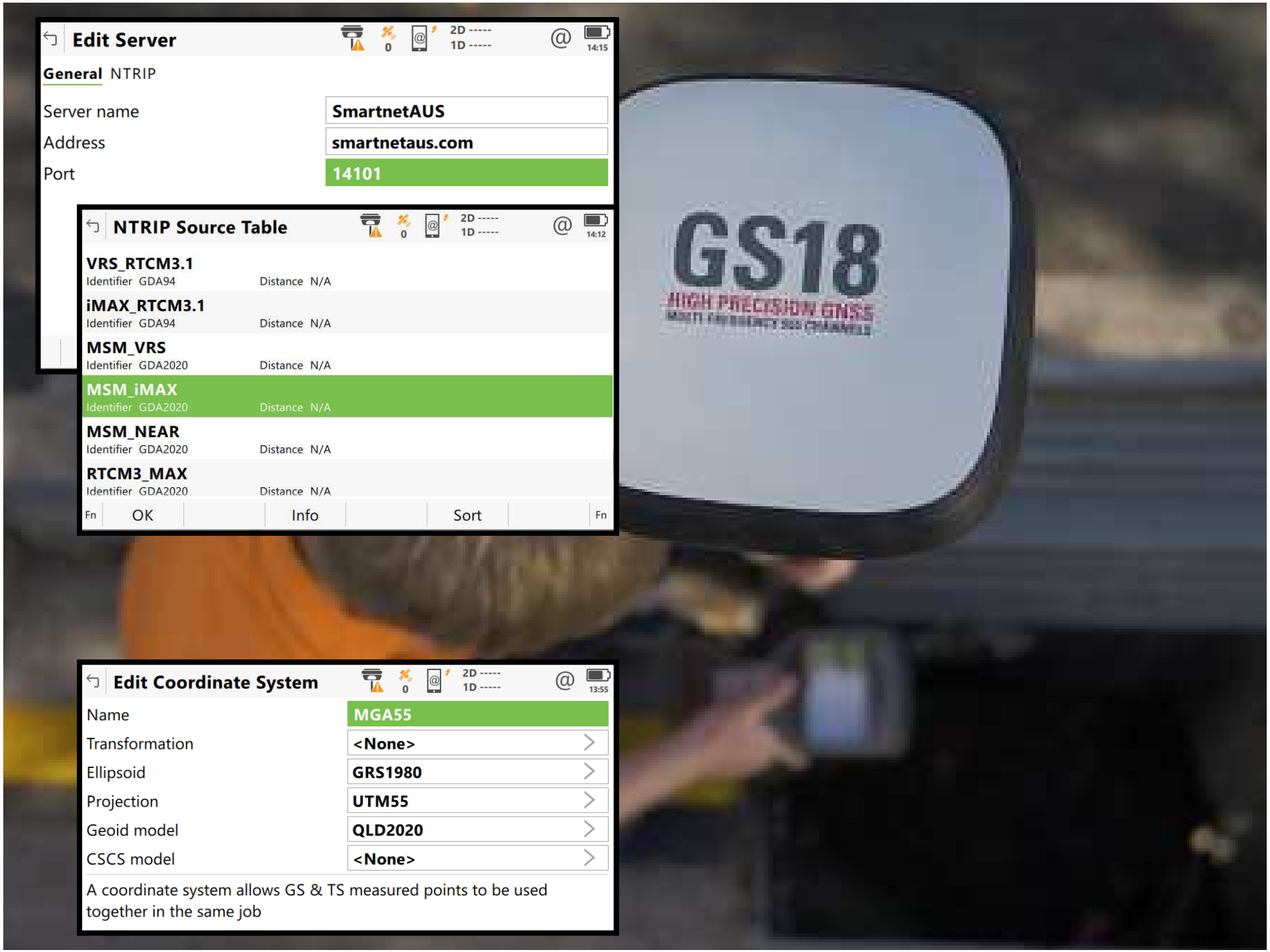
A coordinate system allows GS & TS measured points to be used together in the same job

Ausgeoid2020

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1D -----
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General NTRIP
Server name
SmartnetAUS
Address
smartnetaus.com
Port
14101
NTRIP Source Table
14:12
VRS_RTCM3.1
Identifier GDA94
Distance N/A
iMAX_RTCM3.1
Identifier GDA94
Distance N/A
MSM_VRS
Identifier GDA2020
Distance N/A
MSM_iMAX
Identifier GDA2020
Distance N/A
MSM_NEAR
Identifier GDA2020
Distance N/A
RTCM3_MAX
Identifier GDA2020
Distance N/A
Fn
OK
Info
Sort
Fn
Edit Coordinate System
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MGA55
Transformation
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Ellipsoid
GRS1980
Projection
UTM55
Geoid model
QLD2020
CSCS model
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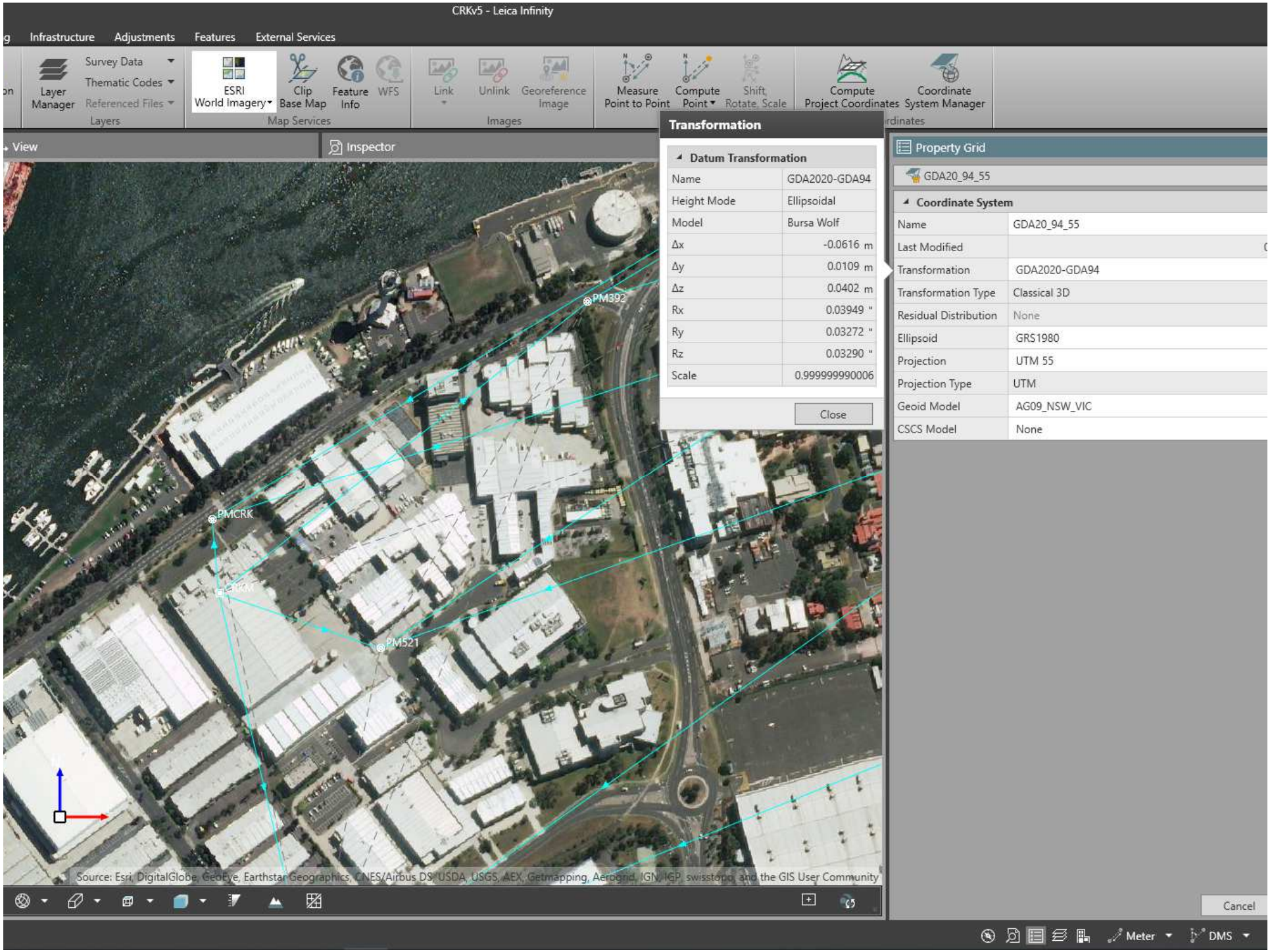
A coordinate system allows GS & TS measured points to be used together in the same job
GS18
HIGH PRECISION GNSS


CRKv5 - Leica Infinity
Infrastructure
Adjustments
Features
External Services
Survey Data
Thematic Codes
Referenced Files
Layer Manager
Layers
ESRI World Imagery
Clip Base Map
Feature Info
WFS
Map Services
Link
Unlink
Georeference Image
Images
Measure Point to Point
Compute Point
Shift Rotate, Scale
Compute Project Coordinates
Coordinate System Manager
View
Inspector
PM392
PMCRK
PM521
Transformation
Datum Transformation
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Height Mode Ellipsoidal
Model Bursa Wolf
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Δy 0.0109 m
Δz 0.0402 m
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Ry 0.03272 "
Rz 0.03290 "
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Ellipsoid GRS1980
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Projection Type UTM
Geoid Model AG09_NSW_VIC
CSCS Model None
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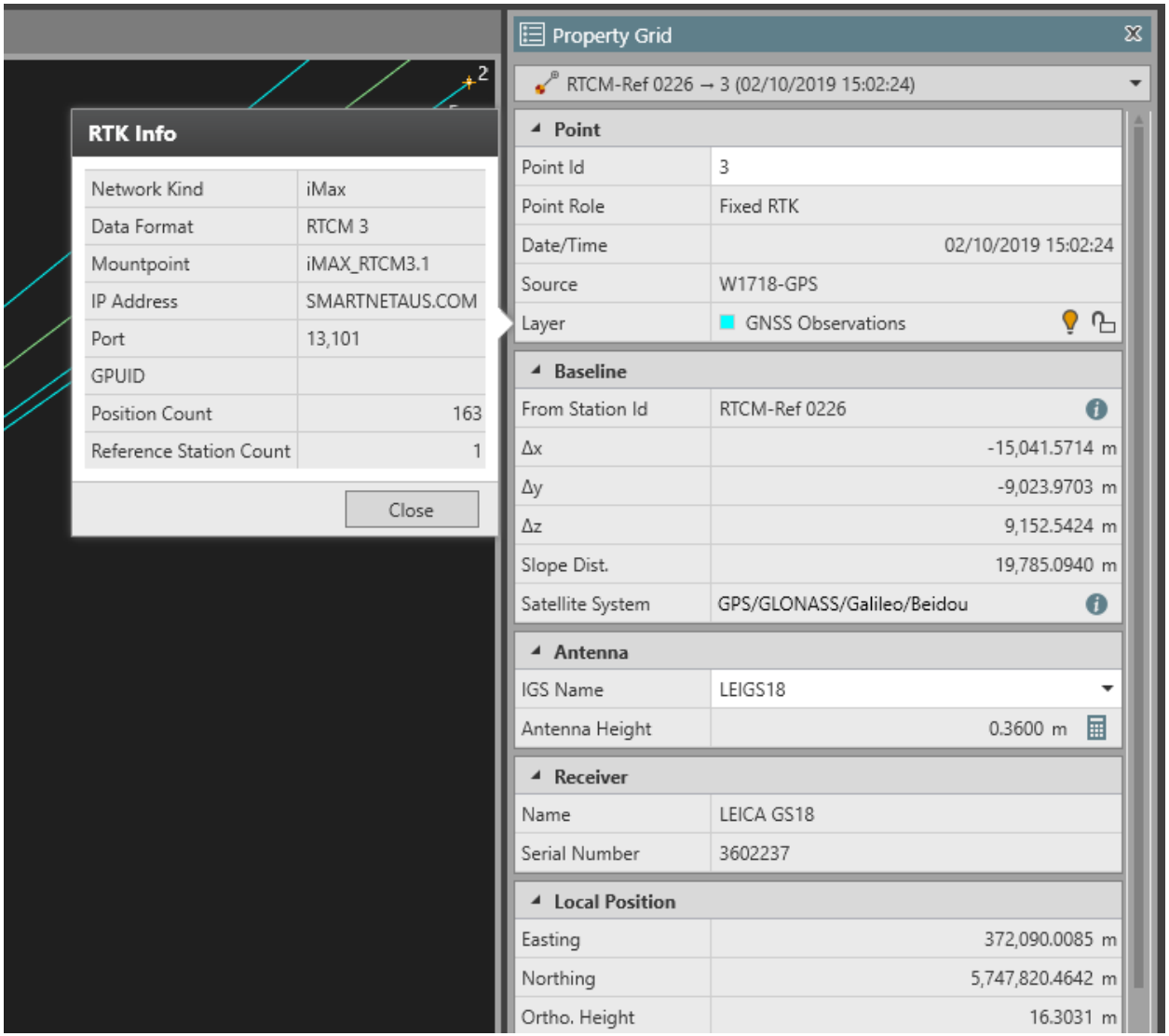
Cancel
Meter
DMS



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Troubleshooting – what goes wrong

Field - Crew not understanding how to work in GDA2020

- Applying a transformation BUT also using a reference point in the desired GDA
- Not knowing the what Mountpoint is selected
- Creating a local transformation using a GDA94 mountpoint then subsequently using a GDA2020 mountpoint
- Contractors not knowing the GDA used on a site / project

Office – 'Spatial database' not ready for GDA2020

"Non-familiarity or requirement to do so under Government reporting guidelines, and the difficulty regards integration of GDA2020 coordinate data with Web Based mapping services due to the issues discussed here: https://www.spatialsource.com.au/surveying/gda2020-and-overcoming-the-web-mercator-dilemma"

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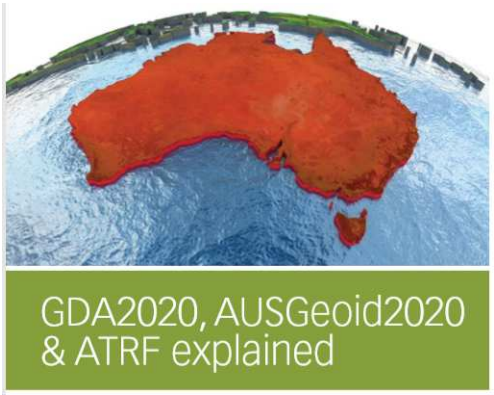
Where can I get more information?

https://survey.crkennedy.com.au/blogs/tech-support

https://www.spatial.nsw.gov.au/__data/assets/pdf_file/0018/217224/2017_Janssen_Position90_GDA2020_AUSGeoid2020_and_ATRF_explained.pdf



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http://icsm.gov.au/datum/gda2020-fact-sheets

https://www.icsm.gov.au/datum/gda2020-forum

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W: http://www.dnrme.qld.gov.au
(search 'GDA2020')