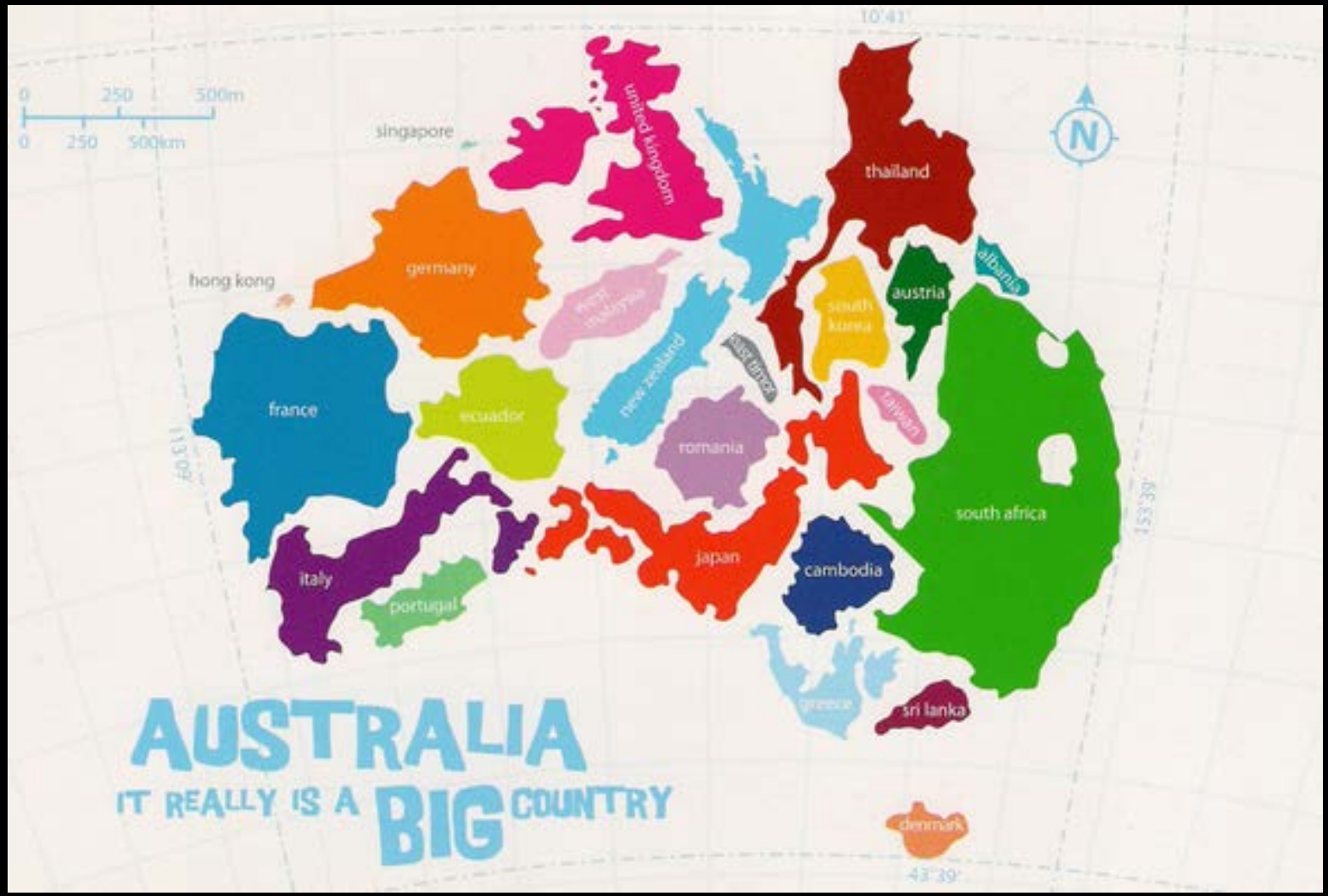
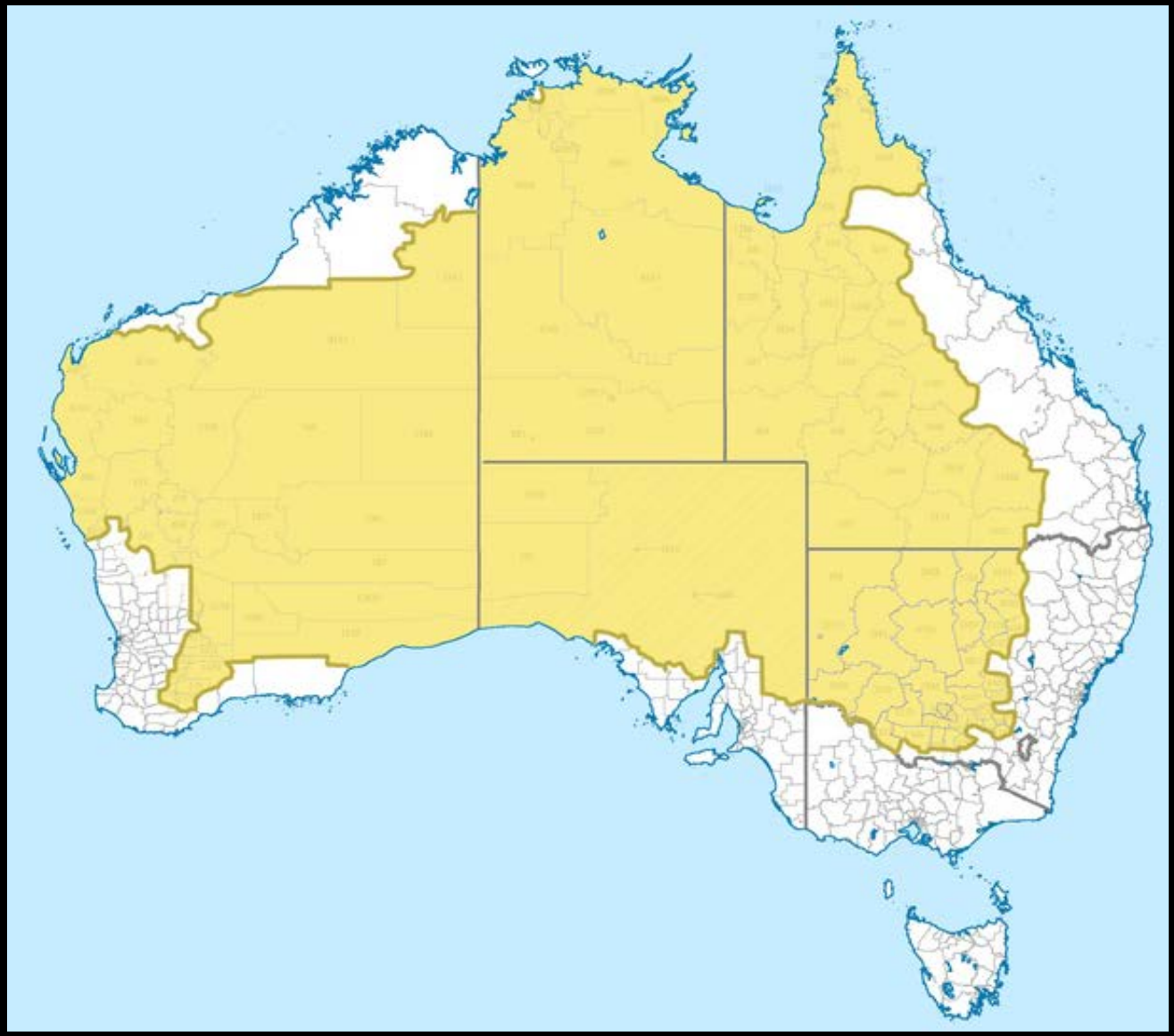
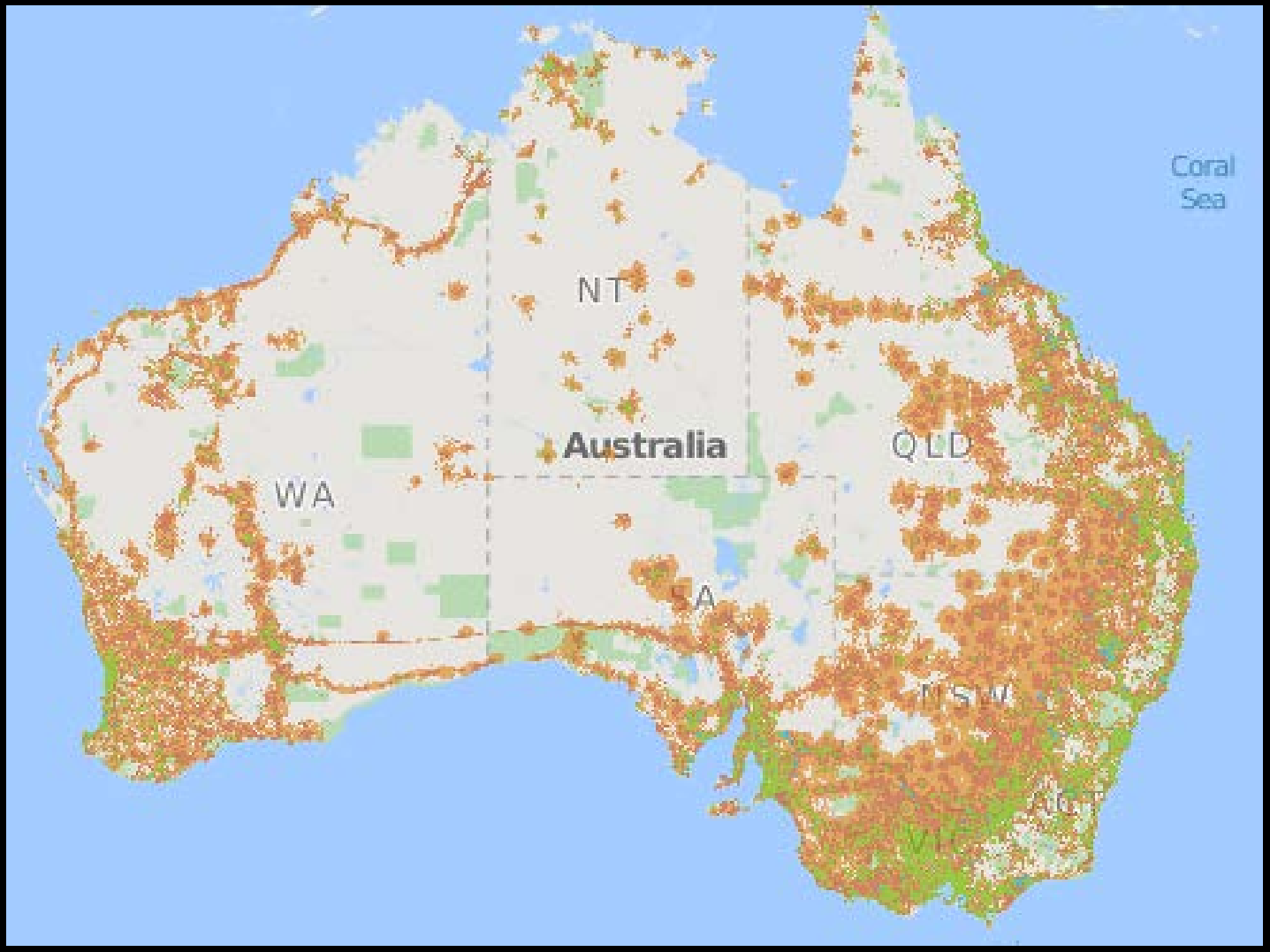
# Ambiguity Resolved PPP – A Case Study in NSW

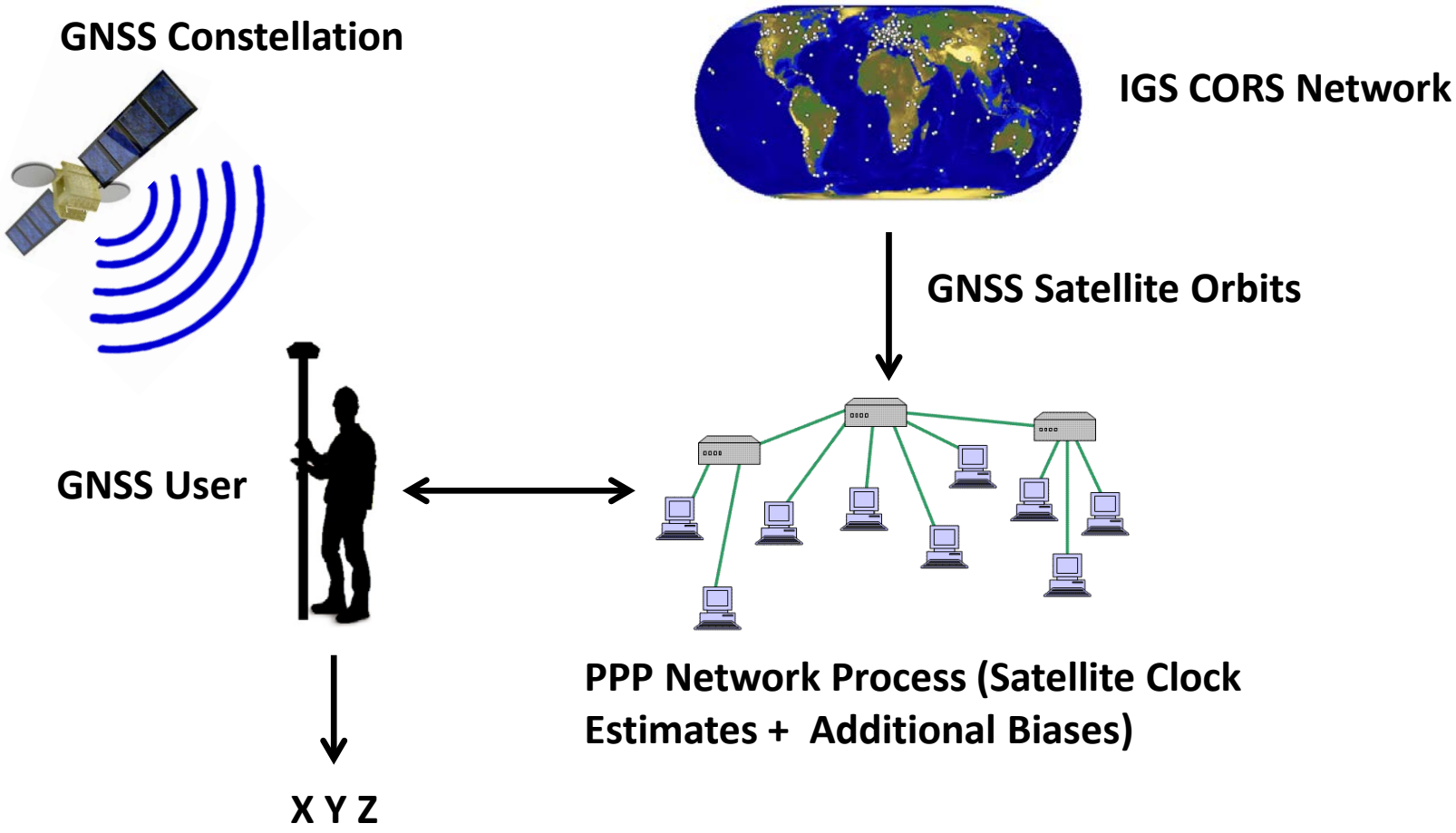
Thomas Grinter, Volker Janssen, Craig Roberts


0 250 500m
0 250 500km
singapore
united kingdom
thailand
germany
hong kong
albania
austria
south korea
france
ecuador
new zealand
sri lanka
romania
taiwan
south africa
japan
cambodia
italy
portugal
greece
sri lanka
denmark
AUSTRALIA
IT REALLY IS A BIG COUNTRY

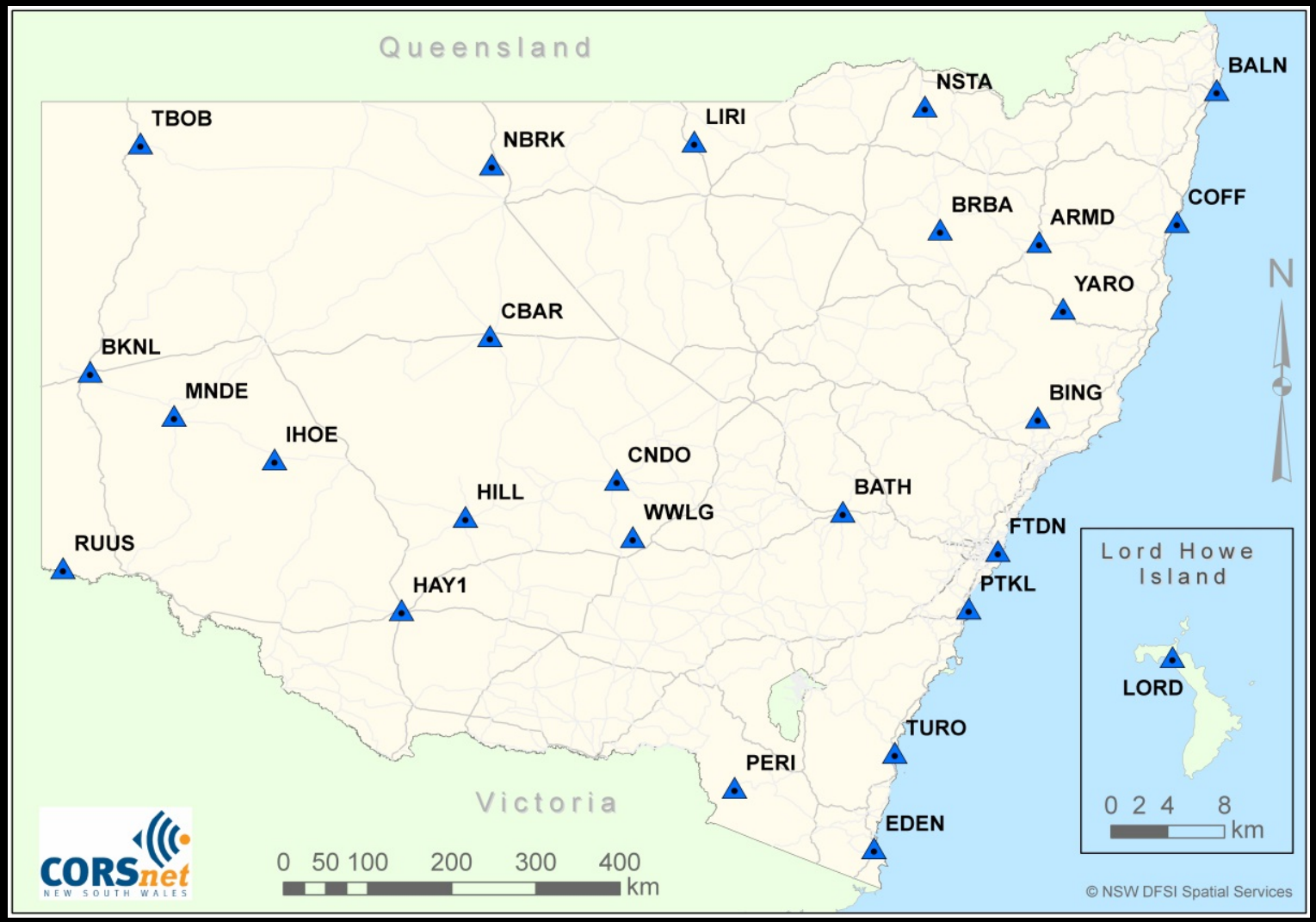



Coral
Sea
NT
Australia
QLD
WA
SA
NSW
VIC

# How it works


GNSS Constellation
IGS CORS Network
GNSS Satellite Orbits
GNSS User
PPP Network Process (Satellite Clock Estimates + Additional Biases)
X Y Z

# Test Area

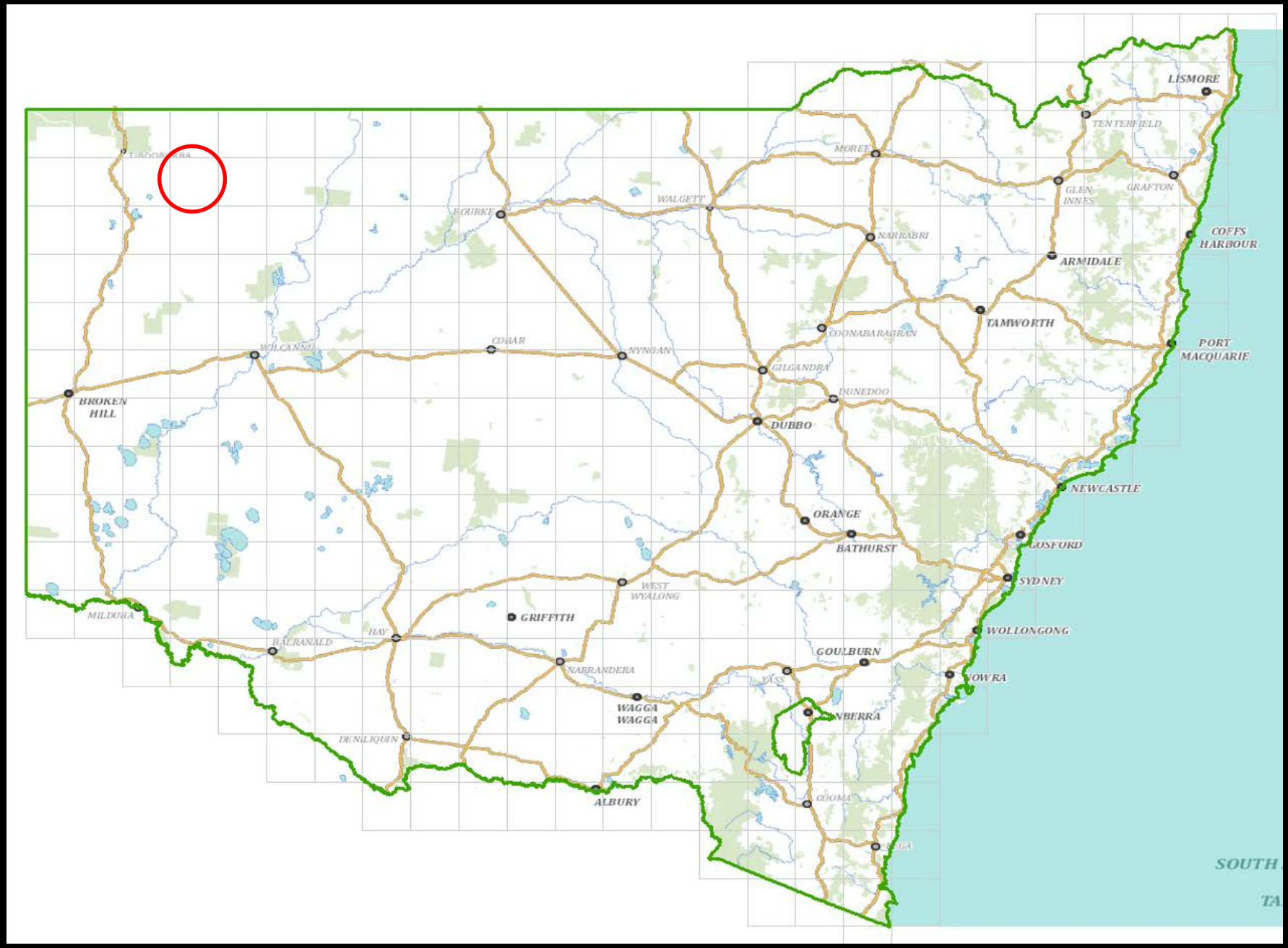

Queensland
Victoria
TBOB
NBRK
LIRI
NSTA
BALN
BRBA
ARMD
COFF
YARO
CBAR
BKNL
MNDE
IHOE
BING
CNDO
HILL
WWLG
BATH
FTDN
RUUS
HAY1
PTKL
Lord Howe Island
LORD
TURO
PERI
EDEN
N
0 50 100 200 300 400 km
0 2 4 8 km
CORSnet NEW SOUTH WALES
© NSW DFSI Spatial Services

# Solution

- Modified RTKLIB software (K Harima)
- GPS only
- Ambiguity Resolved - PPP
- Simulated Real-Time
- CLK91 corrections
- Broadcast + SSR APC
- P1C1DCB
- IGS08 ATX

# Results

| Average | Easting | Northing | Up |
|---|---|---|---|
| RMS (m) | 0.018 | 0.026 | 0.063 |
| Max | 0.049 | 0.041 | 0.181 |
| Min | 0.005 | 0.003 | 0.006 |
| CT (minutes) | 54 | 46 | 50 |


LISMORE
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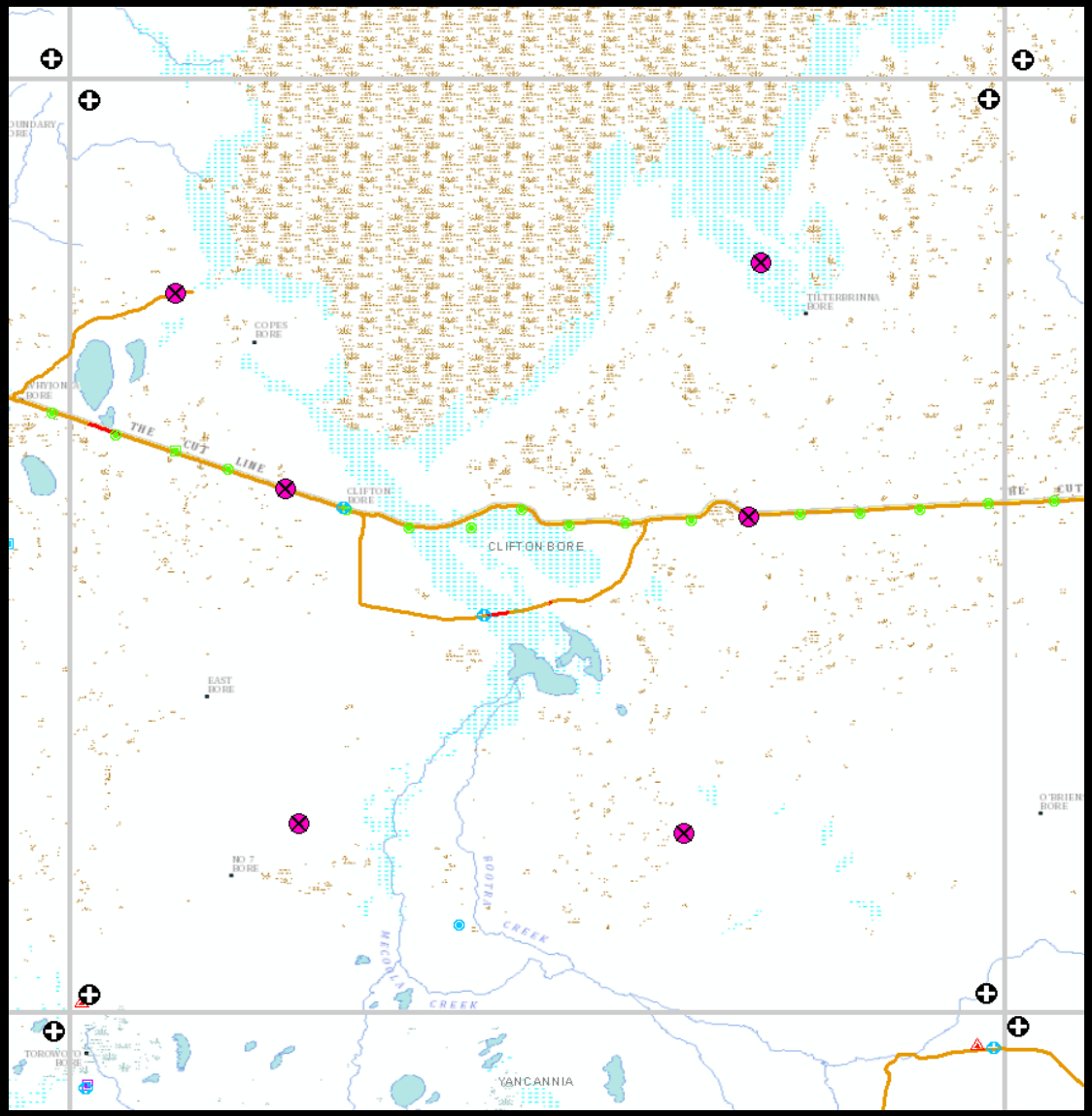
MOREE
GLEN INNES
GRAFTON
COFFS HARBOUR
WALGETT
BOURKE
NARRABRI
ARMIDALE
TAMWORTH
COONABARABRAN
PORT MACQUARIE
WILCANNIA
COBAR
WYNGAN
GILGANDRA
DUNEDOO
BROKEN HILL
DUBBO
NEWCASTLE
ORANGE
BATHURST
GOSFORD
SYDNEY
WEST WYALONG
MILDURA
GRIFFITH
HAY
BALRANALD
WOLLONGONG
GOULBURN
NARRANDERA
YASS
NOWRA
WAGGA WAGGA
CANBERRA
DENILIQUIN
ALBURY
GOOMA


COPES BORE
TILTERBRINNA BORE
THE CUT LINE
CLIFTON BORE
EAST BORE
NO 7 BORE
O'BRIEN BORE
BOOTH CREEK
YANCANNIA

# Results

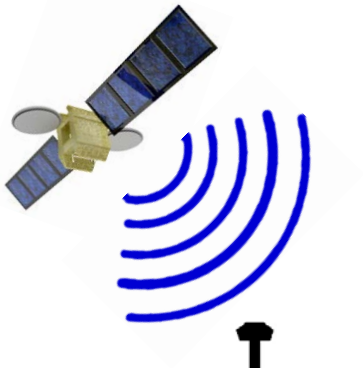
Criteria H < 50mm V < 100mm

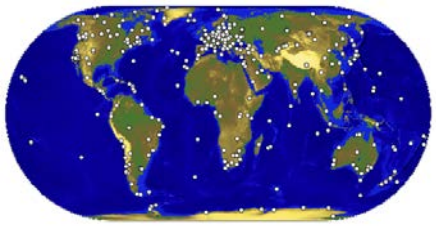
| | | | | |
|---|---|---|---|---|
| **Convergence Times** | < 15 min | < 30 min | < 60 min | <2hrs |
| **Number of Epochs** | 2% (3) | 10% (16) | 55% (86) | 75% (117) |

92% of Epochs had 75% of ambiguities resolved.

# How it could work

GNSS Constellation



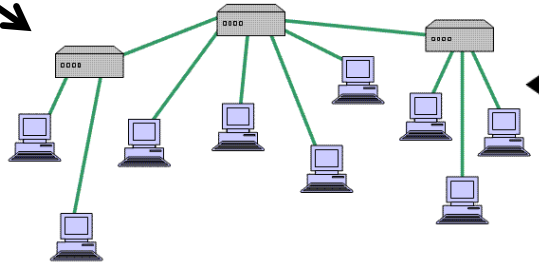


IGS CORS Network

GNSS Satellite Orbits

Regional CORS Network

GNSS User



PPP Network Process (Satellite Clock Estimates + Additional Biases)

X Y Z

# Questions