Geodesy @ DLRRD

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REPUBLIC OF SOUTH AFRICA

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South African Geodesy Working Group

Applicable Legislation :

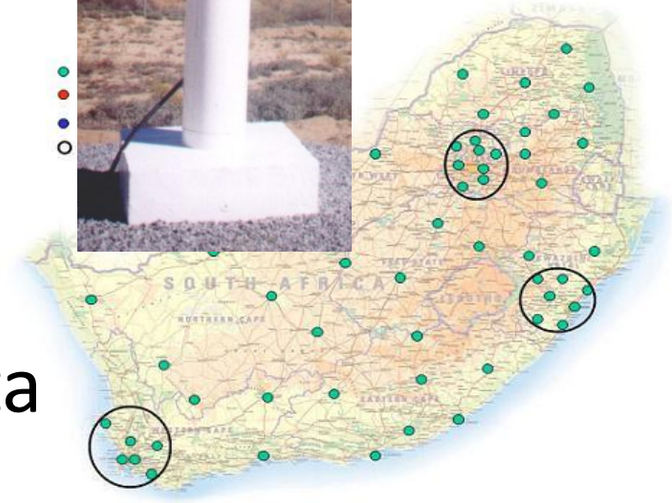
- 1) Land Survey Act, 1997 (Act 8 of 1997)
  - Duties of CD: NGI listed in sec 3 (A), establish and maintain a national control survey system;
  - Secs 42, 43, 44 – beacons and marks of national control survey system
- 2) SDI Act 53 of 2003 and Policy on the Pricing of Spatial Information

National Control Survey System

- Firstly, the unique spatial reference framework provides integrated, unambiguous positioning, connected locally, nationally and internationally.
- Defines the South African Coordinate Reference System (Coordinate System and Geodetic Datum)

National Control Survey System

- Passive Network
  - Co-ordinates and heights of ±28 000 trigonometrical beacons and ± 25000 town survey marks.
- Active Network
  - TrigNet: The SA Network of Continuously Operating GNSS Reference Stations
  - Host for African Reference Frame (AFREF) data center



SA Land Levelling Datum (SALLD)

- Reference surface: Adopted mean sea level at Cape Town (referenced to BM 1).
- Origin: constrained to mean sea level as determined from average tidal observations at Cape Town harbour in 1900 and 1907.
- Precise levelling commenced in 1904 and the first provisional adjustment between Cape Town, Pretoria and Durban occurred in 1943.

Realisation of Hartebeesthoek94

- 29 000 Trigonometrical Beacons
- 24 000 accessible Town Survey Marks
- 70 Permanent GNSS reference stations.

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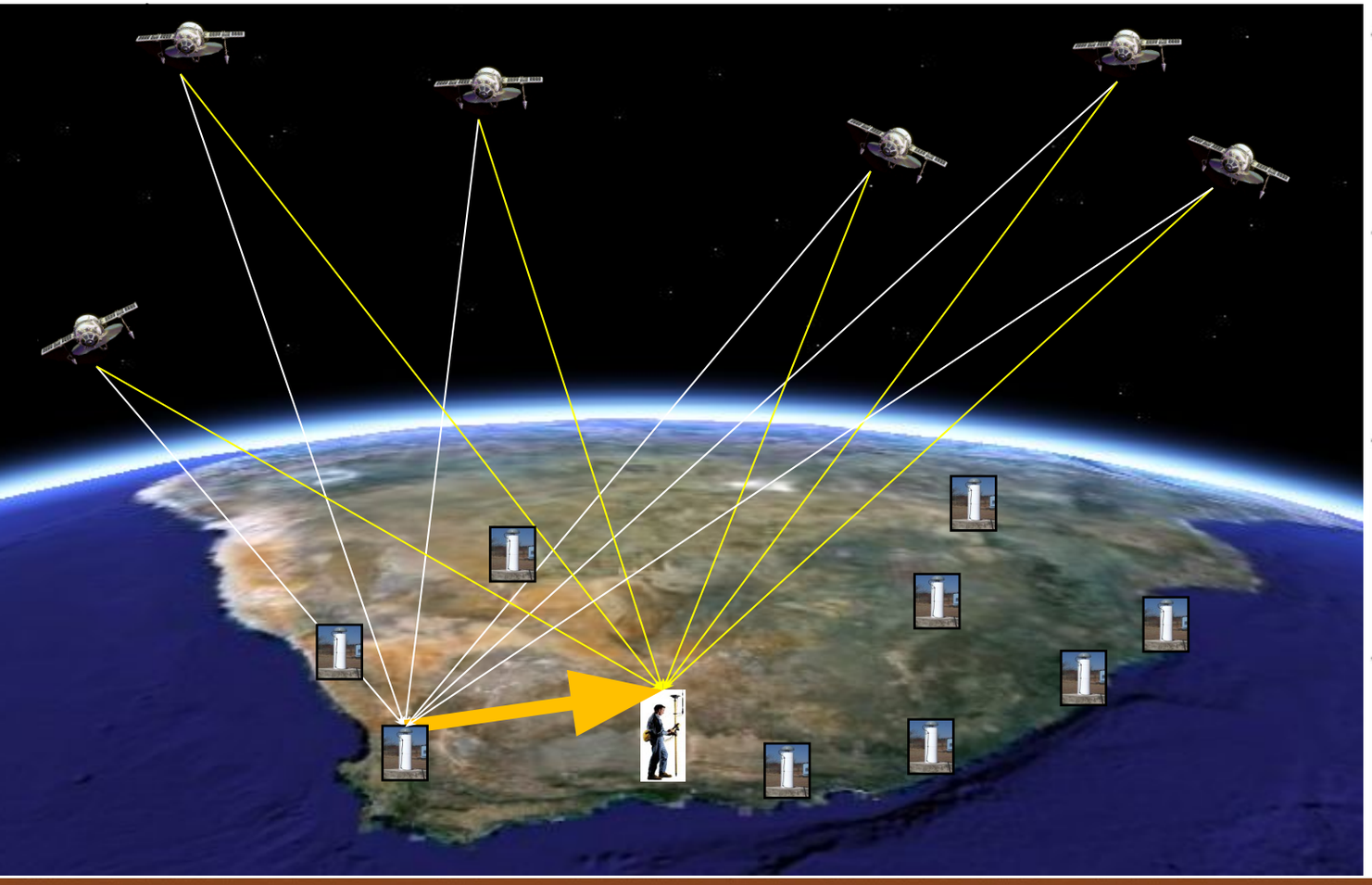
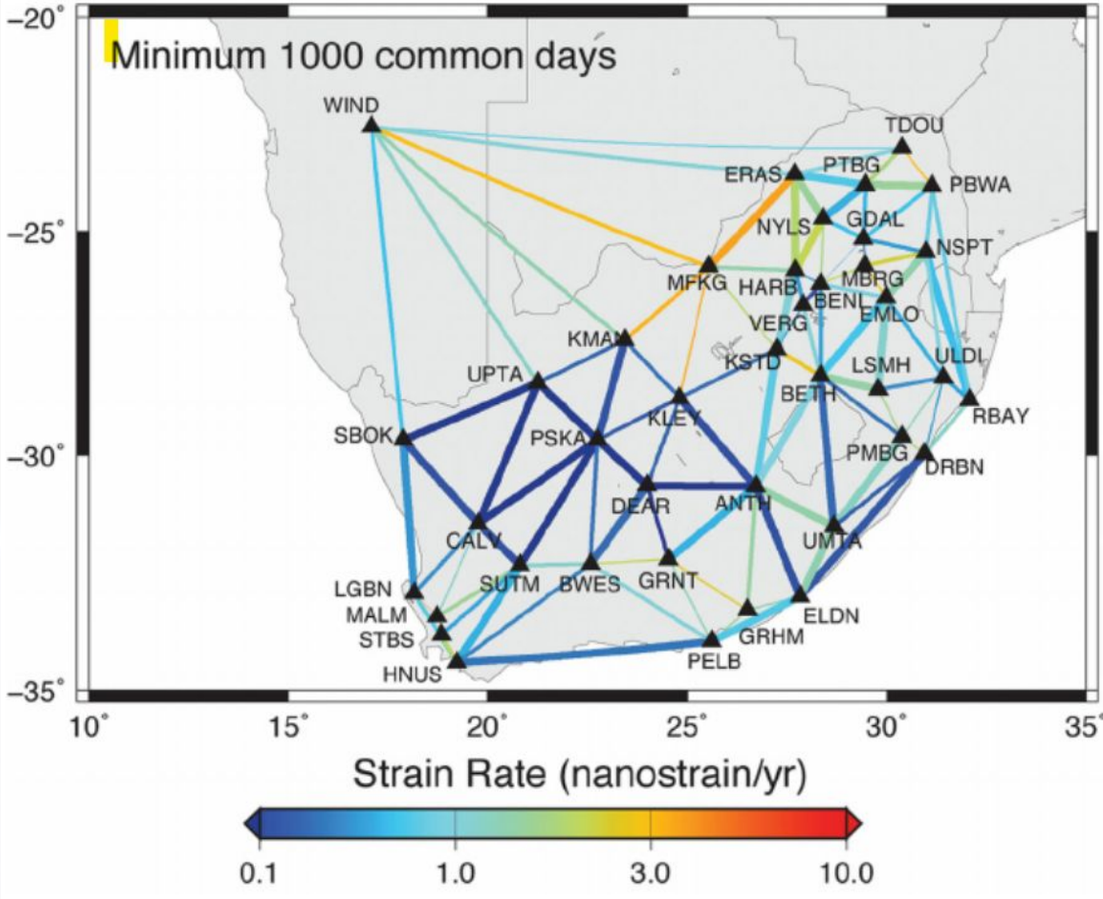
TrigNet www.trignet.co.za





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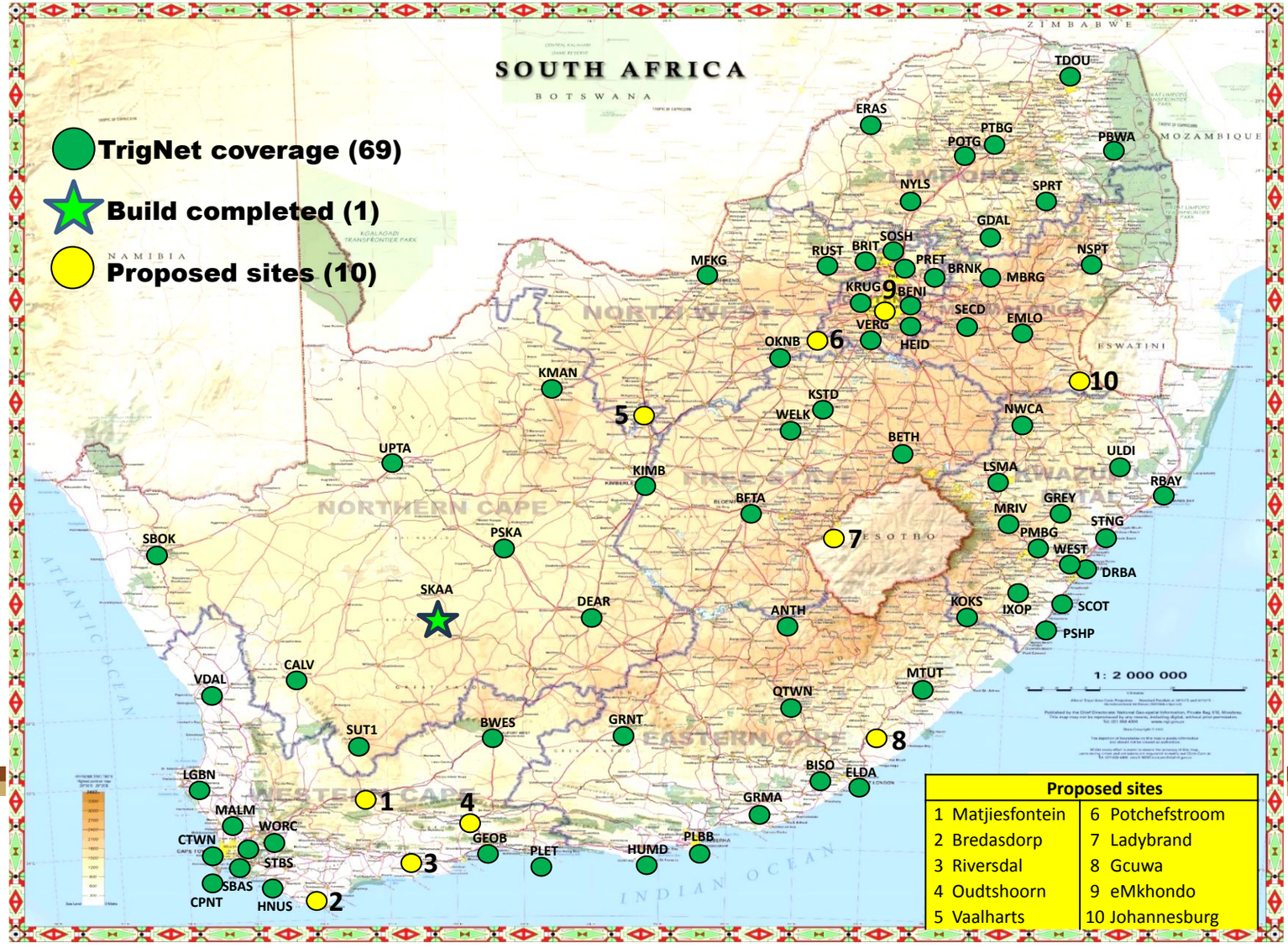
TrigNet @ 2025



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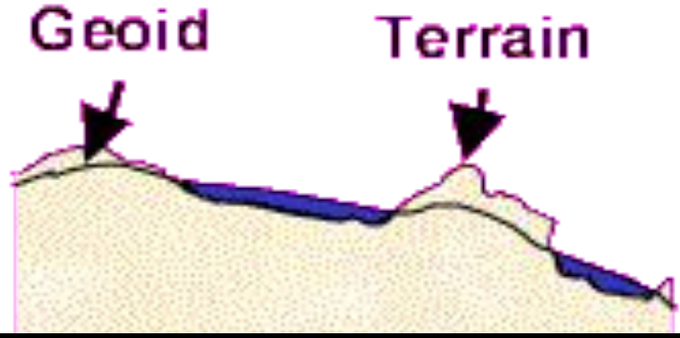
TrigNet Status

- 70 functional stations
- Modernization a priority
- Numerous scientific applications SANSA using to space weather prediction.
- Geoid model used to convert from to Ortho heights.
- Coordinates transmitted in ITRF2014 (epoch 2018) but also available in Hartebeesthoek94

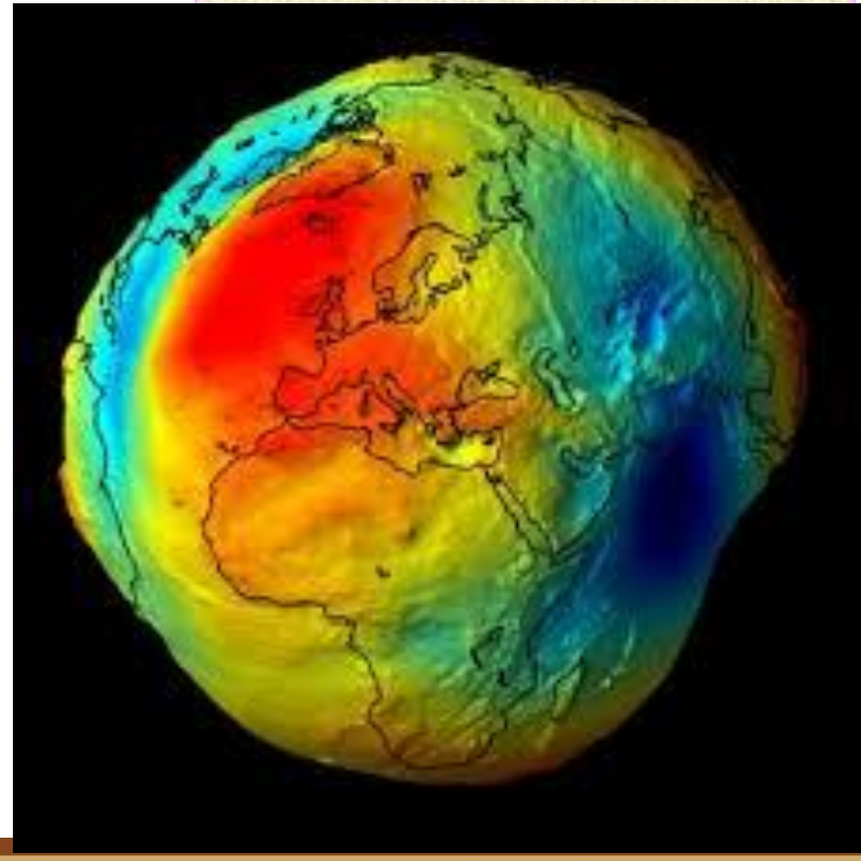
Realisation of LLD

- Numerous precisely levelled bench marks,
- ± 20 000 Town survey marks (> unofficial) ,
- Approximately 29 000 Trigonometrical beacons

The SAGeoid2010



- That equipotential surface that on average coincide with mean sea level.
- In SA, ellipsoidal heights (h) > orthometric heights (H)
- The geoidal undulation (N) is defined as H = h-N



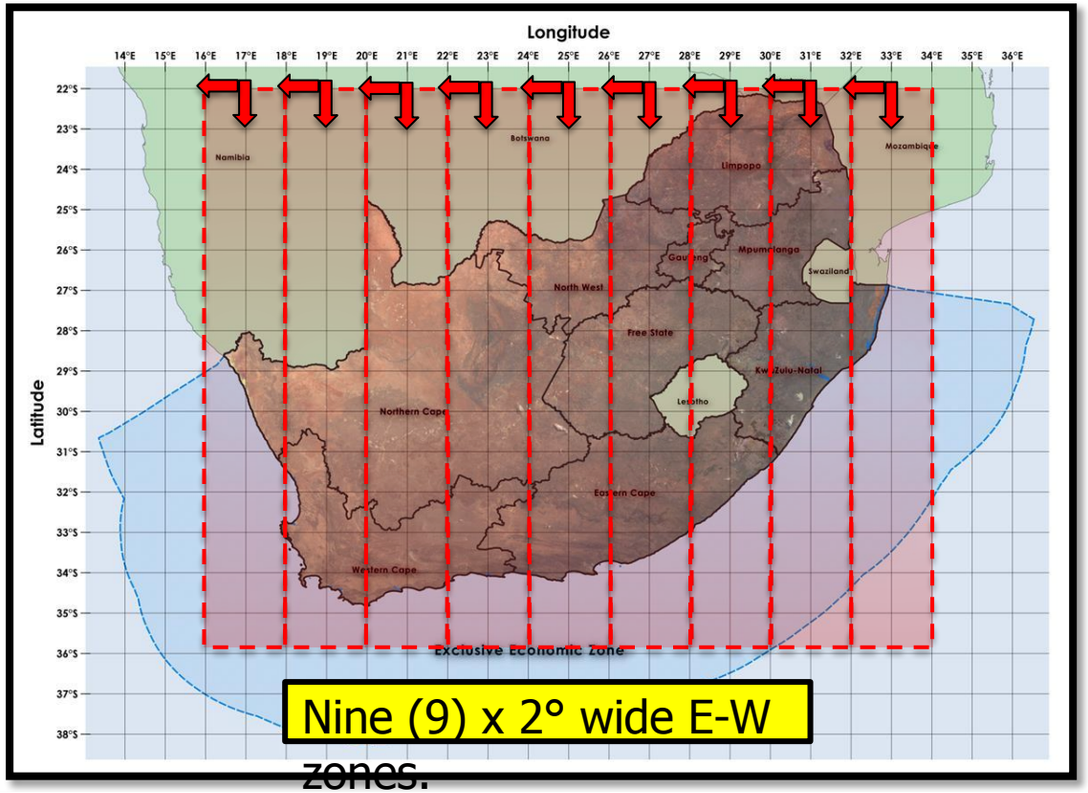
Spatial/Coordinate Reference Systems (SRS/CRS)

- CRS = Coordinate Reference System
- Set of mathematical rules for specifying how coordinates are to be assigned to points (coordinate system) that are related to the real world by a datum/reference frame.

Spatial/Coordinate Reference Systems (SRS/CRS)

South African Coordinate Reference System (current)

- Geodetic Datum (Hartebeesthoek94)
  - WGS84 ellipsoid
  - Coincident with ITRF91 epoch 1994.0
- Coordinate System (Gauss Conformal)
  - Transverse Mercator Projection
  - Coordinate System Conventions



Geodesy is central to affirmation of International Boundaries

- SA has borders with Namibia, Botswana, Zimbabwe, Mozambique, Eswatini (Swaziland) and Lesotho.
- DLRRD is SA lead in positional aspects during multilateral process.
- Also international maritime boundaries and EEZ


THANK YOU