FIG WORKING WEEK 2025
AND Locate25 THE NATIONAL GEOSPATIAL CONFERENCE
Collaboration, Innovation and Resilience: Championing a Digital Generation
FIG Geospatial Council of Australia
Brisbane, Australia 6–10 April

Two-frame approach for height in Australia

ICSM
INTERGOVERNMENTAL COMMITTEE ON SURVEYING AND MAPPING

Craig Harrison (Geoscience Australia)
GWG Vertical Datum Task Force

AUSTRALIAN GEOSPATIAL REFERENCE SYSTEM

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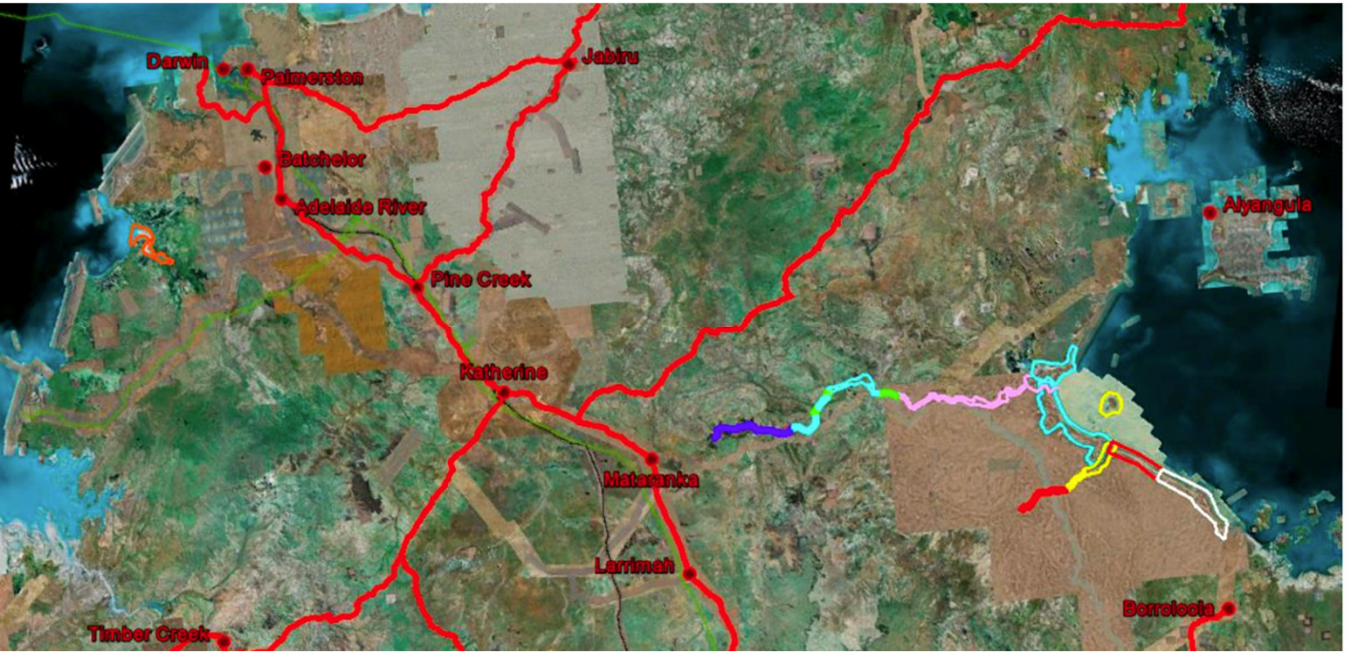
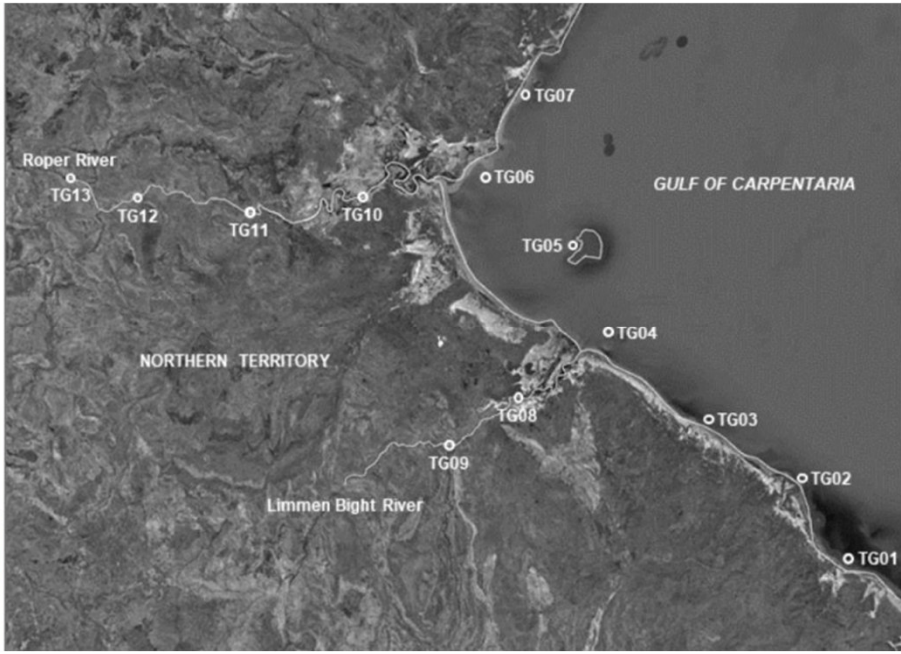
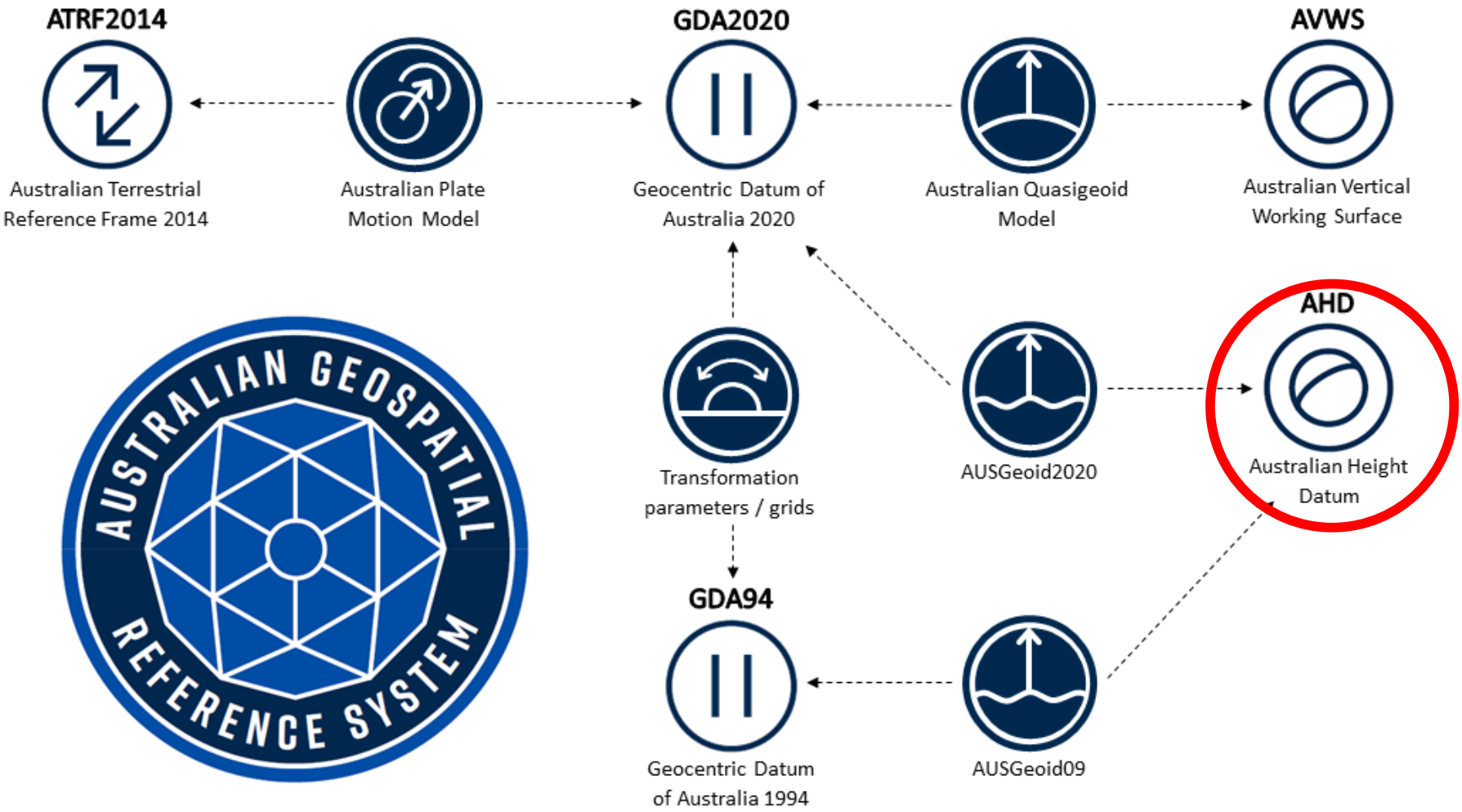
Intertidal Zone Land Claims

- Department of Lands, Planning and Environment
- Surveys of the intertidal zone and the beds & banks of rivers on two sections of the coast
- Define the tidal planes along the coast, the extent of the tidal influence in the rivers, and to create a digital elevation model (DEM)
- Which height datum to use?



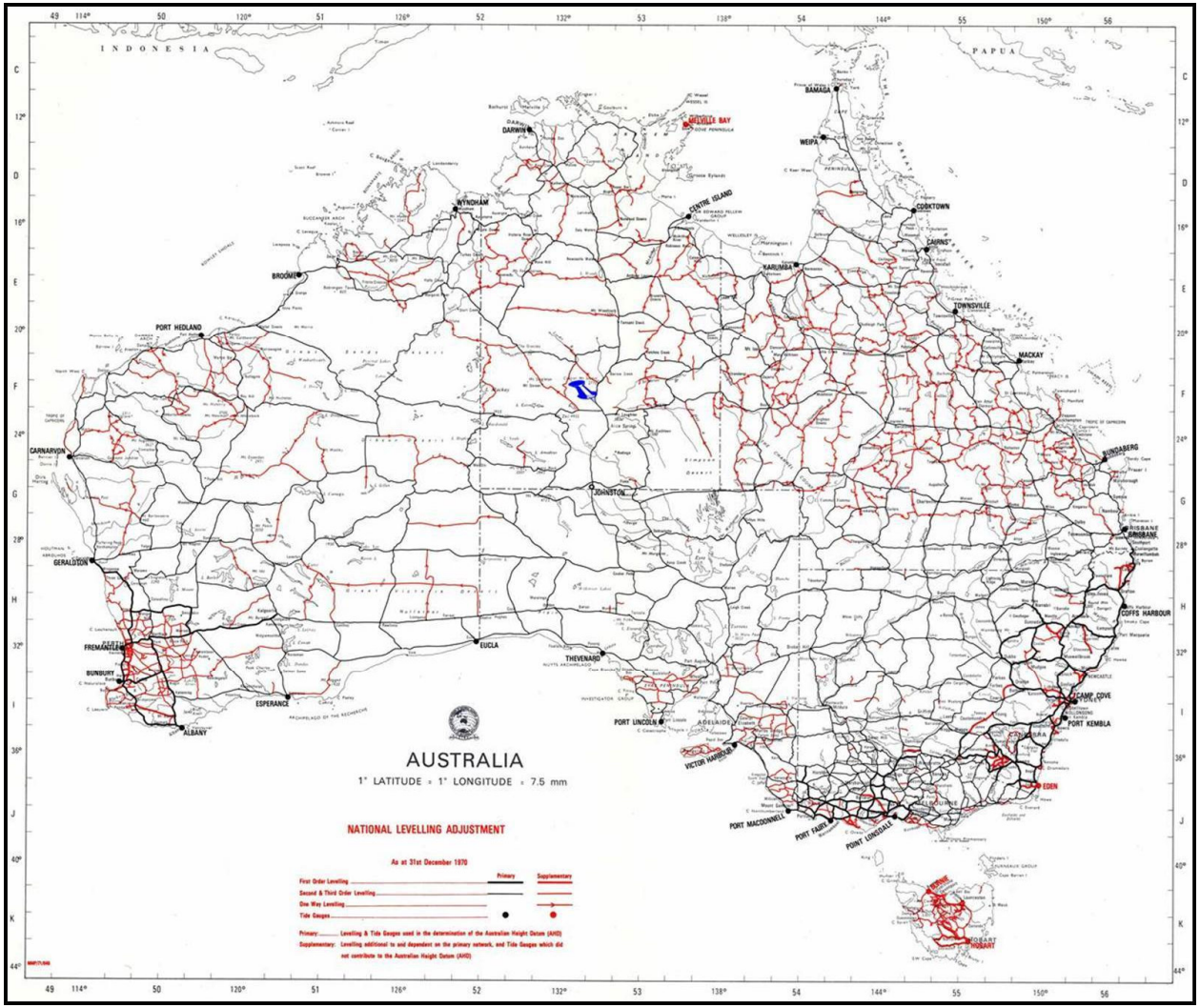


Australian Geospatial Reference System

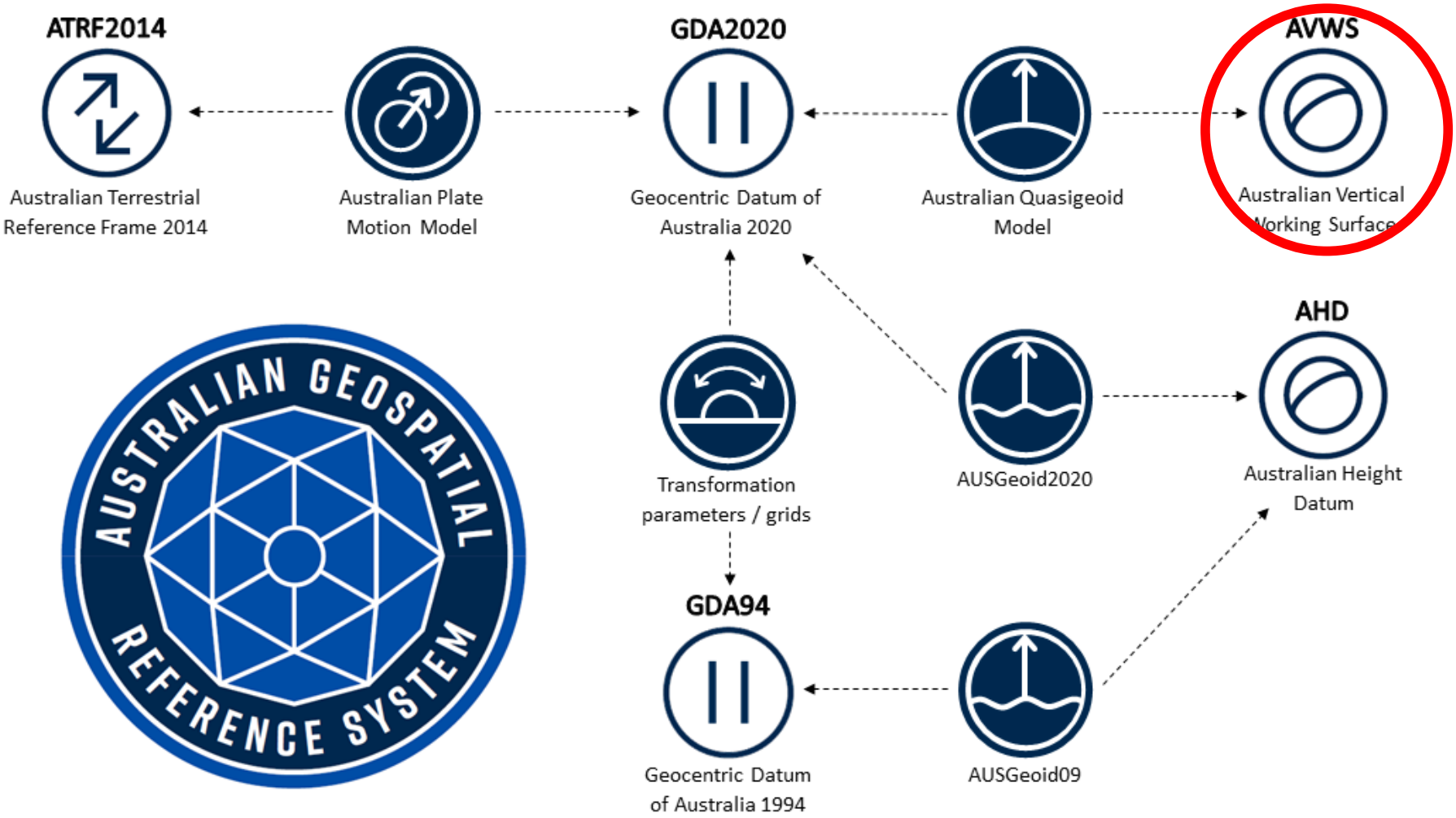


Australian Height Datum 1971

- National height datum for more than 50 years
- Based on 1966-1968 MSL at 30 tide gauges (AHD 0.000m)
- 97,230 km of two-way levelling propagated across Australia
- Height values were calculated through a least squares adjustment of the connected level runs
- Primarily realised through published heights on survey marks
- Accessible with GNSS using AUSGeoid2020
- AHD-TAS83, based on 1972 MSL at Hobart and Burnie

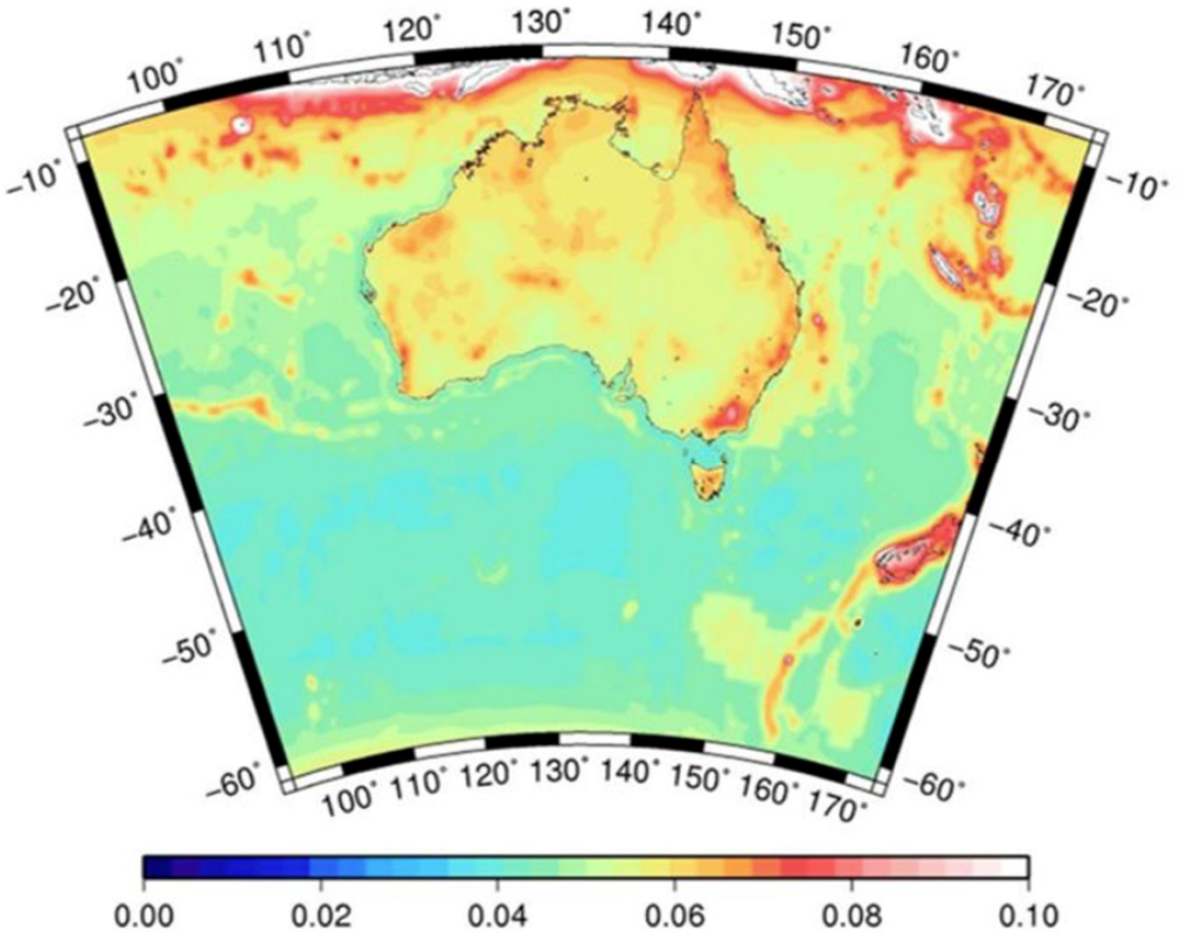


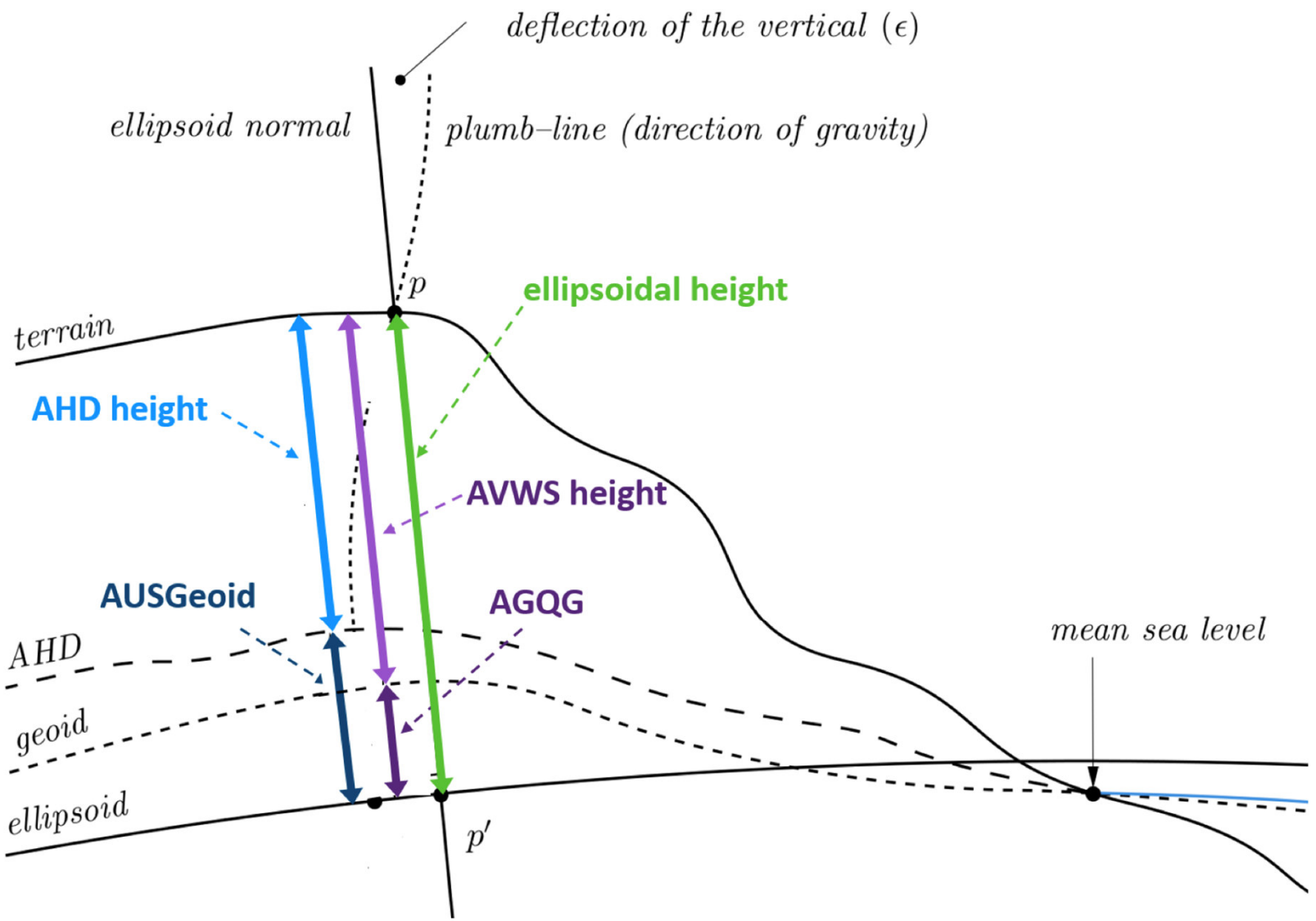
Australian Geospatial Reference System



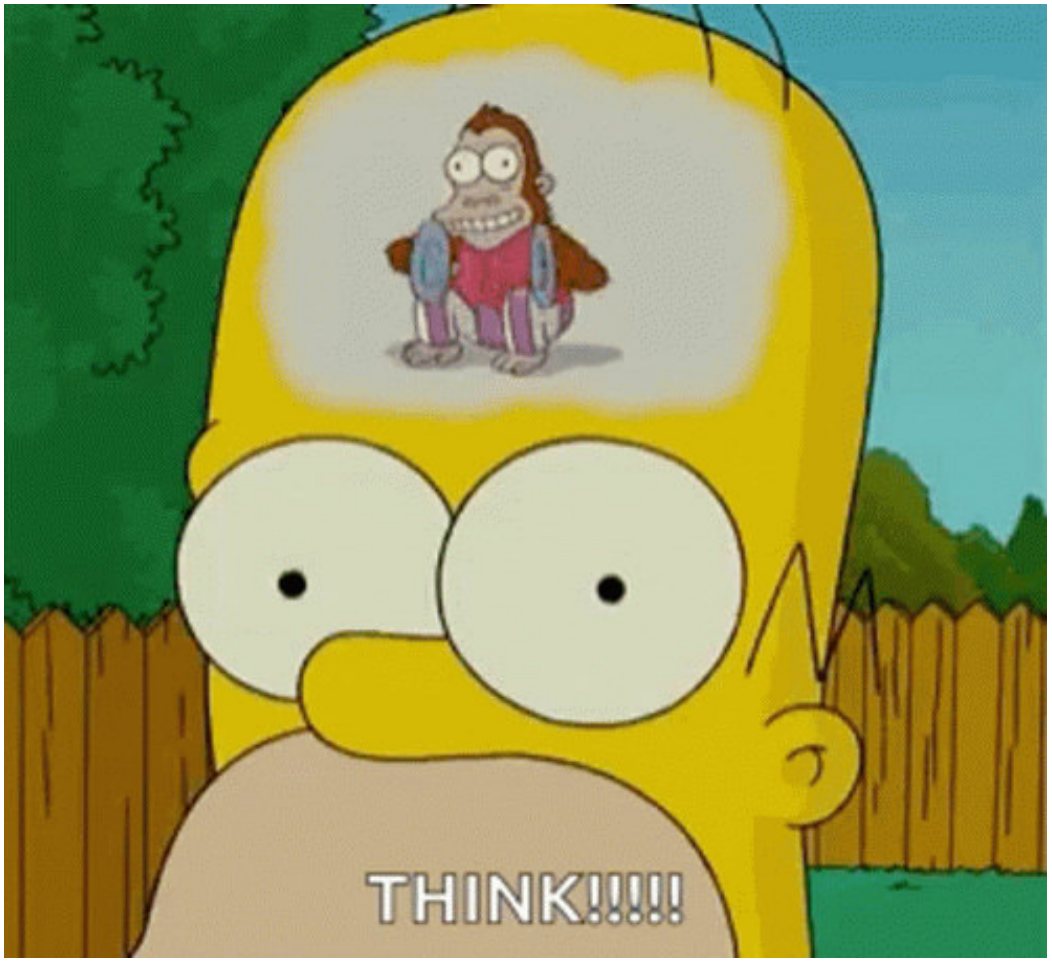
Australian Vertical Working Surface

- Released in 2020 as an alternative to AHD
- Based on the Australian Gravimetric Quasigeoid (AGQG), which provides the offset between the ellipsoid and geoid
- Computed directly from GNSS without needing to connect to survey mark infrastructure
- Free from the biases and distortions associated with AHD
- A model uncertainty of 4-8 cm (AQGQ) compared with a model uncertainty of 6-13 cm for AHD (AUSGeoid2020)
- Available both onshore and offshore





Considerations



- The areas of interest for this current survey were not near any survey control marks (SCM)
- Impractical to attempt a level run from the nearest AHD SCM
- The survey includes both onshore and offshore components
- Any influence of the SCM observations that went into the AUSGeoid2020 model are removed.
- The uncertainties are lower using AWVS compared with AHD

Vertical Datum Task Force (VDTF)

- ICSM endorsed the two-frame approach and its implementation by the GWG
- The VDTF is to explore, assess, and facilitate the full implementation of the two-frame approach for height in Australia
  - Support the on-going use of AHD
  - Promote AVWS as an alternative and increase access to it
- Key deliverables:
  - a roadmap for the technical implementation
  - a technical implementation plan
  - a stakeholder engagement and communication plan
  - reports outlining technical requirements and recommendations for the adoption of AVWS.
- Additional deliverables may include:
  - a more detailed stakeholder engagement plan, including user needs assessment
  - a legislative review.

Two-Frame Update – Work Plan

New Data Acquisition

- Addition of new airborne gravity data from NSW, Victoria, SA; options for other jurisdictional input

Stakeholder engagement

- Improve understanding of height datum user needs

Data Infrastructure Upgrades

- National updates to AGQG gravity model, AUSGeoid2020, AHD, and AVWS.

Implementation

- Create a transformation between AHD and AVWS.
- Derive and publish AVWS heights for survey marks and provide AVWS heights in GA products.

Transition to Operations

- Access AVWS heights through AUSPOS and add AVWS heights option to DynAdjust.

Summary

- Australia has adopted a two-frame approach to height
- AHD will remain the official height datum and will continue to be maintained
  - Legislative requirements
  - Familiarity
  - Fit-for-purpose
  - Education
- AWVS will be provided as an alternative for those projects that require it, and access will be increased
- The GWG formed the Vertical Datum Task Force to explore, assess, and facilitate the full implementation of the two-frame approach for height in Australia

The most relevant SDGs related to the presentation and theme of this session

1st relevant SDG

2nd relevant SDG

3rd relevant SDG

SUSTAINABLE DEVELOPMENT GOALS

International Federation of Surveyors supports the Sustainable Development Goals

Vertical Datum Task Force

- Craig Harrison (Chair; Geoscience Australia)
- Bill Payze (Secretary; DIPL, NT)
- Don Abbey (Australian Geospatial-Intelligence Organisation)
- Irek Baran (Landgate, WA)
- Jamie Dalrymple (Australian Geospatial-Intelligence Organisation)
- Neda Darbeheshti (Geoscience Australia)
- Joel Haasdyk (DCS Spatial Services, NSW)
- Lisa Hall (Geoscience Australia)
- Zarina Jayaswal (Australian Hydrographic Office)
- Jack McCubbine (Geoscience Australia)
- Anna Riddell (Geoscience Australia)
- Alex Woods (Office of Surveyor-General, Victoria)

Scan the QR code above if you would like to participate in the survey and/or provide actual or potential AVWS use cases

STEP 1: SELECT HERE THE THREE MOST RELEVANT SDGs
STEP 2: COPY THE SDG INTO PREVIOUS SLIDE