





Standards and Practices for Control Surveys (SP1): A New Standard for Australia

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SP1: Status



The Geodesy Technical Sub Committee (GTSC) of the Intergovernmental Committee on Surveying and Mapping (ICSM) is responsible for SP1.

In Australia, SP1 has been the primary reference for control surveys by government and industry for 40 years.

The SP1 document is now dated:




- Dramatic changes in technology and field survey methods have created a new paradigm for the practice of survey control
- Limited revisions have produced an inconsistent document
- An outdated style, using prescribed processes to limit error propagation.




SP1-V2: Proposal



- Adopt a 'standards' style with an outcomes-based structure to connect a client's expectation for:
 - connection to datum, and
 - coordinate accuracy, with a
 - a clear demonstration of survey outcome.
- SP1-V2 separates the stable components of a standard from the ever-changing measurement technologies and professional practices.
- SP1-V2 will be supported with separately maintained Technical Manuals and Guidelines.

SP1-V2: The Benefits





- A simple process, in plain English, to specify and demonstrate the delivery of a survey control project for both the client and surveyor.
- An outcome focus to promote innovation and efficiency: a surveyor will apply the most efficient tools and processes to achieve their objective.
- Improved longevity for SP1: changes in technology and practice can be more easily managed in separate Guidelines and Technical Manuals.
- Reduced management overhead – especially when SP1 is embedded in Quality Management Systems.



Accuracy and Uncertainty



- ICSM has adopted Positional and Local Uncertainty to classify the accuracy of geodetic coordinates
 - Positional Uncertainty – absolute accuracy
 - Local Uncertainty – an average measure of ‘relative uncertainty’ between ‘adjacent’ stations
- For survey control projects, LU is a problem...
 - Its roots are in US standards for map accuracy that ignore the measurement process
 - Relative Uncertainty is not defined
 - There is no criteria for ‘adjacency’
 - LU does not provide the covariance information to rigorously propagate PU in an adjustment
 - LU can be biased by network design

Resolving Uncertainty

It is proposed that:

- Relative Uncertainty be formally recognised and defined as:
 - ‘the uncertainty of a coordinate or height difference, in metres, between any two points, at the 95% confidence level relative to the defined reference frame.
- Local Uncertainty be defined as a simple parts-per-million (ppm) indicator that is independent of station spacing.
- Local and Relative Uncertainty are linked with a simple test that directly relates the specified LU to the distance-related (but non-linear) RU.





SP1-V2: New Guidelines

Revised Guidelines will be produced for the:

- Design and Installation of Survey Control
- Testing and Calibration of Survey Instrumentation
- Differential Levelling of Survey Control
- Survey Control by GNSS
- Survey Control by Total Station
- Adjustment and Testing of Survey Control
- Reporting and Archiving of Survey Control Data

New Guidelines will also be introduced for the:

- Specification of a Survey Control Project
- Continuously Operating Reference Stations (CORS)


SP1-V2: Technical Manuals


SP1-V2 will refer users to Technical Manuals for the detailed information about Australia's official datums.



These include the existing:

- 'Geocentric Datum of Australia Technical Manual'
- 'Australian Tides Manual - Special Publication 9'.

Technical Manuals are also proposed for the:


- Australian Height Datum
- National Geospatial Reference System.



SP1-V2: Next Steps

- GTSC has agreed to adopt a standards-based approach for the new SP1
- This proposal for SP1-V2 remains to be ratified
- The draft document will be submitted to GTSC for approval in mid-2010
- Development of the new Guidelines and Technical Manuals will follow immediately
- SP1-V2 is expected to support the next wave of survey innovation that will follow:
 - completion of the AuScope CORS project
 - release of the next Australian geoid model.




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