MATHEMATICAL MODELS AND A CASE STUDY OF THE LOCATA DEFORMATION MONITORING SYSTEM (LDMS)

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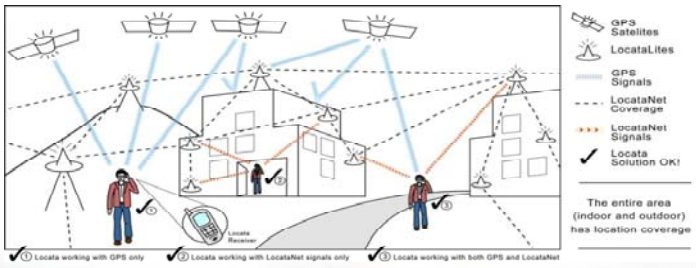
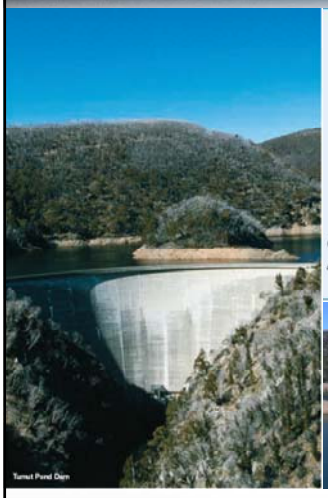
Introduction: Locata

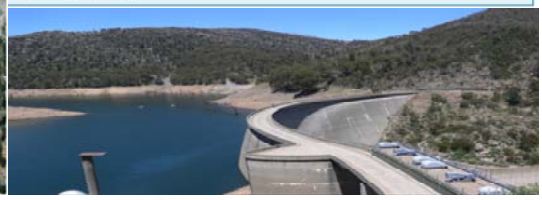
Locata, a terrestrial geodetic measurement technology based on the principle of space geodetic measurement technique, provides position through network of time synchronised pseudolite-like Transceivers.



About Tumut Pond Dam



Type	Concrete arch	Spillway	
Height	86.3m	Type:	Gated chute with two 14.33m wide by 9.14m high radial gates
Crest length	217.9m	Capacity:	1 926m³/s
Crest width	3.7m	Crest length:	30.5m
Base width	29.6m	Crest level:	RL 1 149.10m
Crest level	RL 1 159.76m	River outlet works	Two 2.13m diameter steel-lined conduits, each with capacity of 101.9m³/s
Volume of concrete	141 400m³		
Foundation	Granite	Construction period	November 1955 to March 1959
Reservoir			
Gross capacity:	52 800 x 10³m³		
Active capacity:	50 000 x 10³m³		
Area at FSL:	203ha		



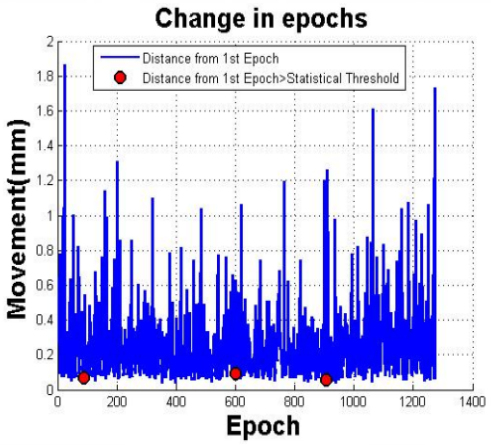
Locata Network @TPD

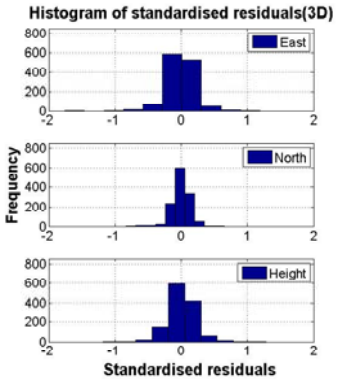
Surveying and Locata Configuration

Results

- 22 hours of data
- Mathematical models are described in the paper.
- Caspary(2000) deformation analysis is used.
- Every 5 seconds data is aggregated with batch least square to generate position of the monitoring point
  - **Better Precision**
  - **Reduce systematic biases**

Point Movement





Conclusions & Acknowledgement

- This case study demonstrated that the Locata Technology can be used into deformation-monitoring applications
- For 24 hours data set, millimetre level movement can be detected. However, for longer (weekly, monthly or yearly) data sets we may observe additional issues

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SSIS
Thank You!
QUESTIONS