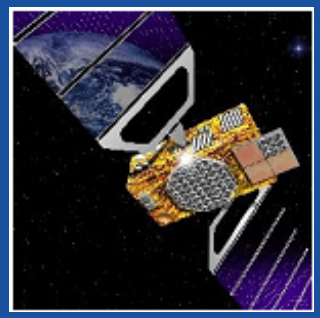
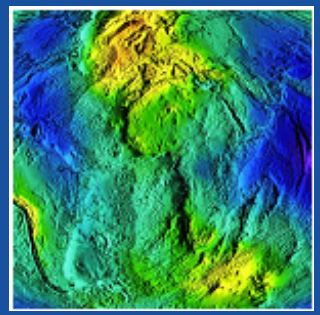


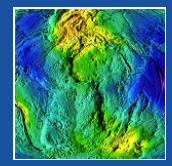


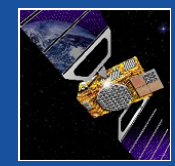
Canadian Height Modernization Study

Consultation Results Presentation

September 19, 2006

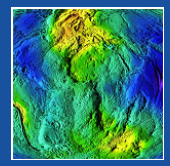
HICKLING ARTHURS LOW
TECHNOLOGY MANAGEMENT, STRATEGY, AND ECONOMICS

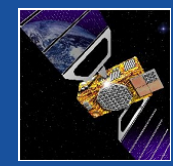




Outline

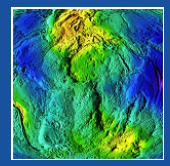
- Methodology
- Consultation Results
  - Applications and Activities
  - Accuracy Requirements
  - Datum Maintenance Impacts
  - Advantages and Disadvantages
  - Height Change Impacts
  - Legal Implications
  - Cross-Border Implications
  - Transition Requirements
  - Risks and Impediments
  - Additional Comments
- Conclusions

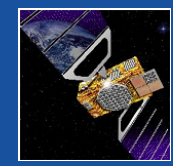




Methodology

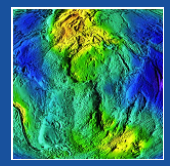
- Based on:
  - 50 Interviews
  - 14 Web survey responses
- Segmentation
  - Data providers
  - Data users
  - Water Management
  - Provincial and territorial governments
  - Municipal governments
  - Academic and Research
  - International

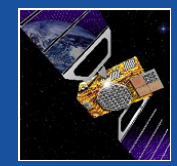




Applications and Activities

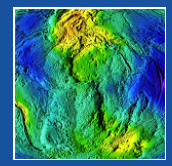
- Users are not always aware of which height sub-system they are using.
- Municipalities often have their own reference system.
- Major applications include:
  - Urban, transportation, and utilities infrastructure
  - Watershed management and disaster management
  - Natural resource production – forestry, mining, oil and gas
  - Mapping
- Watershed management requires accuracy over large areas.

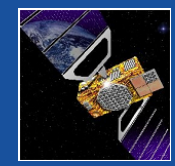




Accuracy Requirements

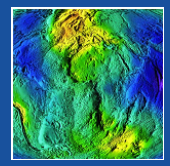
- The conception of accuracy differs between GPS and levelling:
  - Levelling – better relative accuracy
  - GPS – better absolute accuracy
- Most users are concerned with relative accuracy with respect to local control networks.
- Absolute accuracy becomes important when combining information from different data sets – which is becoming more common.

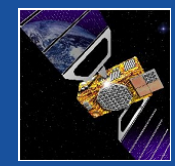




Datum Maintenance Impacts

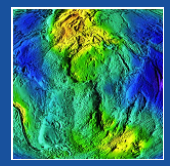
- There is confusion over which benchmarks will be affected.
- Municipal and provincial stakeholders expressed the greatest concern.
- Large survey companies are the least concerned – they are already intense users of GPS techniques.
- International stakeholders noted the benefit of coordinating the change with the United States.

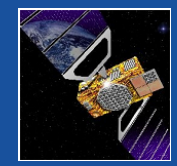




Advantages and Disadvantages

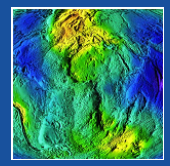
- The majority of organizations interviewed felt that the advantages of the geoid model outweigh the disadvantages...
- With the exception of municipal governments, which are concerned with costs, conversion, and confusion.
- It is not clear that all databases would need to be converted.
- Stakeholders with GIS databases are less concerned about conversion.
- Advantages include ability to share and integrate data, and reduced cost of establishing heights at remote sites.

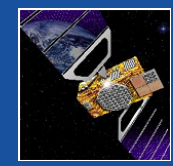




Height Change Impacts

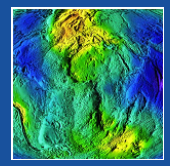
- Most stakeholders feel that there will be little negative impact.
- Potential for misunderstandings and errors.
- Possible need to convert legacy databases, particularly municipal.
- Possible need to re-calibrate flow models.

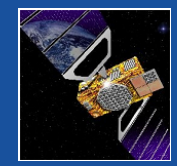




Legal Implications

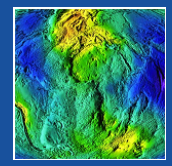
- Most stakeholders feel there will be minimal legal implications.
- Concern about re-opening existing agreements.
- Possible liability from misunderstandings and errors.

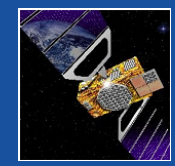




Cross-Border Implications

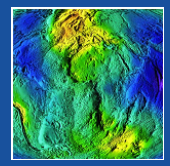
- Stakeholders feel the cross-border implications will be minimal.
- There is already a significant difference between the Canadian and US height systems.
- The Great Lakes has its own datum (IGLD 1985).
- The US has a strong interest in defining a common geoid model.

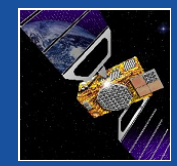




Transition Requirements

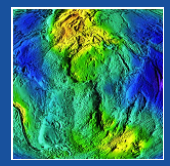
- Communicate!
- Provide transformation parameters and tools. Publish old and new values.
- Maintain a base network of benchmarks.
- Provincial stakeholders feel that transition funding should be provided.
- Provincial stakeholders feel the transition should be steered by a joint council (such as CCOG).
- How often should the geoid definition change? – The majority of stakeholders prefer consistency to accuracy.

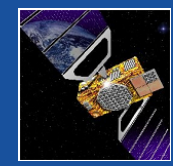




Risks and Impediments

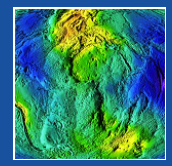
- There is a close relationship between transition requirements and risks/impediments.
- Dependence on satellite technology and data.
- User understanding.
- Confusion.

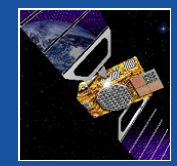




Additional Comments

- Some stakeholder groups (e.g. US, Water Survey) are considering similar changes.
- With the exception of municipalities, stakeholders are supportive.





Conclusions

- Major issues:
  - There will changes in elevations of up to 1 metre.
  - Over time, the number of federally maintained benchmarks will decrease.
- Impacts of elevation changes will only be negative if:
  - The magnitude of the change is significant to the user.
  - The user is using the CGVD28 datum.
- Impacts of benchmark decreases will depend on the location of the user and whether other systems are available.
- Among some stakeholders, there is a perception that height is absolute and that the current system is accurate. As GNSS becomes more prevalent, these problems will be magnified.
- The truth is that there are currently a multitude of datum realizations being used.