



NATURAL RESOURCES CANADA - INVENTIVE BY NATURE

# *Canadian Geodetic Survey: Supporting Surveying and Geoscience Needs on Land and in Canada's Coastal Regions*

CHC-NSC 2018

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Canadian Geodetic Survey, Surveyor General Branch



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# OUTLINE

## The Canadian Spatial Reference System (CSRS)

- ✓ How does it support surveying and geoscience?
- ✓ What tools and services are available to facilitate access?
- ✓ What changes (improvements) are planned for 2018?
- ✓ What does the future hold?



# What is the CSRS?

- ✓ *The CSRS provides the fundamental values for latitude, longitude, height, and gravity in Canada*
- ✓ It is realized by a pair of reference frames
  - ✓ NAD83(CSRS) – geometric
  - ✓ CGG2013a - geopotential



# How does the CSRS support surveying and geoscience?

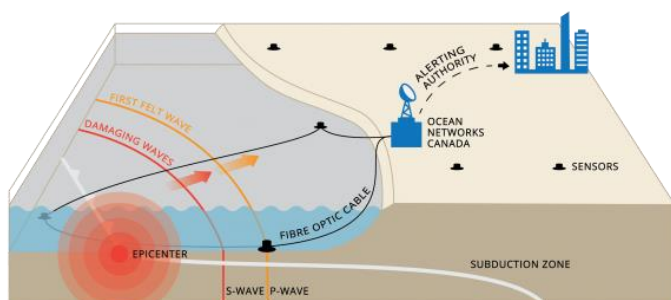
*Enables modern satellite based high accuracy positioning for:*



Boundary Demarcation



Water Management and  
Climate Change



Natural Hazards



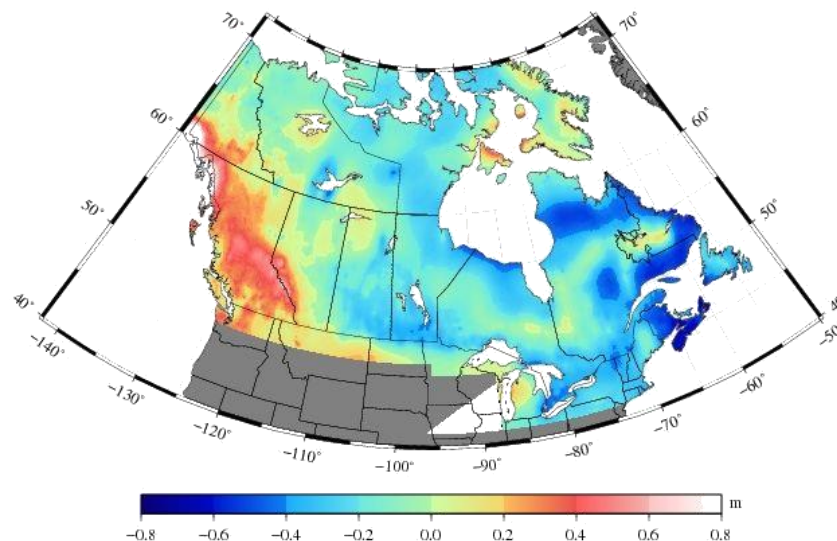
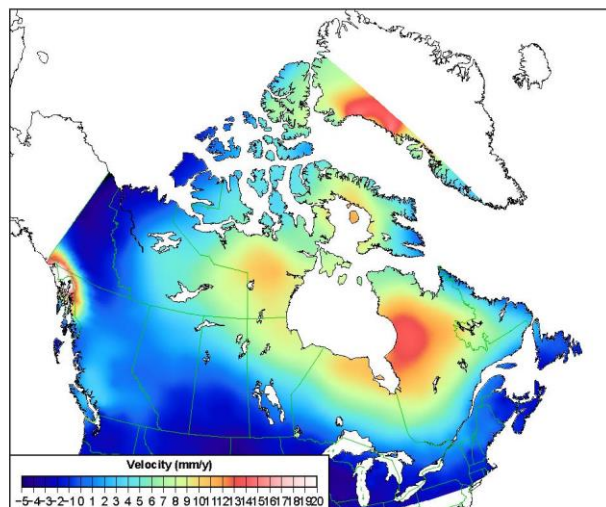
Construction



Mapping

# CGS Tools and Services to Access CSRS

## *Transformation Tools*



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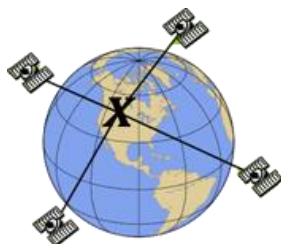
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# CGS Tools and Services to Access CSRS

## Positioning Tools and Data Products



CSRS-PPP

### RTK Networks

► Help for RTK Networks

**RTK networks**

- LEWIS
- CANNET
- TOPNET
- SMARTNET

**Status Display**

- ☒ Compliant stations
- ☒ Non-compliant stations
- ☒ Status unknown

**Define search area**

- ☒ Search visible area
- NTS map sheet
- Radial search
- Geographic bounds

**Data**

- KML file of selected stations
- CSV file of selected stations

**Stations**

Map Stations List

► Instructions: Map Navigation

©GeoGratis - Canada Base Map

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Map Stations List

► Instructions: Map Navigation

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# RTK Service Provider Compliance Agreement

## CGS:

- ✓ Official NAD83(CSRS) coordinates
- ✓ Monitor reference station stability

## User:

- ✓ Gear is configured properly
- ✓ Adequate field checks
- ✓ Follows association's best practices



## Service Provider:

- ✓ NRT station monitoring and alerts
- ✓ Notify users when stations are down
- ✓ Follows CGS's best practices

It is recommended that all survey associations update their best practices to endorse compliant RTK Service Providers.



# Upcoming CSRS Improvements

## NAD83(CSRS)

- ✓ v7 coordinates and velocity grid to be released

## GPS-H

- ✓ Height system conversions added in 2017
- ✓ Support for LiDAR (las) datasets coming

## CSRS-PPP

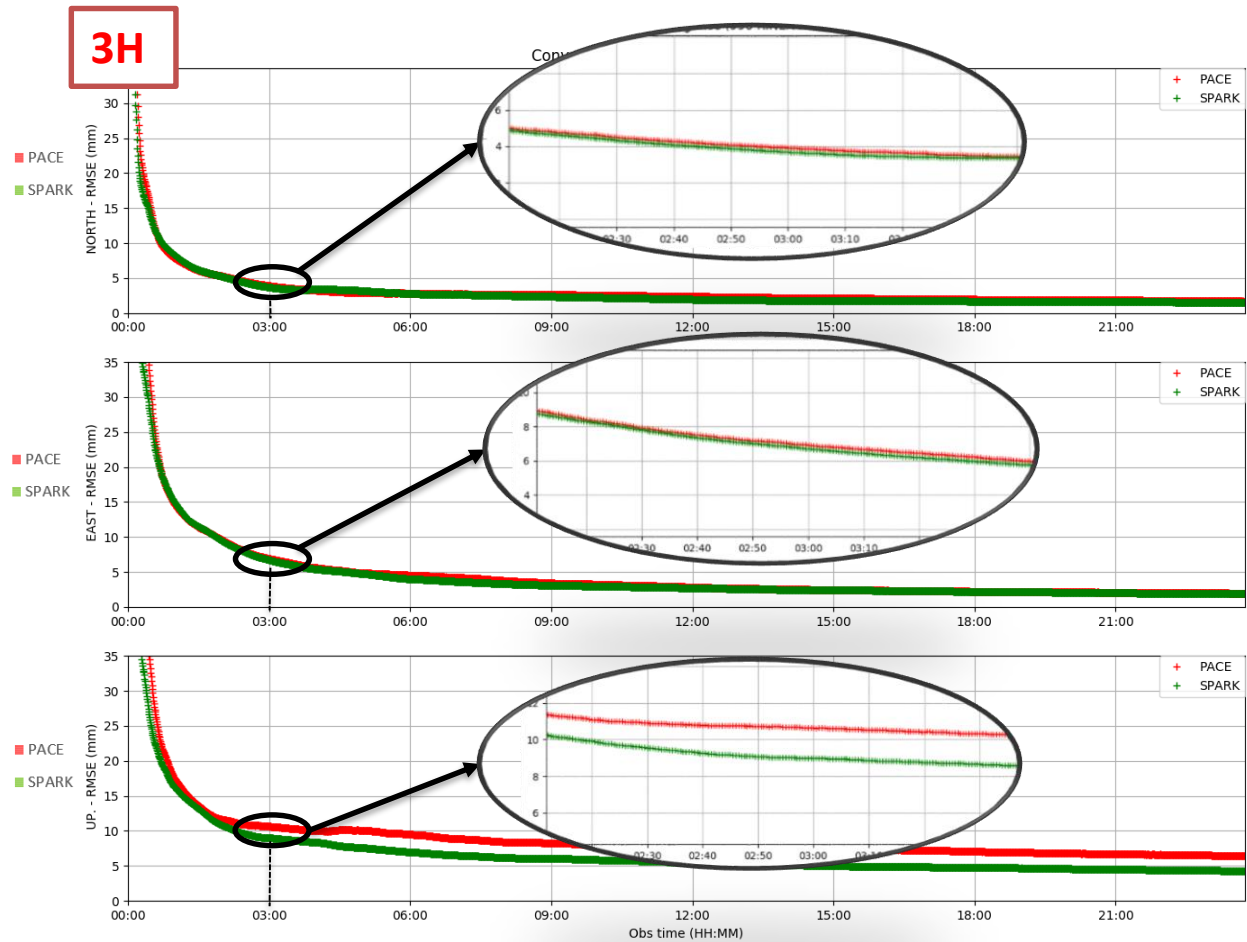
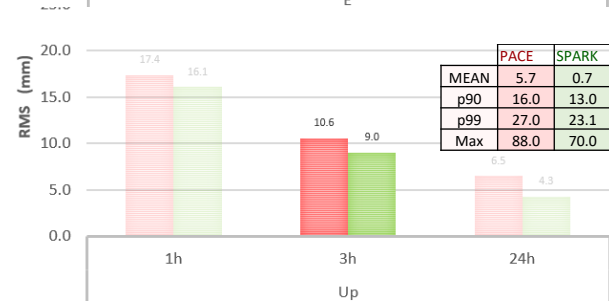
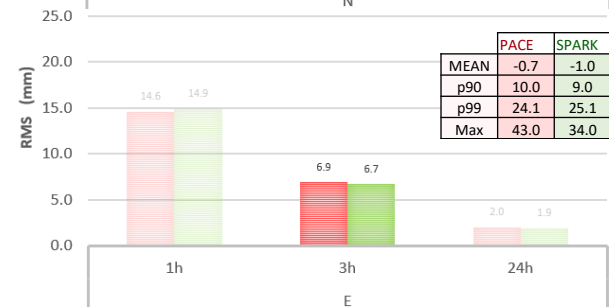
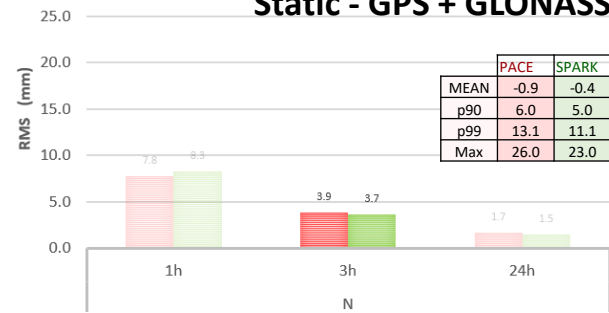
- ✓ New modernized software (SPARK) to be released in 2018





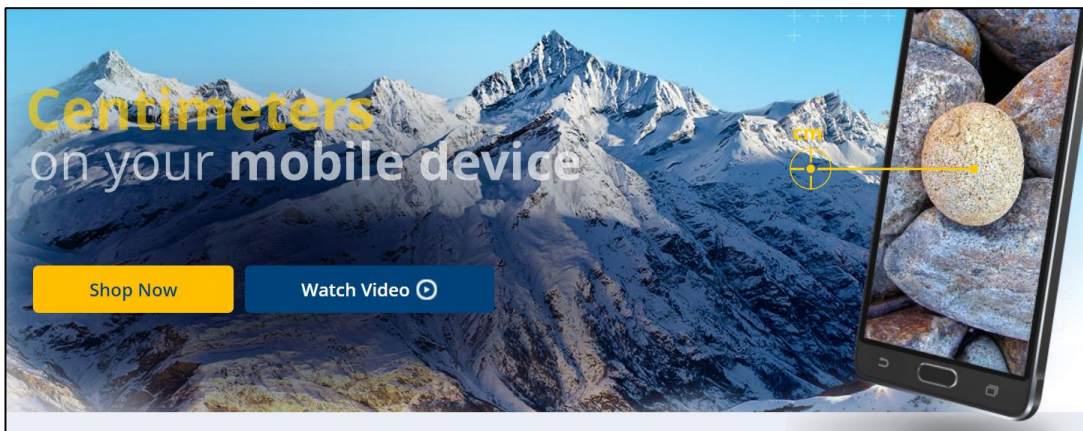
# Results GPSPace vs SPARK

## Static - GPS + GLONASS

**3H**


# What does the future hold?

Precision GNSS as a utility service?

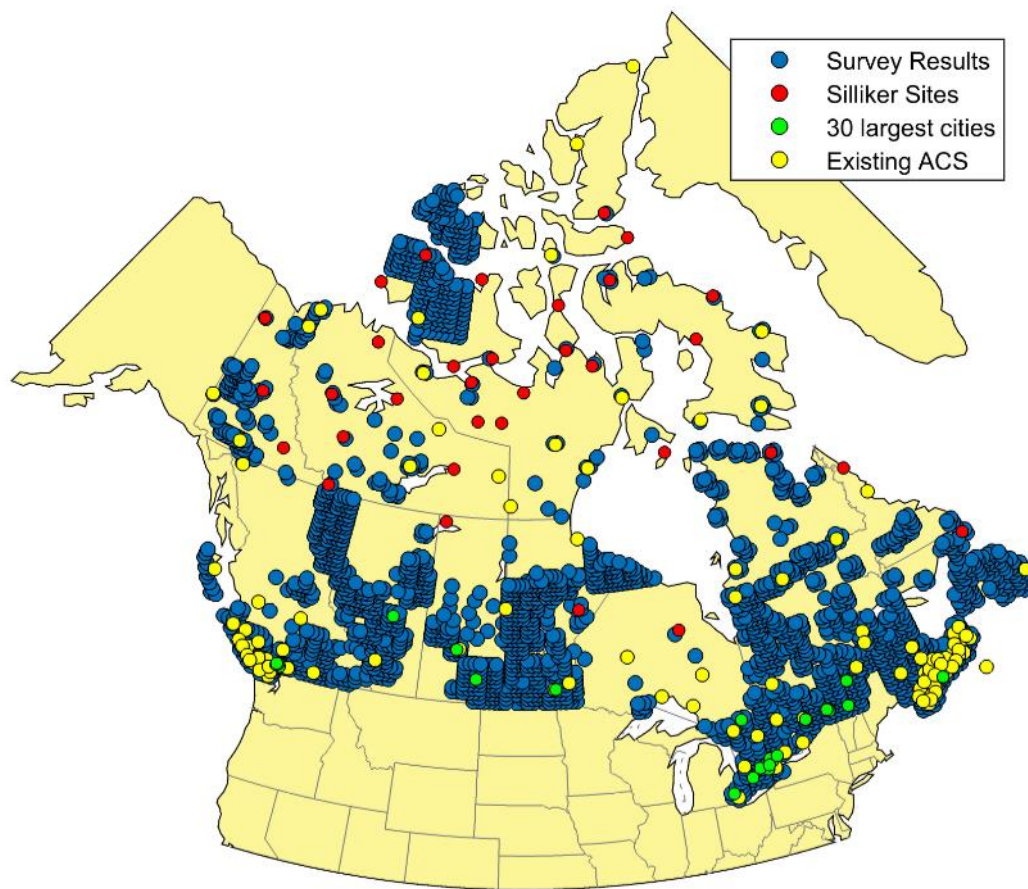


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# Positioning Needs Survey Preliminary Results

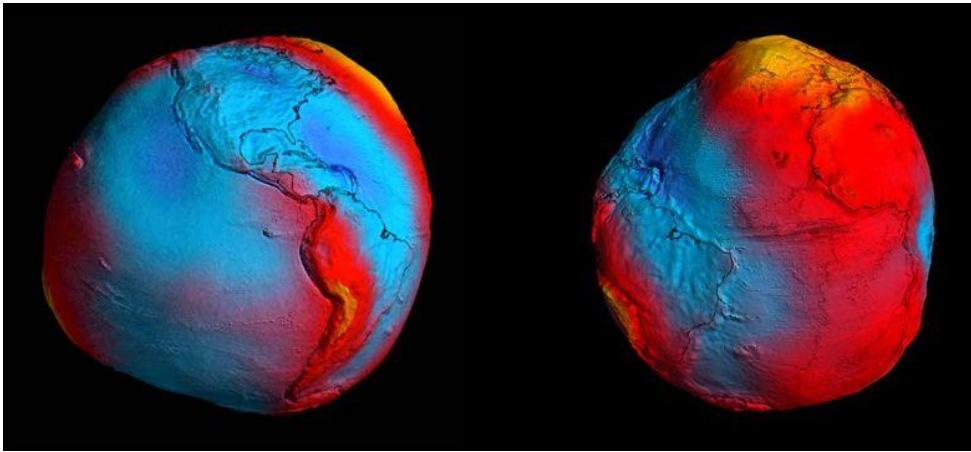


# Positioning Infrastructure Strategy for Canada - Components

- ✓ Global Geodetic Observation Station
- ✓ GNSS Integrity Monitoring
- ✓ Real-time PPP Services
- ✓ Active Control Stations Densification
- ✓ Resilient Timing (NRC)

To be integrated into a National PNT strategy





# QUESTIONS?

- Canadian Geodetic Survey Contacts:
  - CSRS-PPP - Philippe Lamothe ([philippe.lamothe@canada.ca](mailto:philippe.lamothe@canada.ca))
  - Height and Gravity Systems - Marc Véronneau ([marc.veronneau@canada.ca](mailto:marc.veronneau@canada.ca))
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  - Email: [nrcan.geodeticinformationservices.nrcan@canada.ca](mailto:nrcan.geodeticinformationservices.nrcan@canada.ca)