

# Application and Practice of Survey-Grade GNSS Real-Time and Static surveys in the USGS

Tampa, FL, February 4-8<sup>th</sup>, 2013

Day 1 – Feb 4, 2013

0800-1000 - Rydlund

1. Datum Establishment Overview in the USGS
2. Equipment
  - Receivers
  - Antenna and Radio
  - Data Collector
  - Tripods
  - Benchmarks
  - Software
3. Mission Planning and Error Sources
  - Benchmark Assessment
  - Continually Operating Reference Station (CORS) Assessment
  - Ionosphere and Troposphere
  - Multipath
4. Real-Time (RT) Surveys
  - Traditional Single-Base Real-Time Kinematic (RTK)
    - Techniques
      - Base receiver: Reliant vs. Autonomous
    - Quality Assurance
      - Localization
  - Networks
    - Quality Assurance
      - Localization

1015 – 1200 - Rydlund

5. Static GNSS
  - Single-base OPUS
    - Quality Assurance

1300 – 1500 - Rydlund

6. GNSS Quality
  - Level I Survey
  - Level II Survey
  - Level III Survey
  - Level IV Survey

7. Metadata

1515 – 1700 - Rydlund

1. RT GNSS field exercise(s)
  - Localization
  - RT Blunder Check
  - GNSS “as a level”

## Day 2 – Feb 5, 2013

0800 – 1000 - Rydlund

1. Project Application
  - Integrating total station surveying with GNSS
  - Bathymetric surveys
  - High-water mark surveys
    - Inundation mapping
    - Indirect measurement of peak discharge & modeling
  - Storm-surge sensor surveys
  - Project Application – GNSS Level Quality selection discussion

1015 – 1115 – Rydlund and Densmore

2. Network Surveying and Processing
  - Network Control
  - Planning
  - Processing and Adjustment

1230 – 1500 – Rydlund and Densmore

Simplified Network Survey - Field exercise

1530 – 1730 - Densmore

3. Simplified Network Survey - Processing

## Day 3 – Feb 6, 2013

0800 – 0930 - Densmore

1. OPUS-Projects
  - Introduction
  - Creating a Project

0930 – 1000 - Densmore

- Uploading Data
- Session Processing

1015 – 1200 - Densmore

- Session Processing
- Network Adjustment and Publishing

1300 – 1700 - Densmore

2. OPUS-Projects – Application with user or example data set

#### Day 4 – Feb 7, 2013

0800– 0900 – Rydlund and Densmore Briefing

1. GNSS Class Campaign Assignment
  - Group 1 – Single-base RTK
  - Group 2 – RTN
  - Group 3- Single-base OPUS-S & RS redundancy

1500 – 1600 – Class participants

3. Group data download and processing

1600 – 1700 - Densmore

4. TEQC Demonstration using the windows-based utility

#### Day 5 – Feb 8, 2013

0800 – 0930 – Class participants

1. Results and discussion of GNSS Class Campaign

0945 – 1100 – Rydlund and Densmore

2. Individual Project Presentations / Discussion
3. Coastal Surge Sensor GNSS Discussion
4. Future Direction & Wrap up