



# OSU Basics of GNSS Workshop

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### Part 3. GNSS Survey Methods and Styles

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10 slides

# Surveying Methods and Styles

## •Static and Fast Static Surveys

- ✓ High accuracy control
- ✓ Network approach

## •Dynamic Surveys

- ✓ Post process
- ✓ Real time single base and RTN
- ✓ Control
  - Densification
  - Stake out

# Static Survey Methods

## Field Technique:

**STATIC--L1 only (Post Processed)** – Rarely done anymore (pre 1994)

## Hardware Required :

**L1 Receiver/antenna -**

## Time of Occupation: collector)

**Typ. 60 min. – 48 hours (Data logging in receiver or data**

## Baseline Precision:

**1 cm + 2ppm X Baseline Length**

## Advantages :

**Tolerates cycle slips, needs only basic receiver  
Highest level of confidence in results, economical**

## Disadvantages :

**Limited to approx. 15 km, long occupations**

# Static Surveys Methods cont.

**Field Technique:**  
large

**STATIC--L1/L2 (Post Processed)** – Common method today for control networks – multiple sessions and observations! (OPUS-S)

**Hardware Required :**

**L1/L2 Dual Freq. Receiver . L1/L2 Antenna**

**Time of Occupation:**  
**collector)**

**Typ. 45 min – 48 hours (Data logging in receiver or data**

**Baseline Precision:**

**0.005m +1ppm X Baseline Length**

**Advantages :**

**Tolerates cycle slips, works out effects of ionosphere, very long baselines, highest level of confidence in results**

**Disadvantages :**

**Relatively long occupations**

# Fast- Static Surveys

**Field Technique:**  
for

**FAST STATIC--L1/L2 (Post Processed)** – Common method today  
small/medium project control. – multiple sessions and  
observations! (OPUS-RS)

**Hardware Required :**

**L1/L2 Dual Freq. Receiver . L1/L2 Antenna**

**Time of Occupation:**

**Typ. 8 – 45 min. (Data logging in receiver or data collector)**

**Baseline Precision:**

**0.005m + 1ppm X Baseline Length**

**Advantages :**

**Tolerates cycle slips, works out effects of  
ionosphere, short to long baselines, good level  
of confidence in results. Short - Medium occupation times**

**Disadvantages :**

**Requires careful planning of sessions and good communication  
for simultaneous observations. Susceptible to multi-path.**

# L1 Kinematic (Post Processed)

## Field Technique:

**KINEMATIC -- L1 ONLY** – Commonly used in GIS data gathering

## Hardware Required :

**L1 Receiver . L1 Antenna** – PP with remote base

## Time of Occupation:

**Typ. 5 - 30 seconds per occupation (Stored in data collector)**

## Baseline Precision:

**1cm + 2ppm X Baseline Length (horizontal)**

**2cm + 2ppm X Baseline Length (vertical)**

## Advantages :

**Very short occupations, very efficient data collection, can be used on moving vehicles, economical solution.**

## Disadvantages :

**Susceptible to multipath; requires initialization on a known (or previously surveyed) point when lock is lost**

# L1/L2 Kinematic (Post Processed)

## Field Technique:

**KINEMATIC -- L1/L2 – Commonly used today.**

## Hardware Required :

**L1/L2 Receiver . L1/L2 Antenna – PP w/ base station logging data on known point while rover is gathering data.**

## Time of Occupation:

**Typ. 0.5 - 30 seconds per occupation (Stored in data collector)**

## Baseline Precision:

**1cm + 2ppm X Baseline Length (horizontal)**

**2cm + 2ppm X Baseline Length (vertical)**

## Advantages :

**Very short occupations, very efficient data collection, OTF initialization - can be used on moving vehicles, economical solution.**

## Disadvantages :

**Susceptible to multipath; data is not statistically checked for integer ambiguity resolution in field.**

# L1 RTK -Kinematic (Real Time)

## Field Technique:

**RTK – L1 – Not commonly used today.**

## Hardware Required :

**L1Receiver . L1 Antenna – Single base line with base receiver/radio or cell phone**

## Time of Occupation:

**Typ. 3 - 5 seconds per occupation (Stored in data collector)**

## Baseline Precision:

**1cm + 2ppm X Baseline Length (horizontal)**

**2cm + 2ppm X Baseline Length (vertical)**

## Advantages :

**Very short occupations, extremely efficient data collection, quality checks in field, can perform staking; No office Post Processing, economical**

## Disadvantages :

**Must return to known or previously point when initialization lock is lost, for short baselines only (+/- 10km)**

# L1/L2 RTK -Kinematic (Real Time)

## Field Technique:

**RTK – L1/L2 – Most commonly used today!**

## Hardware Required :

**L1Receiver . L1 Antenna – Single base, multi-base or RTN with base receiver/radio or cell phone**

## Time of Occupation:

**Typ. 1 - 5 seconds per occupation (Stored in data collector)**

## Baseline Precision:

**0.5 cm + 1ppm X Baseline Length (horizontal)**

**1 cm + 1ppm X Baseline Length (vertical)**

## Advantages :

**Very short occupations, extremely efficient data collection, OTF initialization, quality checks in field, can perform staking; No office Post Processing, economical**

## Disadvantages :

**For short single base RTK (~10km) or multi-base network correction (~35km)**