## **Lab 6 – GPS Accuracy**

Grading: 50 points

## **learning outcomes**

1. Students will be able to collect raw GPS data.
2. Students will be able to compute Post Processing Fixed Ambiguity and Float Resolution Phase solutions using NGS Online Processing User Services (OPUS). Additionally, students will be able to analyze GNSS results.

## **activities**

**Introduction and Data Collection**

Setup GPS on Benchmark or nearby point and collect Raw GPS data.

Upload Raw GPS data to NGS-NOAA Online Positioning User Service- OPUS

## **Part 1 Field Assignment**

**Collect**: Raw GPS Data File of dual-frequency GPS (L1/L2) full-wavelength carrier observables:

Static data only; the antenna must remain unmoved throughout the observing session.

**(20pts)** Complete Observer Field Log for GNSS Surveys (See Attached) with photos

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| **Step** | **Action** |
| **A** | Complete Observer Field Log for GNSS Surveys (See Attached) |
| 1 | Set GPS on Fixed Height Rod On Static Point to be measured |
| 2 | Turn on GPS |
| 3 | **Select** Jobs & Data |
| 4 | **Select** Create New Job |

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| 5 | 1. Instrument 2. GPS Setting: 3. Antenna Heights:    1. Rover antenna: GS15 Pole    2. Antenna height: 6.562 ft 4. OK |
| 6 | 1. Instrument    1. GPS Setting    2. Raw data logging    3. Log Data to: GS Sensor    4. Loggins starts: **Only within survey**    5. Log data when: Static    6. Rate: 5.0s    7. Data type: RINEX (Version 3)    8. Observer: **Group #**    9. Agency: **TAMU** 2. **OK** |
| 5 | 1. Go to Work 2. SURVEY 3. Point ID: **GA02** 4. F1: Meas 5. **Record for 4.5 hrs** 6. **Storage LED should flash** 7. F1: Stop Store |
| 6 | **Take a Close Up Photo of Point and Take a Hz Photo of Setup** |
| 7 | **Pull SD Card and copy Rinex files**  **Rinex file address: Data>Gps>Rinex** |

# Part 2 Computation Assignment

**Upload** RINEX 3.x data format raw data in Compressed format.

**Select** OPUS settings. Select the Antenna, Antenna Height = 2.0 m email address=

<https://www.ngs.noaa.gov/OPUS/about.jsp>

OPUS is a popular NGS tool which helps survey-grade GPS users tie their local surveys to the National Spatial Reference System. By leveraging the processing software used to manage the Continuously Operating Reference Station (CORS) network, OPUS improves raw GPS results to within a few centimeters of accuracy. We will describe how various OPUS options work, explain typical OPUS reports and errors, and discuss emerging issues and opportunities.

**(30 pts)** From the Raw GPS data collected in Class, upload data and compute solution for the benchmarks surveyed in Bryan/College Station area using RINEX. Include your results in the PDF you submit.

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| **Step** | **Action** |
| 1 | Watch the [OPUS Video](https://www.ngs.noaa.gov/web/science_edu/webinar_series/understanding-opus.shtml) |
| 2 | Upload the static GPS Raw Data in Rinex to OPUS Rapid Static |
| 3 | Set correct OPUS Settings  Antenna Type: Leica GS15  Antenna Height: 2.0m |
| 4 | Review emailed results. |

## **Submittal-**

1. **(20pts)** Complete Observer Field Log for GNSS Surveys (See Attached PDF) with photos.
2. **(30pts)** OPUS Report **PDF** (Your results from the Opus website).