**Lab 1. Mission Planning & Data Dictionaries**

**Introduction**

This lab will introduce Trimble Mission Planning software, which allows you to select a location, date, time & duration of your GPS survey in order to get a count of visible satellites, your best satellite geometry, and best ionosphere conditions. The lab also provides instructions on how to create a data dictionary for use in a GPS survey.

**Instructions**

Read the assigned readings in Part I, and complete the hands-on exercises described in Parts II & III.

**Deliverables**

Answer the questions throughout the lab and produce any outputs, as instructed. Your lab document should be typed, well organized, and submitted based on the “how to” guidelines provided in the course syllabus.

***Part I – Assigned Readings***

1. Go to: <http://www.trimble.com/gps_tutorial/> and read the first 5 bullets:
   * + Why GPS?
     + What is GPS?
     + How GPS works?
     + Triangulating
     + Measuring distance
2. The US Army Corps of Engineers created a NAVSTAR Global Positioning System Surveying manual in 2003. There is a lot of detail in here (it’s 470 pages!), but it’s a good reference for everything GPS/NAVSTAR. Take some time to look through Chapter 2, Operational Theory of NAVSTAR GPS: <http://www.georeferencial.com.br/old/material_didatico/entire_GPS.pdf>

***Part II: Mission Planning***

In class we went through a demonstration of how to use Trimble’s Mission planning online software (<https://youtu.be/MvBIFqLhEhU>). In this lab, you will walk through the same steps as in class using the guidelines listed below. Use the Snipping tool to get screenshots of your Mission planning and paste them into your lab document.

[**Trimble Mission-planning Website**](http://www.gnssplanningonline.com)

(Use Internet Explorer)

* Set up a mission plan using the following guidelines:
  + a location in the Portland Metro area (not campus)
  + an upcoming date in October at 6pm with a five hour time span
* Use print screen to capture screenshots of:
  + settings,
  + elevation,
  + number of satellites,
  + DOPs visibility,
  + Skyplot,
  + Iono Map

1. *Include 6 screenshots (from above) in your lab document.*
2. *Based on the visibility, what is the best hour to collect? What is the worst hour to collect? Explain?*
3. *Based on the skyplot, what is the best hour to collect? What is the worst hour to collect? Explain?*
4. *How much ionospheric interference is present on your collection date? Where on the Earth are the highest levels of ionospheric interference?*

***Part III: Data Dictionary***

In this part of the lab, you will create a data dictionary for a fictitious GPS survey. Select one of the following scenarios and create a hypothetical data dictionary to go with the project using the guidelines provided. Don’t worry if it isn’t specific or accurate to industry standards - just create something that goes with the scenario of your choice.

Scenarios:

* Invasive Plant Survey in a National Park,
* Survey of interstate rest stops prior to maintenance, or
* Mapping of amenities at the zoo

Guidelines:

* Create a point feature with at least 2 attributes types
  + Under Default Settings, set minimum positions to 30 and logging interval to 1 second.
  + Under Symbol, choose a fun symbol
* Create a line feature with 4 attributes types (make 2 attributes of different types from the point)
  + Under Default Settings, set the logging interval to 1 second.
* Create an area feature with 1 menu attribute with at least 5 menu options
  + Under Default Settings, set the logging interval to 1 second.

To create the Data Dictionary:

* Open Pathfinder office
* Go to *Utilities > Data Dictionary Editor*
* Give the new data dictionary (dd) an appropriate name
* Set *Version* to “TerraSync V5.00 and later”
* Click *New Feature…F3*  button
* Under the Properties tab, give the new feature a name
* Choose what type of feature it will be (i.e., point, line, or polygon)
* Under the *Symbol* tab, choose an appropriate marker to represent your new feature; click *OK* when you’re happy with symbol.
* Highlight your new feature and click *New Attribute…F7* button
* Below is a description of the different options you have when creating fields in your data dictionary. Create new features until you meet the guidelines for the assignment (which is a minimum – going above and beyond is encouraged)
* When you are all finished, go to *File > Save > [ insert file name.ddf ]* to save the data dictionary
* Next, save your data dictionary as a .txt file. Go to *File>Export to ASCII*

1. *Name the file with your last name and assignment (Friedle\_lab1\_dd) and turn in with your lab doc.*

**Field value options** for creating the data dictionary:

* The ***menu*** button allows you to set up a questionnaire with pick-lists and check-boxes.
* The ***numeric*** button creates an attribute that accepts *only* numeric values. ***Auto-incrementing*** causes the value to automatically increase from the previously entered value by a pre-determined amount. It is often a good idea to create a Numeric for the first attribute, in order to automatically provide a unique id number for your features
* The ***text*** button creates a field which will accept *any* character, whether text or numeric, which is then saved as *text data.*
* ***Time and Date*** buttons are pretty self-explanatory
* ***File Name*** is for photographs taken with the device camera
* ***Separator*** button allows the addition of a +/- choice to the interface to help limit screen-clutter