

## sdmay19-37: Are Cross Country Courses Avoiding Hills?

Week 5 Report

October 10 - October 20

### Team Members

Connor Smith — *Ground Truth Engineer*

Thomas Chambers — *Ground Truth Engineer*

Ryan Hilby — *Data Handling Engineer*

Jacob Feldman — *Data Handling Engineer*

David Kirshenbaum — *Data Analysis Engineer*

Andrew Mumm — *Data Analysis Engineer*

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### Summary of Progress this Report

From October 10th to October 20th, the team focused its efforts primarily on our pivot away from using ArcGIS for the handling of our project's data and towards our use of the R programming language and its associated Shiny package. The ground truth team finished its comparison of GPS-verified geodetic points to the Iowa DNR's LIDAR dataset, while the data team wrote an R script that will pull Z values from the LIDAR dataset based on XY coordinate inputs.

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### Pending Issues

We need to form a more robust explanation of our project's original motivation by finding examples of cross country course routes that have changed over time to avoid hills.

We're also actively working to have a prototype built for the lightning talk early next week.

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### Past Week Accomplishments

- Connor
    - Retrieved LIDAR measurements for geodetic point comparison study
    - Analyzed data in Excel and presented findings to team
  - Thomas
    - Troubleshooting ProMark 2 data connection and GNSS solutions software
    - Researched R and Shiny
  - Ryan
    - Worked on GDAL a little bit
    - Researched R programming language
  - Jacob
    - Learned R programming language
    - Set up R programming environment
    - Wrote script to compare datasets to LIDAR data
  - David
    - Kept working on input from users.
  - Andrew
    - Used R to extract z values based on X and Y and plotted that Z data
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## Plans for Upcoming Reporting Period

- Connor
  - Conduct research on past XC course routes
  - Accumulate more test GPS data from multiple sources from ISu XC course
  - Begin researching classification algorithms for topographic signatures
- Thomas
  - Complete more field surveys.
  - Attempt final solution with differential GPS.
  - Continue working with R and Shiny as it will be the bulk of the project's work later.
- Ryan
  - Keep learning R
- Jacob
  - Finish up the R script for comparing elevation datasets, and begin statistical analysis of the differences between the datasets.
- David
  - Will set up communication between my front-end and Andrew and Jacob's R script, so that when we enter lat and long, we can graph elevation.
- Andrew
  - Figure out how to connect David's point plotting component with the R scripts and implement it

## Individual Contributions

Team Member	Contribution	Weekly Hours	Total Hours
Connor Smith	LIDAR vs. geodetic point comparison study	4	32.5
Thomas Chambers	Troubleshooting ProMark 2 data connection and GNSS solutions software and R/Shiny research	3.5	24.5
Ryan Hilby	Worked with GDAL and learned some aspects of R	3	21
Jacob Feldman	Learned R programming language, set up programming environment, and wrote script to compare datasets to LIDAR data	10	23.5
David Kirshenbaum	More front end work on user input	3	20
Andrew Mumm	Used R to extract z values based on X and Y and plotted that Z data	7	16

## Gitlab Activity Summary

Pushed an almost finished R script for comparing elevation datasets.