

# CartoCosmos

Kaitlyn Lee



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Mentor:  
Isaac Shaffer

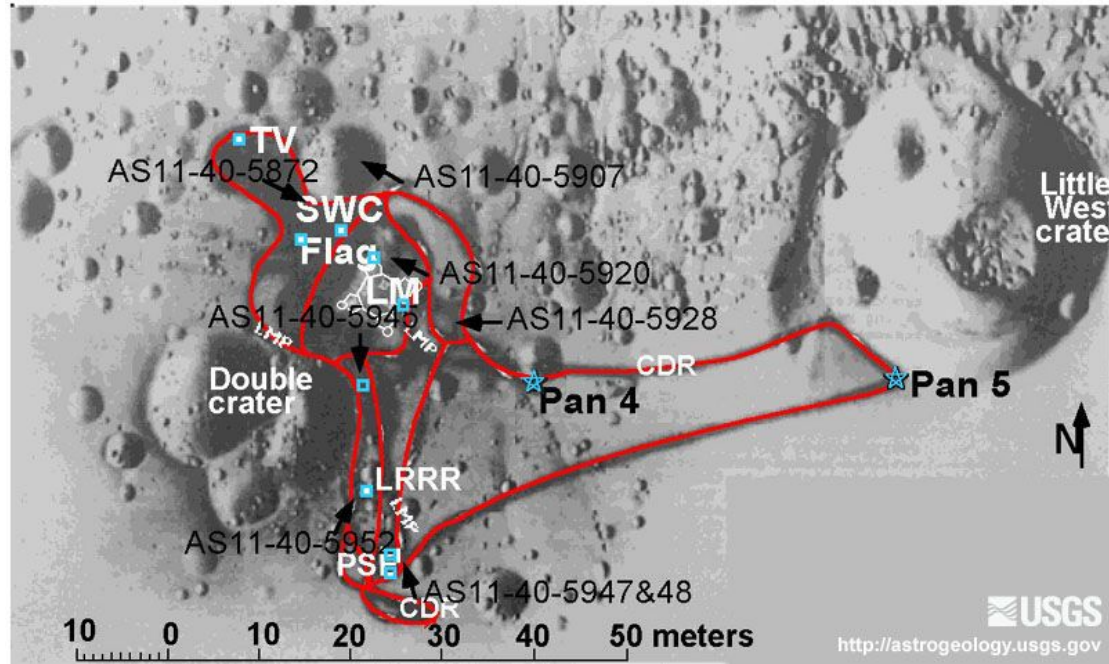
Client:  
USGS's Trent Hare and Scott Akins

# Outline

In this presentation, we will go over the:

- Introduction: project/clients/problems
- Solution
- Requirements
- Implementation/architecture
- Demo
- Challenges/resolutions
- Testing Outcomes
- Future work
- Conclusion

# The Planetary Science Community



**Figure:** Map of Landing Site for Apollo 11 Mission

# Our Clients



Trent Hare - Cartographer



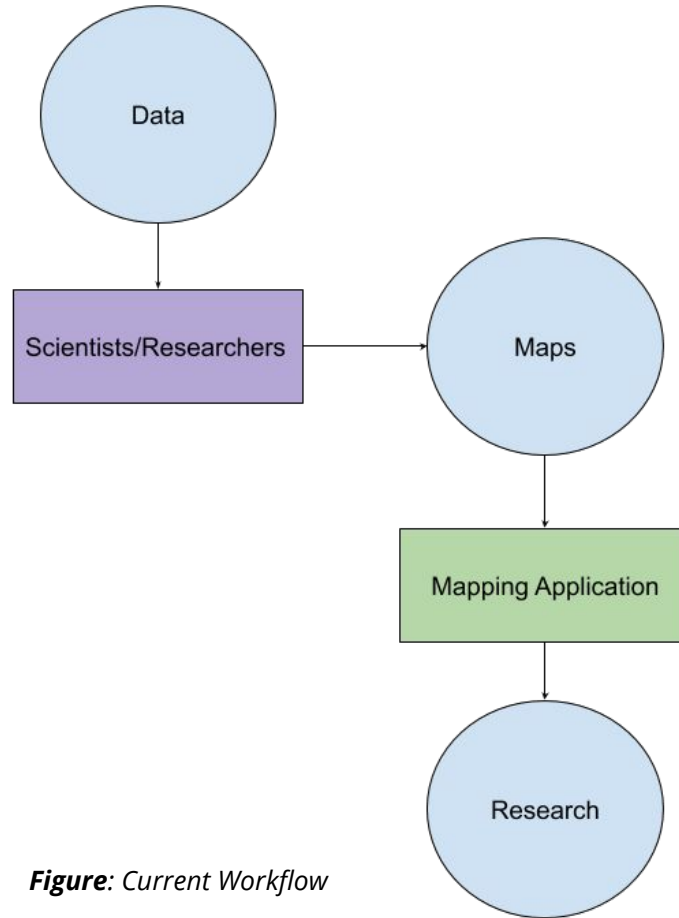
Scott Akins - IT Specialist



# Workflow & Problems

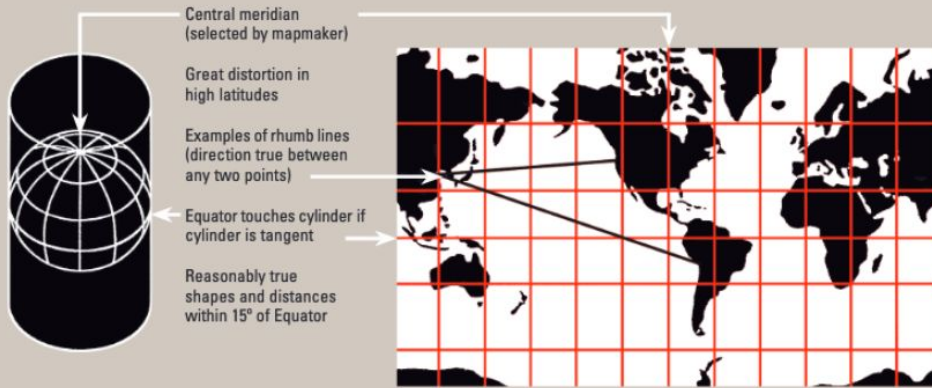
Need a tool that allows them to:

1. View maps of all bodies.
2. Change lat/lon settings.
3. View bodies in multiple projections.
4. Draw polygons on the map.



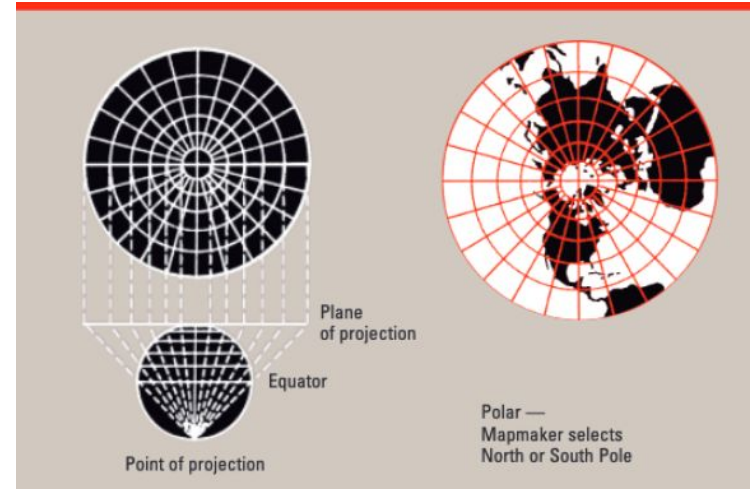
**Figure:** Current Workflow

# Projections



**Figure:** Cylindrical Projection

<https://store.usgs.gov/assets/mod/storefiles/PDF/16573.pdf>

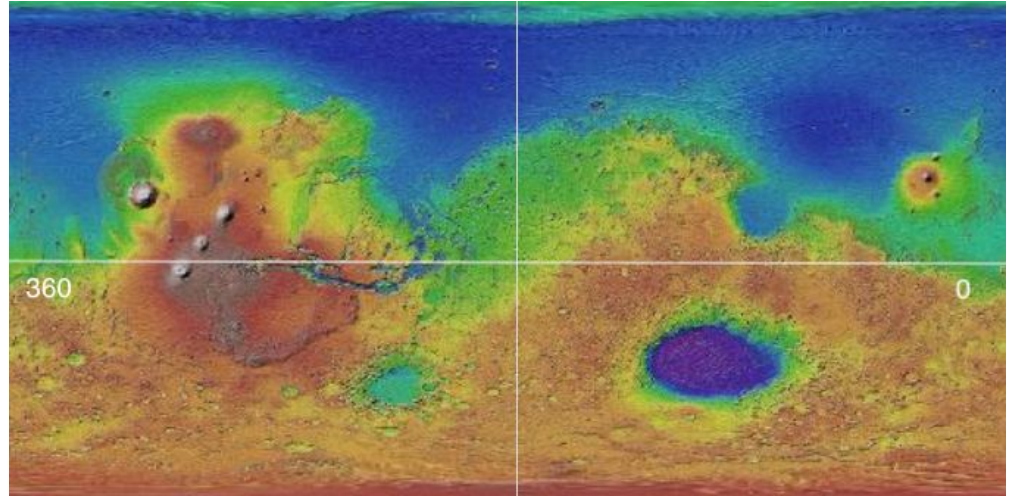


**Figure:** Polar Stereographic Projection

<https://store.usgs.gov/assets/mod/storefiles/PDF/16573.pdf>

# Solution Overview

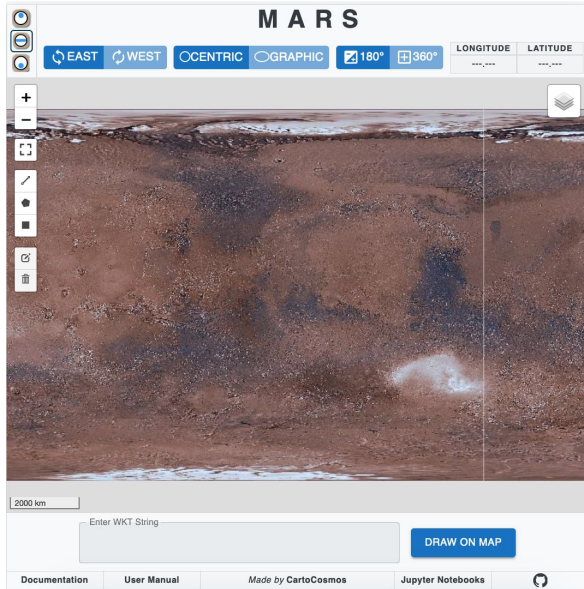
1. View more bodies, not just Earth.
2. Swap the Lat/Lon settings.



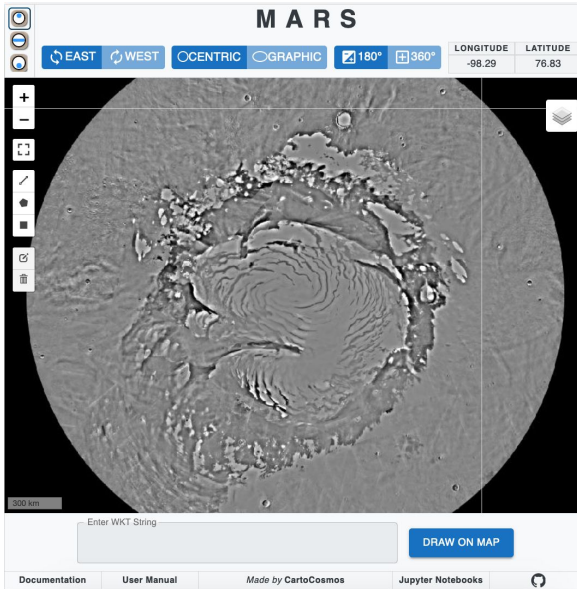
**Figure:** Lat/lon on Map



# Solution Overview



**Figure:** Cylindrical Projection of Mars

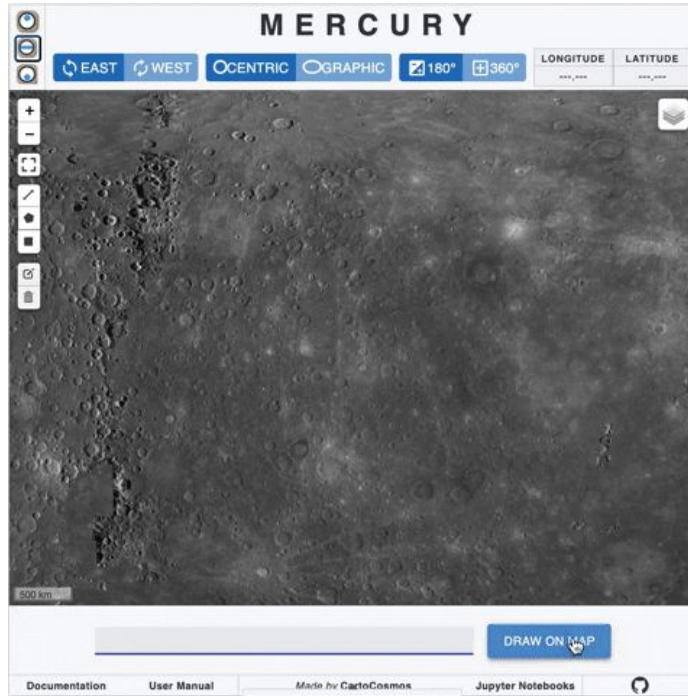


**Figure:** North Polar Projection of Mars

3. View a body in multiple projections.



# Solution Overview

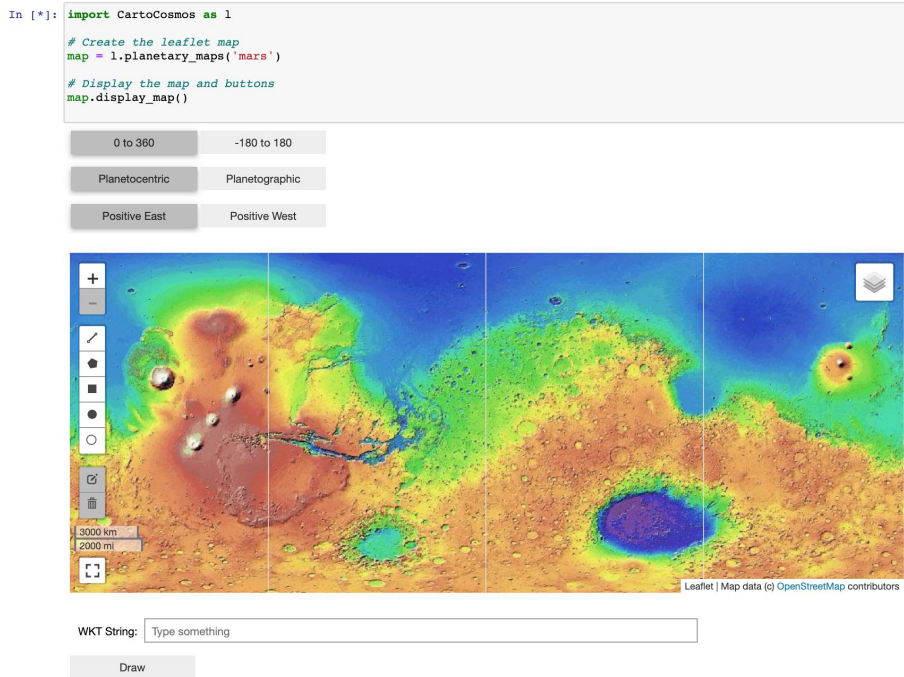


4. Draw polygons on the map.

**Figure:** Adding a well known text polygon to a map

# Solution Overview:

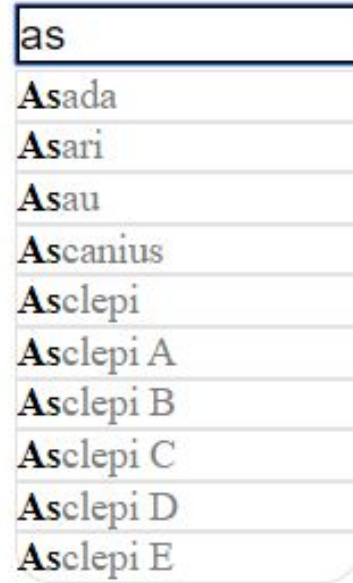
- Create a mapping tool for Jupyter Notebook.
- Follows our implementation for our JavaScript application.



**Figure:** Jupyter Module Application

# Solution Overview:

- Build an autocomplete module
- Directs users to surface feature information pages

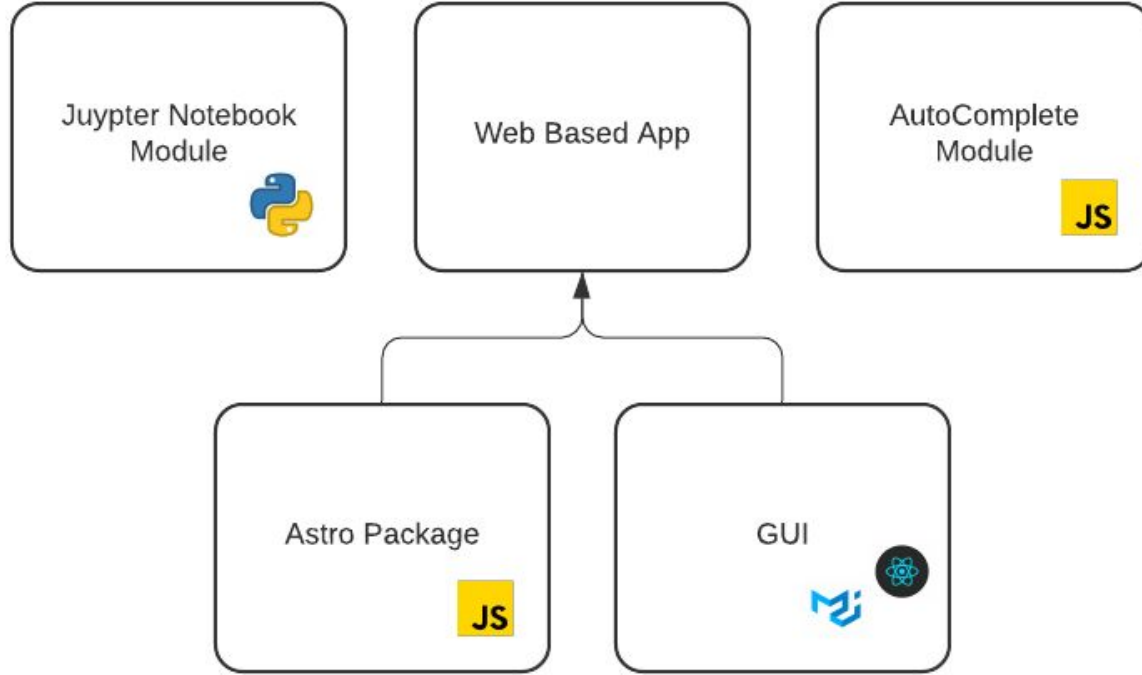


**Figure:** AutoComplete Module

# Requirements Refresher

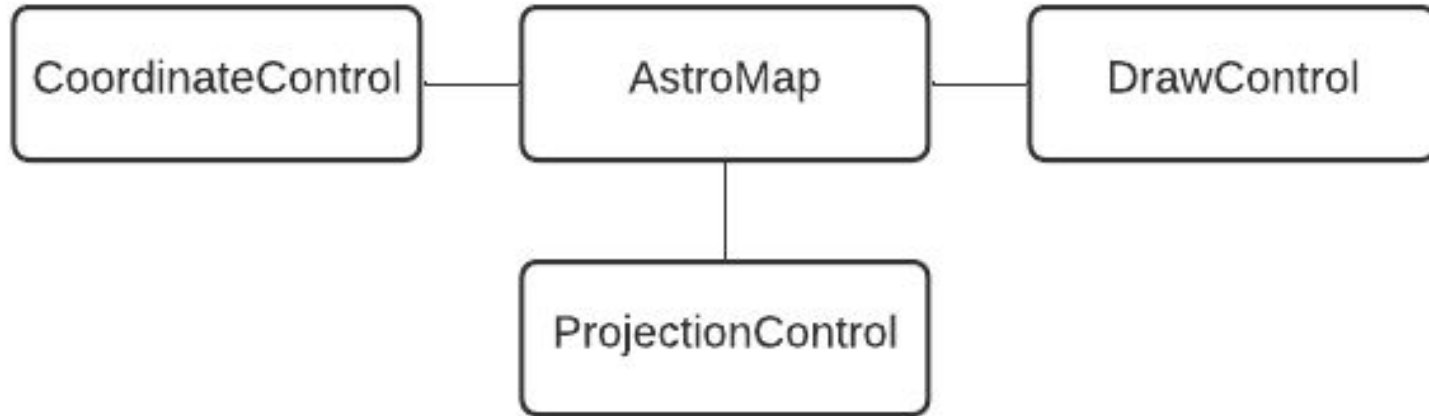
- Leaflet, JavaScript, and Python.
- GUI with all features needed by scientists.
- Modular for easy updates.
- Compatible with any web browser.

# Implementation Overview



**Figure:** Overview of Modules

# The Astro Package



**Figure:** Overview of the Astro Module



# Prototype Demo and Review

Demo Website:

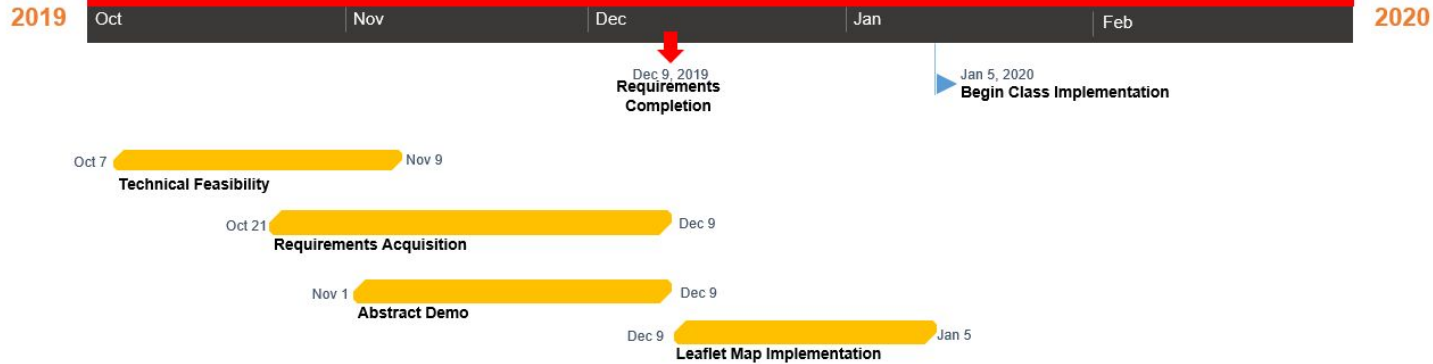
**[cartocosmos.github.io](https://cartocosmos.github.io)**



# Challenges and Resolutions

- Using React for the front-end and CommonJS for the back-end.
  - Refactor the CommonJS code.
- Polygons would disappear on projection change.

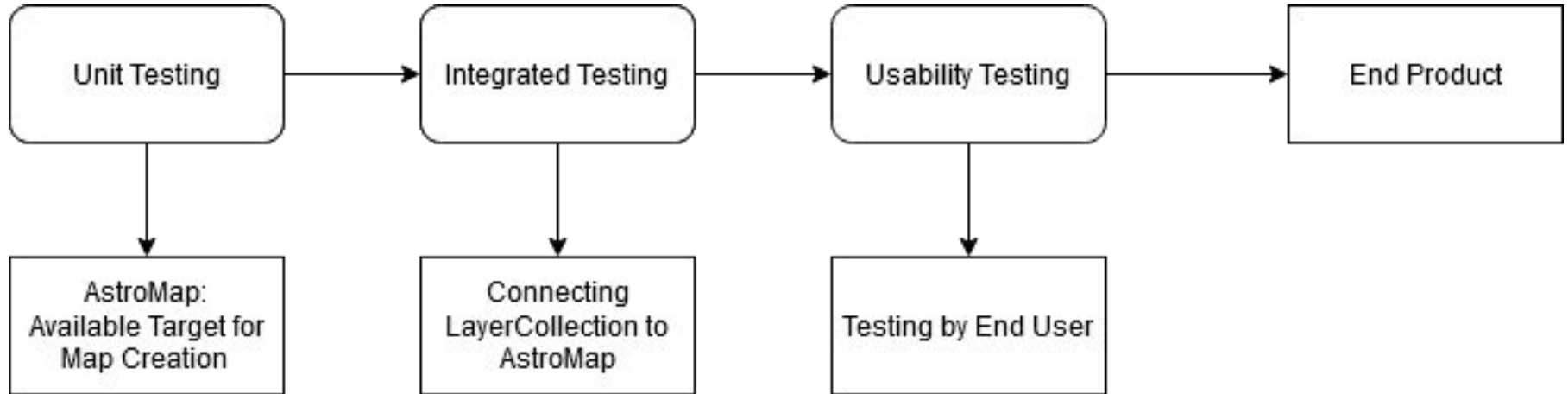
# Previous Semester Schedule



# Current Semester Schedule



# Testing Outcomes



**Figure:** Overview of Testing Plan

# Future Work

- Click on Feature Name on USGS website and show feature on map.
- Getting multiple projections to work in Jupyter.
- Adding fullscreen menu for Leaflet.



# Conclusion

- Team CartoCosmos
- Client: USGS
- Problem: USGS needs a new mapping application.
- Solution: A modular Node package using leaflet.
  - AutoComplete search tool
  - Python Implementation
- Alpha-Prototype and stretch goals completed, now testing.

# Thanks For Listening



## Team Members:

Kaitlyn Lee, Jacob Kaufman,  
Scott Ames, Christopher Moore

## Mentor:

Isaac Shaffer

## Client:

USGS

CartoCosmos  
Website:

