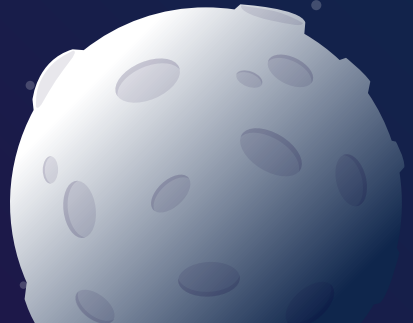
Lunar Pit Patrol

Presents

Crater Stats

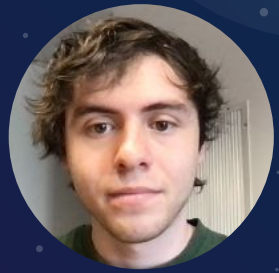


Meet the Lunar Pit Patrol

Evan Palmisano
Team Lead

Ibrahim Hmood
Customer Communicator

Caden Tedeschi
Architect



Alden Smith
Release Manager

Levi Watlington
Recorder

Our Sponsors

Trent Hare
Sponsor

Marc Hunter
Sponsor Associate

- USGS
  - Cartographer
  - GIS Specialist
- NASA
  - Principle Investigator
- USGS
  - Supervisory Cartographer
    - Planetary GIS
    - Data Management

FACULTY

Isaac Shaffer

Faculty Professor

Vahid Nikoonejad Fard

Team Mentor

Problem Statement

Problem Statement

Our business area is in astrogeology with the United States Geological Survey (USGS)

- **What is USGS?**
  - **A science agency that provides scientific information about the Earth, water, and biological resources of the United States**

Problem Statement

Our business area is in astrogeology with the United States Geological Survey (USGS)

- **Flagstaff AZ**
  - **Astrogeology Science Center**
- **Celestial bodies**
- **Natural landmarks**
  - **Age, Substance, Epocs**

Problem Statement

Trent Hare

Cartographer at U.S. Geological Survey (USGS)
Employed for over 35 years.

- **Crater Stats CLI application**
- **Python application**
- **Used by hundreds to thousands of scientists**

What problem are we trying to solve?

The usability of Crater Stats needs improvement!

"Scientists should not have to attend a boot camp to use Craterstats…"
- Trent Hare

Problem Statement

Key Problems

What's broken

- Crater Stats is hard to learn
  - CLI is not the easiest and has little documentation…
  - Previous GUI attempts were not user friendly…
- Crater Stats is inefficient in terms of time
  - Rewrite an entire command for a slight change…
  - Old GUI was not very good either…

Problem Statement

CLI is not user friendly - Designing a GUI is hard

Intuitive Consistency Simplicity	Clear Navigation Responsiveness Feedback

That is our challenge

Our Promise

- Standalone GUI environment for running craterstats
- Frequent iteration and testing
- Customer collaboration
- Continuous improvement

Solution Overview

Solution overview

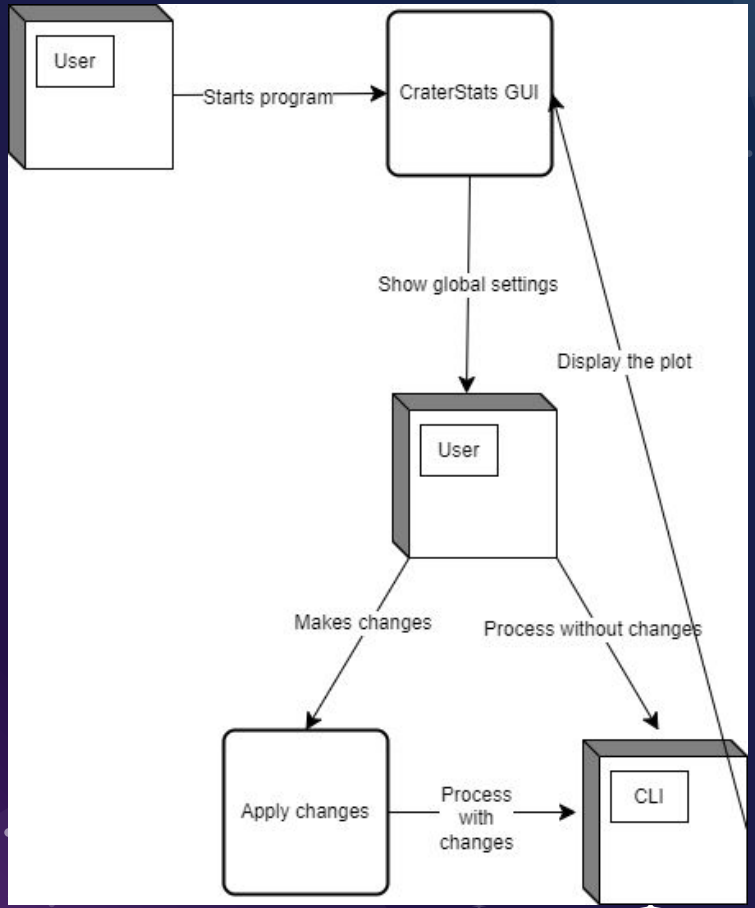
- How will we solve our problems and meet promises?
  - Provide a GUI that is
    - Intuitive
    - Consistent
    - Simple
  - And supports feedback
    - Must display plots live

Solution Overview

- GUI will be minimalistic and organized and will:
  - Separate and group all configurations into tabs
    - Makes GUI application intuitive
    - Ensures clear navigation
  - Provide a plot in every tab
    - Displayed by libraries
    - Data generated by CraterStats
- Ensures CraterStats and GUI easy to learn and use

Solution Overview

Features make app intuitive



Interface makes it easy to use

Implementation Overview

Implementation overview

- Easy to use and user friendly
- Keep graphs dynamically updated
- Easy navigation through tabs
- Ability to upload and save graph files
- OS Compatibility

CRATERSTATS GUI FRAMEWORK

FRONT END

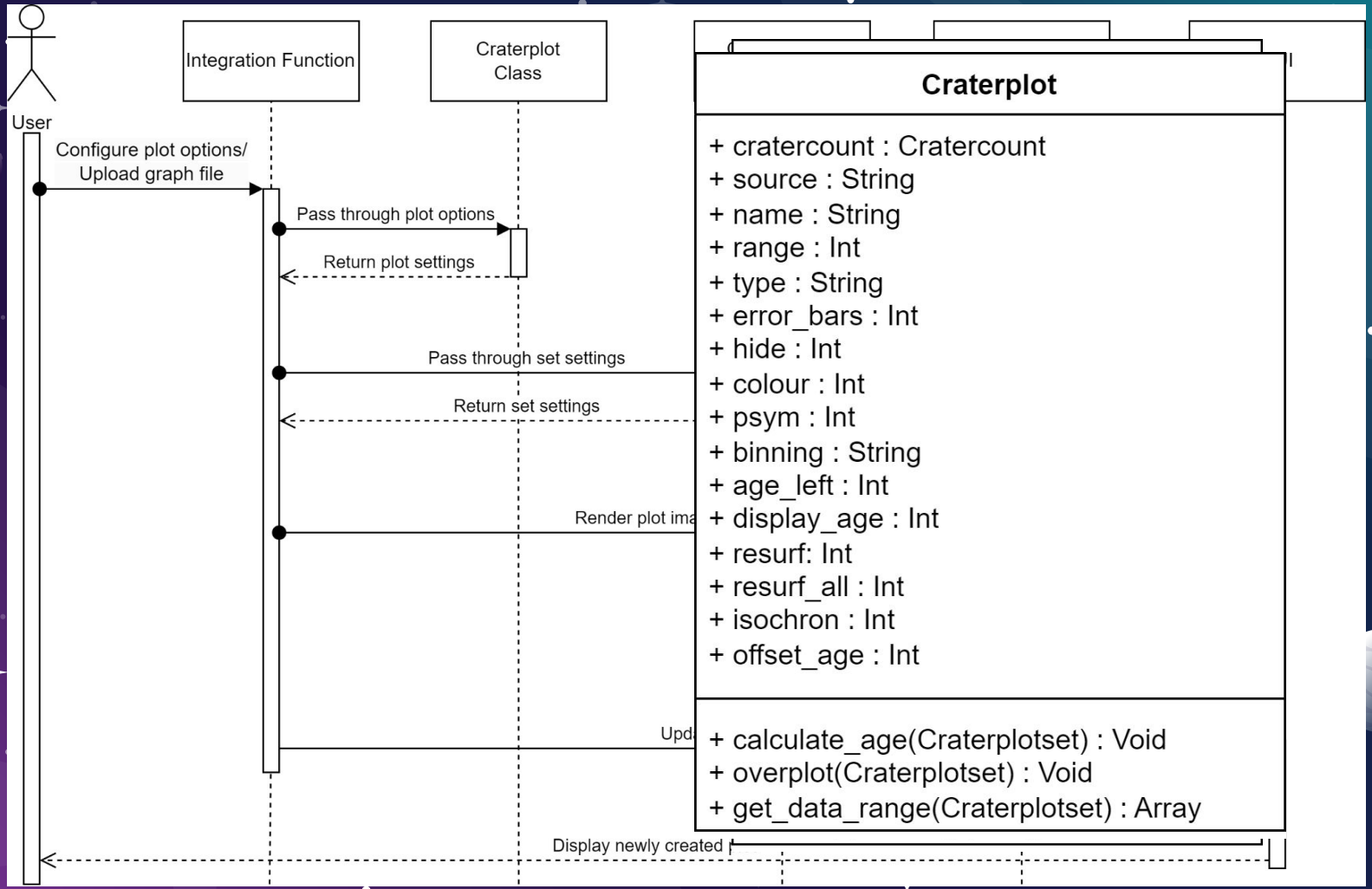
The front end of our application is created using Flet

BACK END

The back end consists of integration with the previous version with extra data handling

HOSTING

The program will be hosted either through PyPi or an executable file format


User
Integration Function
Craterplot Class
Configure plot options/ Upload graph file
Pass through plot options
Return plot settings
Pass through set settings
Return set settings
Render plot ima
Upd
Display newly created
Craterplot
+ cratercount : Cratercount
+ source : String
+ name : String
+ range : Int
+ type : String
+ error_bars : Int
+ hide : Int
+ colour : Int
+ psym : Int
+ binning : String
+ age_left : Int
+ display_age : Int
+ resurf: Int
+ resurf_all : Int
+ isochron : Int
+ offset_age : Int
+ calculate_age(Craterplotset) : Void
+ overplot(Craterplotset) : Void
+ get_data_range(Craterplotset) : Array

Challenges & Resolutions

Challenges and resolutions

- Most challenges related to integrating Craterstats CLI
- Experiencing minor challenges with GUI development

Challenge - Documentation

- Very little documentation regarding development
  - No comments
- Variable issues
  - Single Letter variables
  - Non-Descriptive variables

Challenge - Support

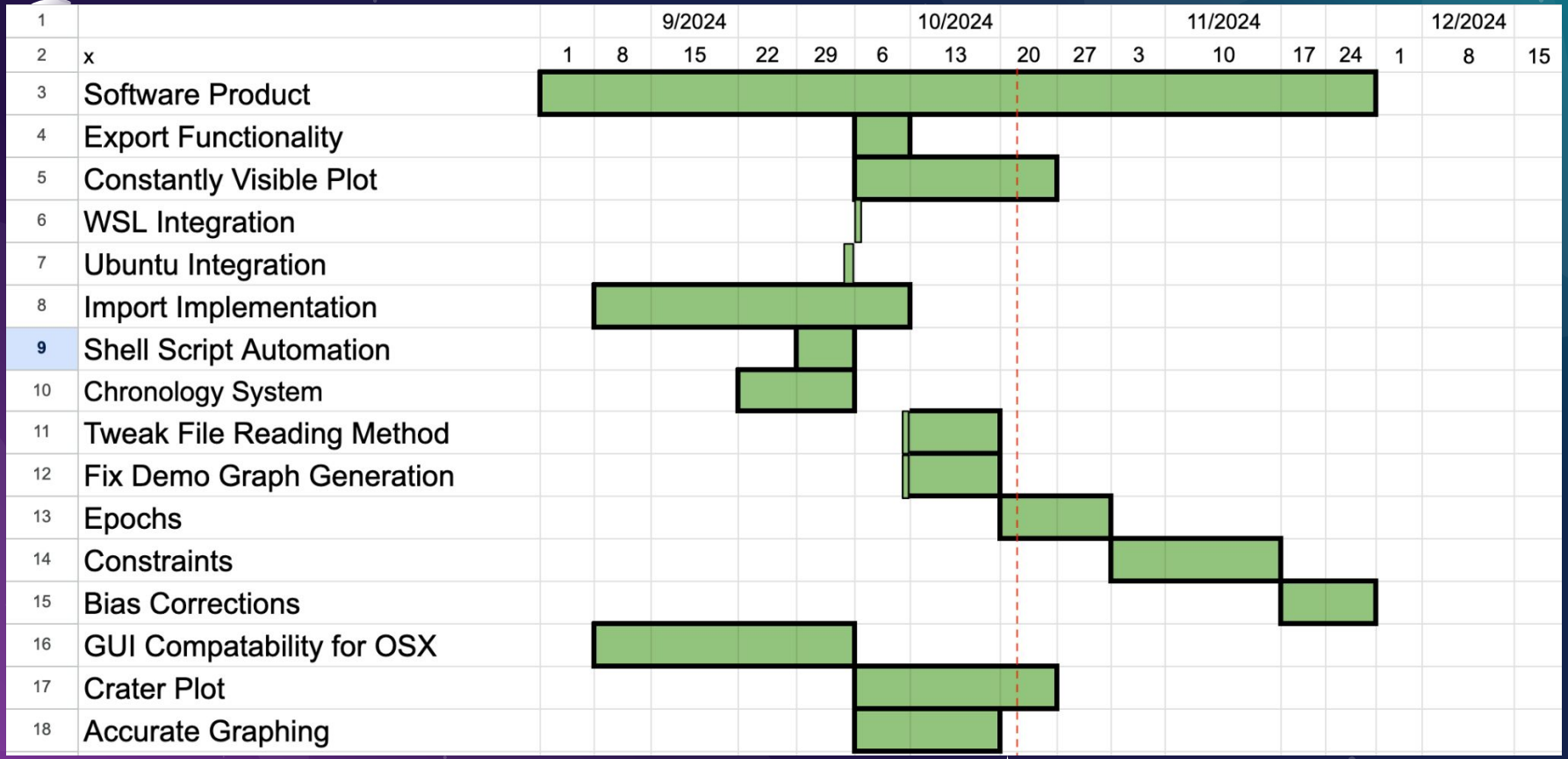
- Crater Stats CLI support was terminated after Python version 3.8
  - Caused issues with dependencies
    - Scipy
  - Required changes to programming style
    - Match case → If Else statement

Minor Challenges

- Plot file configuration styles
- Data point display
- Demo efficiency

Development Schedule

GUI Development schedule



GUI Development Schedule

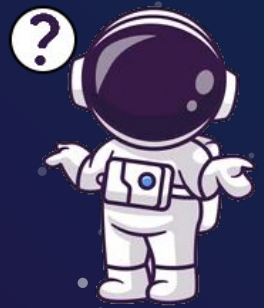
Functional Milestones

Milestone Complete:

- **Export functionality**
- **Import functionality**
- **Accurate plot**
- **Constantly visible plot**
- Integrated WSL
- Integrated Ubuntu
- Shell script automation
- Finished chronology system
- Compatible with multiple systems

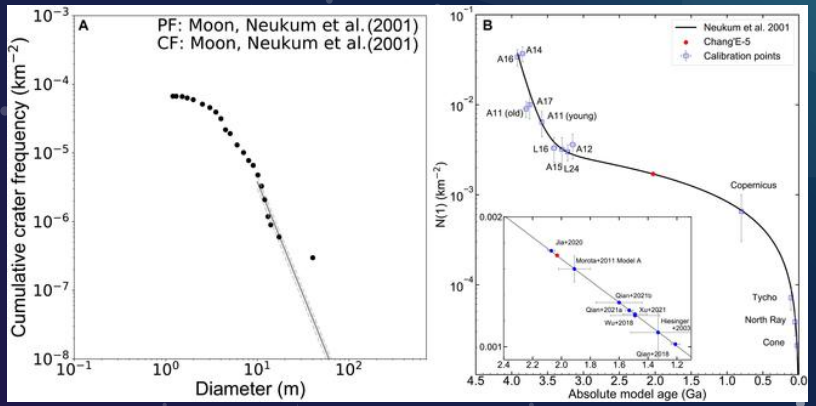
Milestone In Progress:

- Correct file reading for new format
- Rework demo graph generation
- Add data points



Conclusion

Surface of our moon



Crater Frequency
on Lunar Surface