

GeoSTAC

Design Review III



Team Members

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Mentor

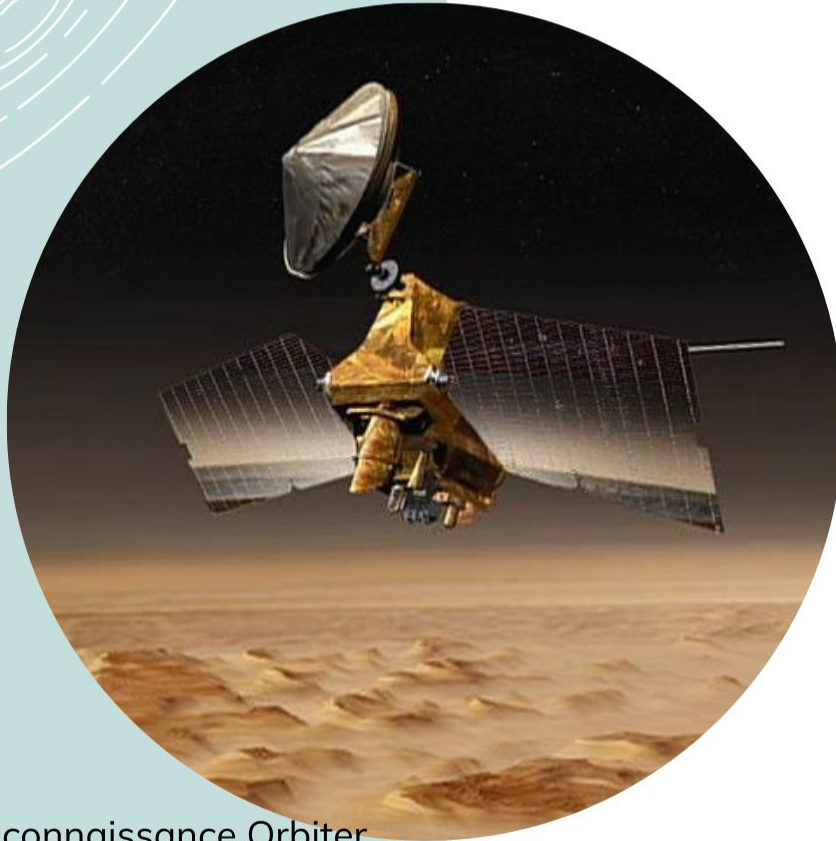
Melissa Rose

Client

United States Geological Survey (USGS)

Astrogeology Science Center

Big Picture



- More than **250 robotic spacecrafts** and **24 humans** have explored beyond Earth.
- **Hundreds of terabytes** of data gathered every hour.

Clients



Trent Hare - Cartographer



Dr. Jay Laura - Software Lead



Problem

- Collection of ARD (Analysis Ready Data)
- Difficult to Access
- Client's STAC API New and Unknown



STAC

SpatioTemporal
Asset Catalog

The Data

- Data footprints
- Close up on a surface of a planetary body
- Used by planetary scientists



MARS ▾ LONGITUDE 146.689 LATITUDE -0.839

EAST WEST CENTRIC GRAPHIC 180° 360°

Map of Mars showing data footprint overlays (blue rectangles) on a satellite image. The interface includes a 'Query Console' at the bottom with a STAC query and a 'Sort and Filter' panel on the right.

Sort and Filter

APPLY CLEAR

Sort By ▾

Filter By...

Selected Area

Keyword

Date Range

Number of Displayed Footprints

< 1 2 3 4 5 ... 24 >

Displaying 10 of 236 Results

Footprint Results

Collection: *ctx_dtms*

ID: P18_007883_1801_XN_00N
213W_P21_005109_T797_XN_00S213W_DEM
Date: 2021-08-16T00:00:00Z

Metadata STAC Browser

Collection: *ctx_dtms*

ID: J03_046149_1781_XN_01S
192W_J03_045938_T781_XN_01S192W_DEM
Date: 2021-08-16T00:00:00Z

Metadata STAC Browser

Collection: *ctx_dtms*

ID: J04_046440_1942_XN_14N
218W_J06_047152_T943_XN_14N218W_DEM
Date: 2021-08-16T00:00:00Z

Metadata STAC Browser

Query Console Auto-populate with: STAC Query

`https://6vpdmaqce6.execute-api.us-west-2.amazonaws.com/dev/collections/ctx_dtms/items?page=1`

COPY CODE

DRAW WKT STRING

RUN STAC QUERY

Documentation User Manual GeoSTAC Project Website

Solution

- Map of data footprints
- Filter parameters
→ STAC Queries
- Easy to find/view data with locational context

Requirements Review



View image footprints overlay within the web map



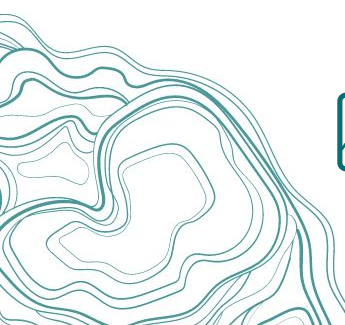
A query search functionality



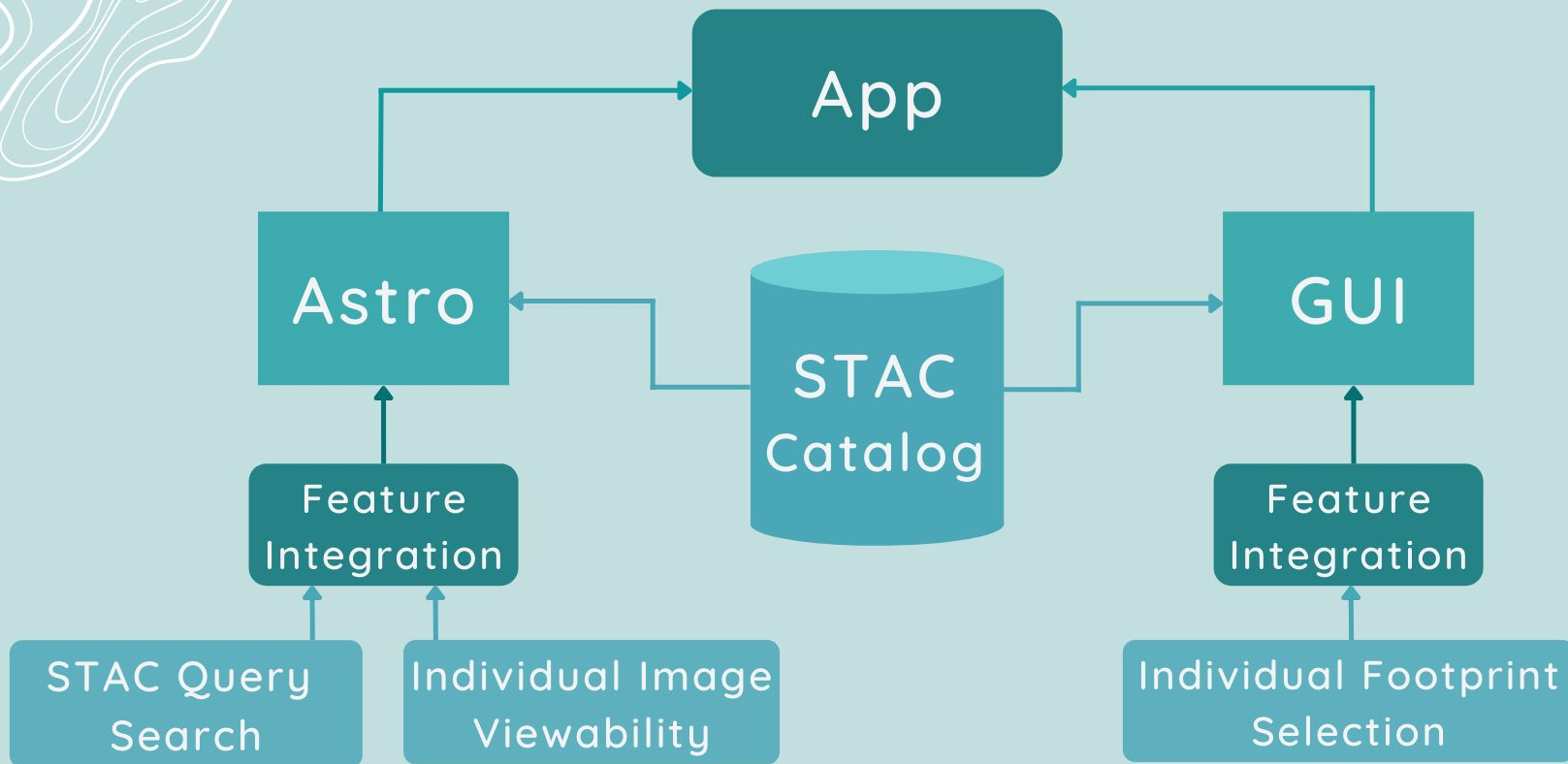
An interactive selection tool to select multiple footprints



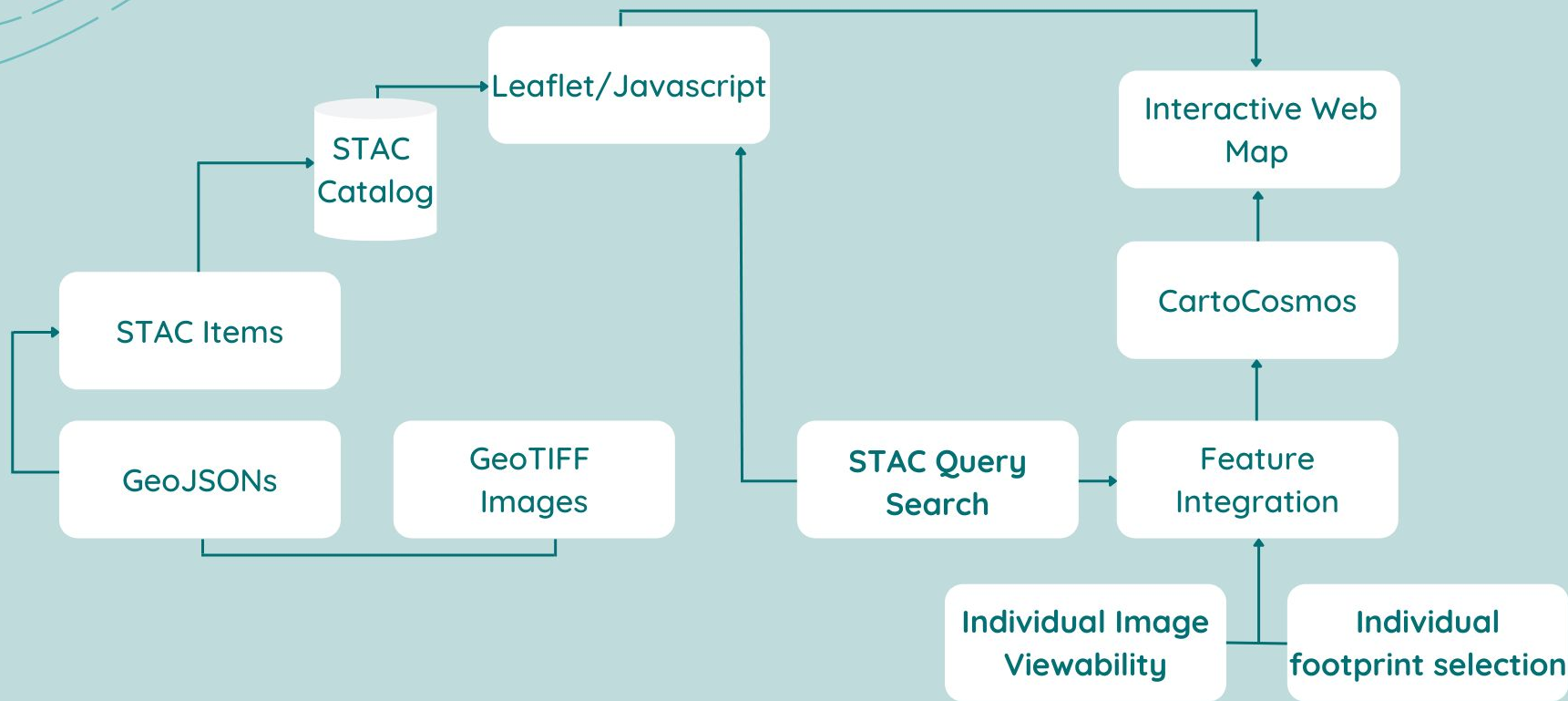
Display Cloud Optimized GeoTIFF (COG) images within the web map



Architectural Overview

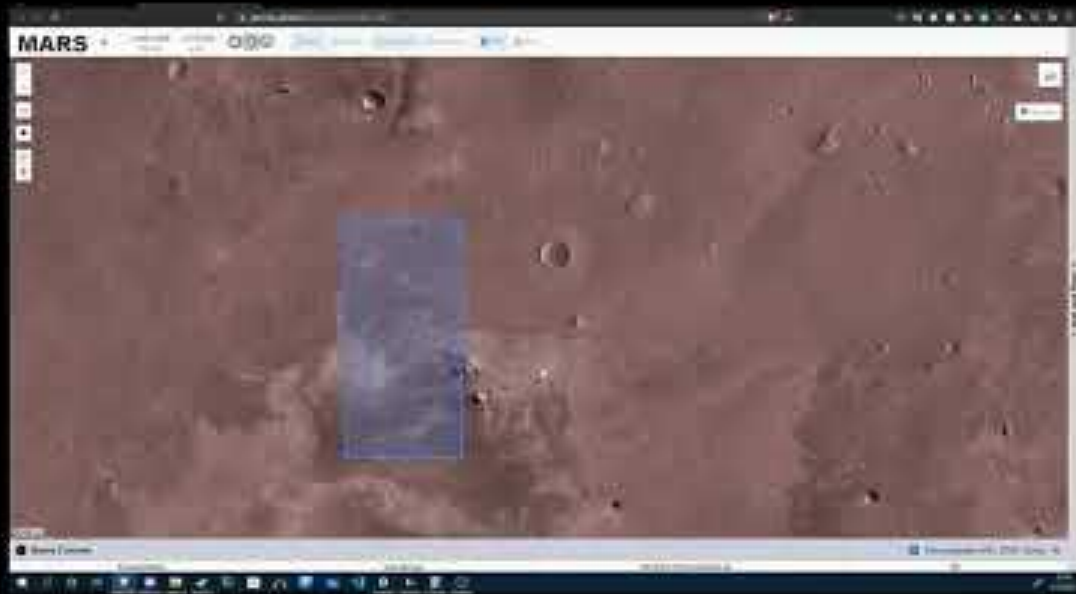


Implementation Overview



Prototype Review

 Footprint Overlay:

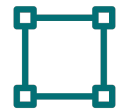


Prototype Review

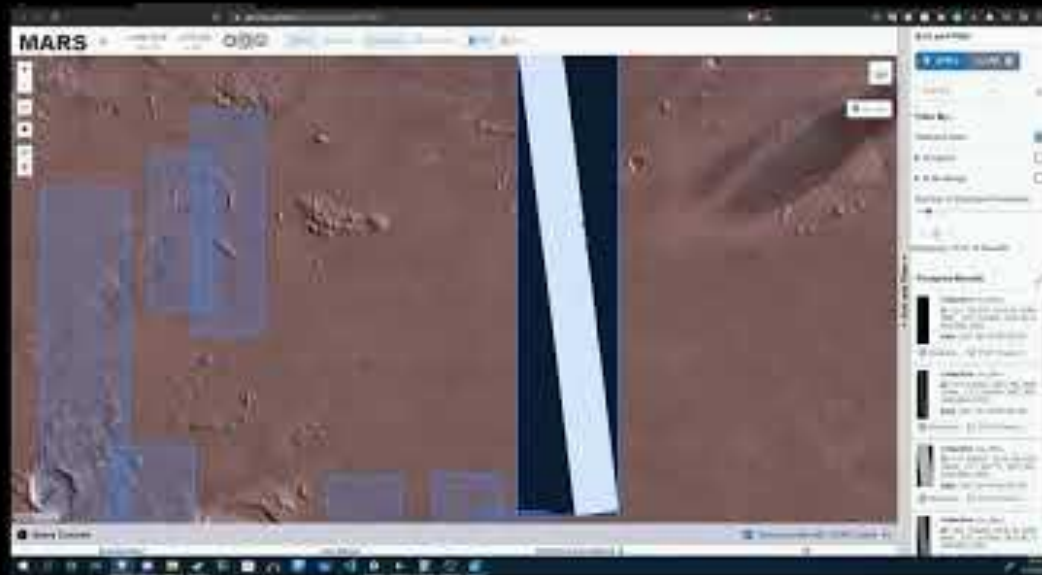
🔍 Query Search:



Prototype Review



Interactive Selection:



Prototype Review



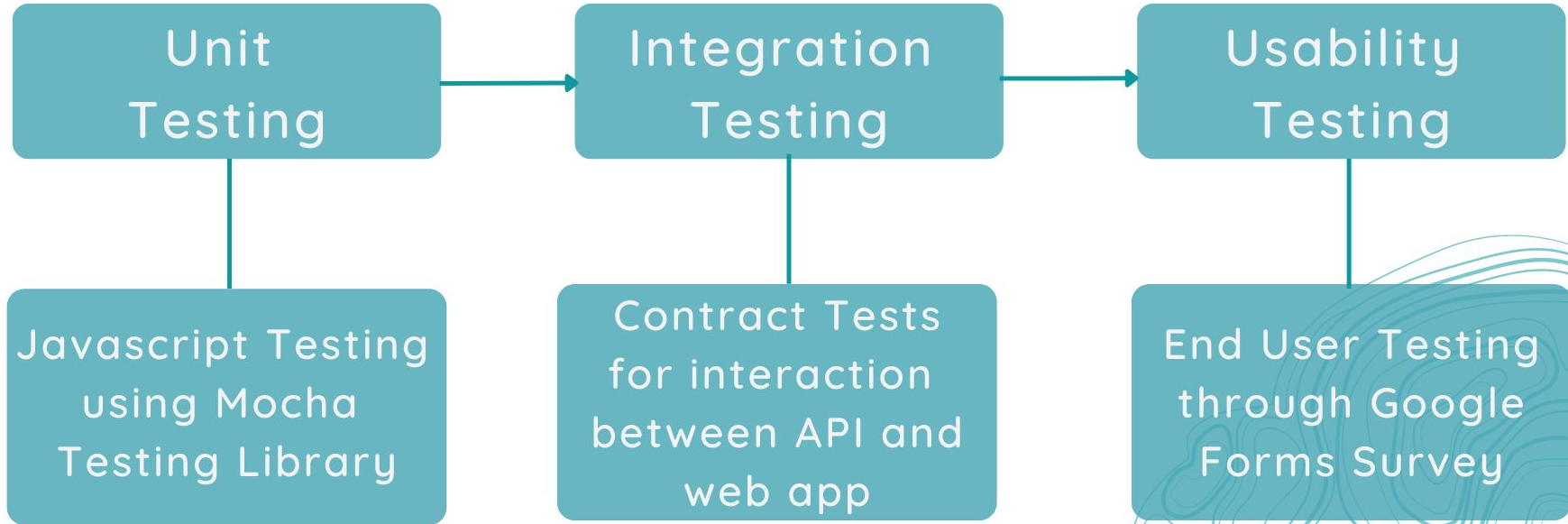
Display COG's:



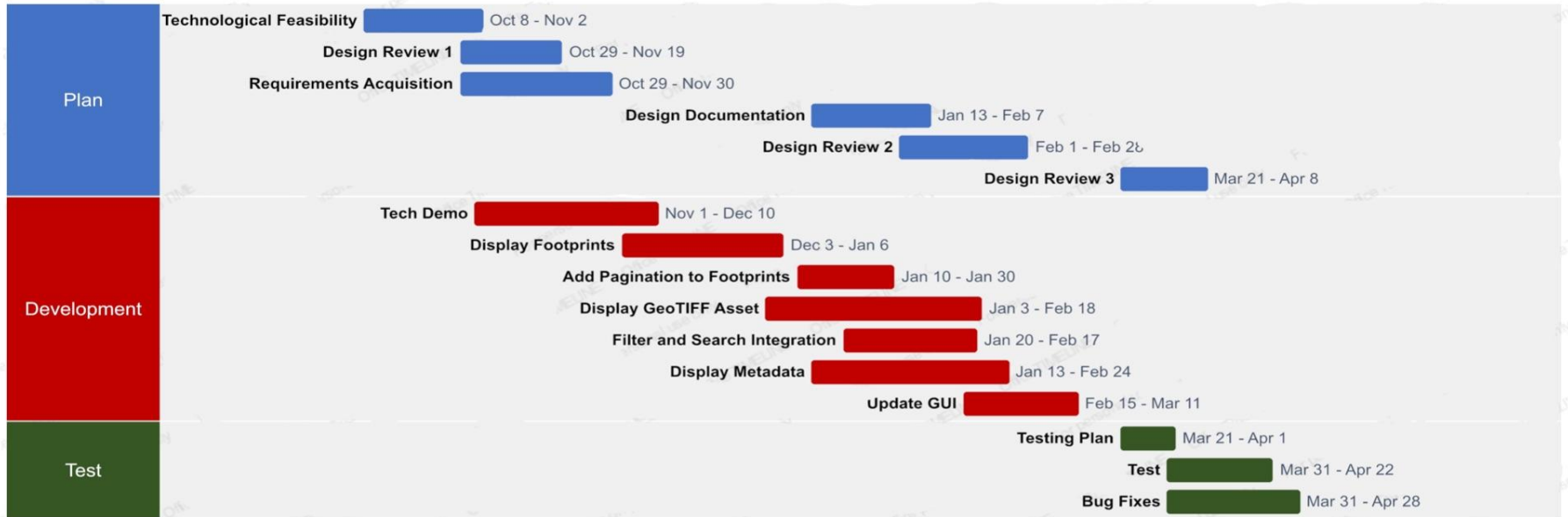
Challenges and Resolutions

Challenges	Resolution
Rendering GeoTIFFs in a Leaflet viewer	<ul style="list-style-type: none">● Render Footprint Thumbnails as JPGS● Potential tile layer to render GeoTIFFs
React component interactions with Leaflet DOM	<ul style="list-style-type: none">● Parse element from Leaflet DOM by selecting on HTML element
NPM packages from CartoCosmos are outdated and causing vulnerabilities	<ul style="list-style-type: none">● Clean up existing NPM variables and packages● Introduce conda environments for building and installing the application and required packages

Testing Plan



GeoSTAC Development Schedule



Conclusion

- Accessing Clients ARD with STAC API
- Develop a Web Application
- Successful Development Process
- Redesigning Planetary Map Data