



Team Skyward: Frost Monitor



Alexander Sears - Justin Kincaid - Gage Cottrell - Chris French

Project Sponsors and Mentors

Sponsors:

- Dr. Michael Mommert
- Dr. David Trilling

Faculty Mentor:

- Dr. Dieter Otte



Dr. Mommert

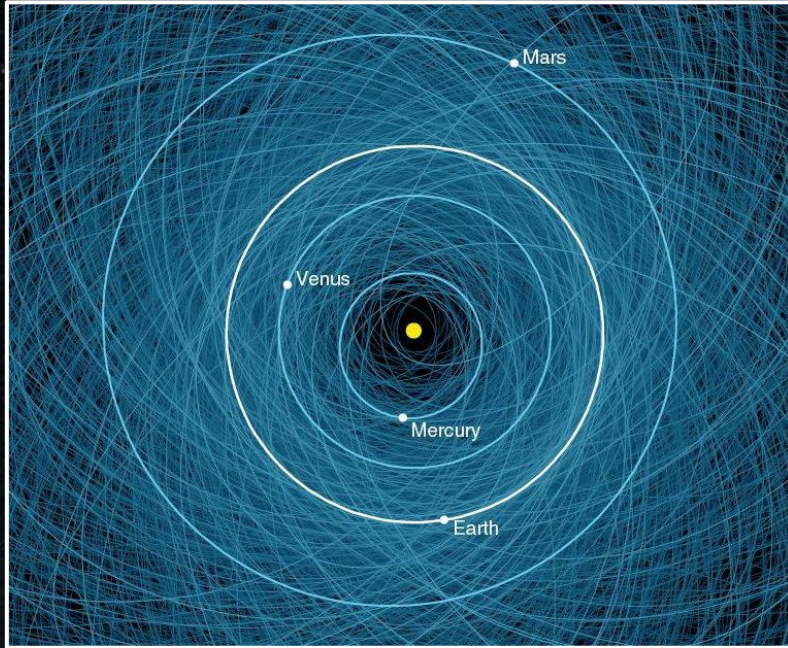


Dr. Trilling

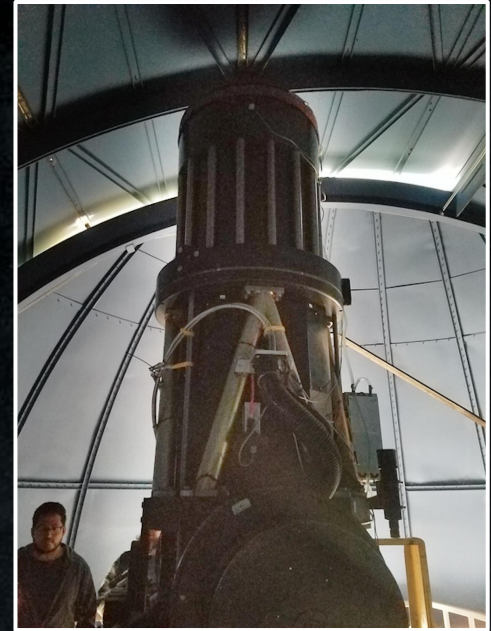


Dr. Otte

Project Domain



Near Earth Object (NEO) Research



Flagstaff Robotic Survey Telescope (FRoST)

Problem Statement

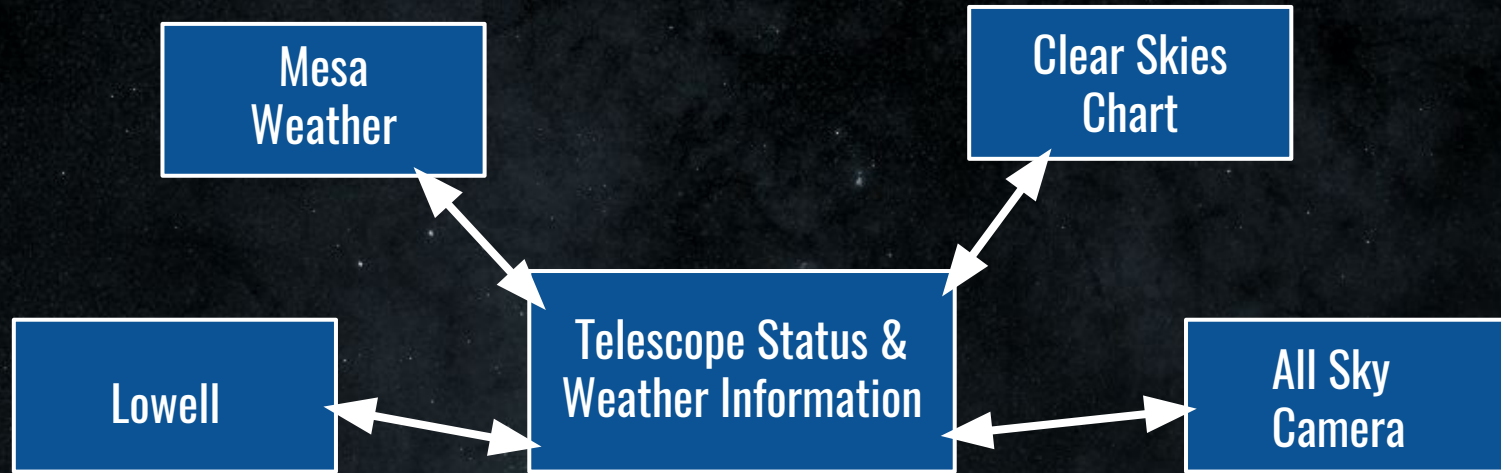


Figure 1: Current Workflow

Key Requirements

Functional Requirements:



Gather Telescope &
Weather Information



Single Password
Protected User

Performance Requirements:



Admin Login in 60 Seconds,
Dashboard Updates Every 10
Seconds



Network Agnostic

Solution Overview

- Frost Monitor System
- Django application with a REST API to handle data flow

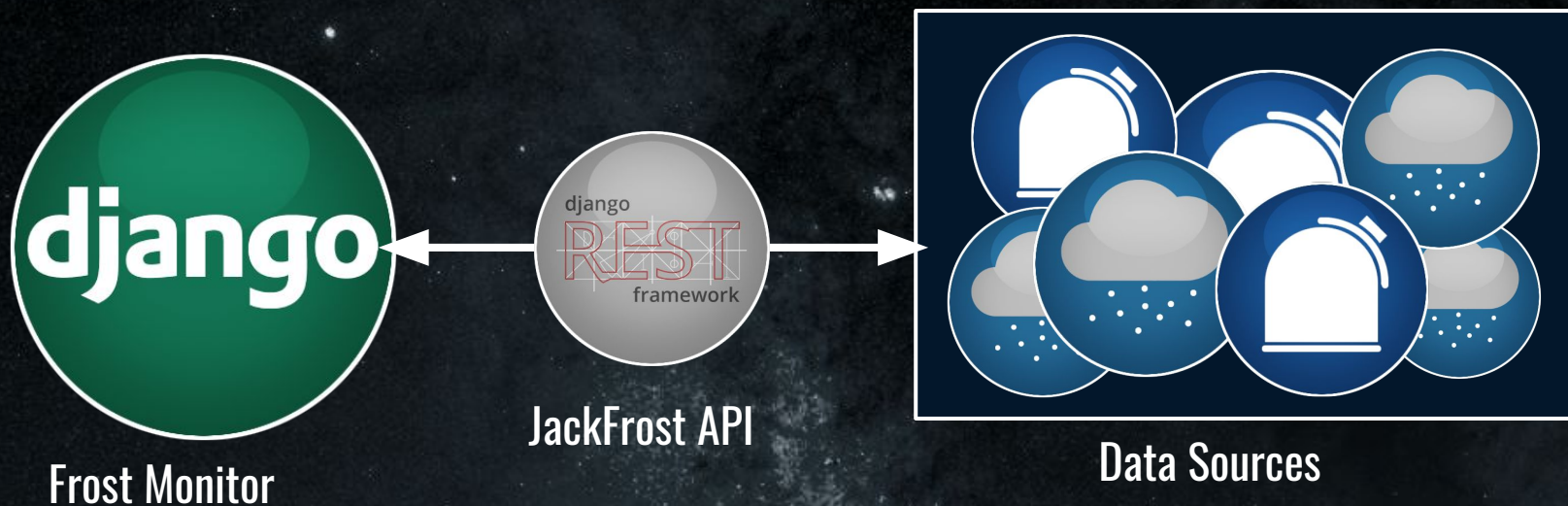


Figure 2: Proposed Solution

Front-End Implementation

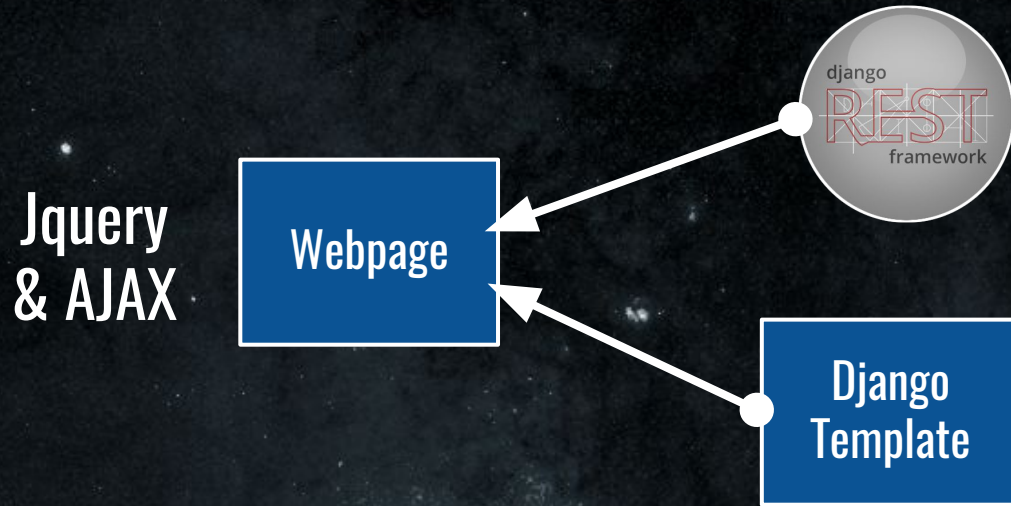


Figure 3: Front-End Components

Back-End Implementation

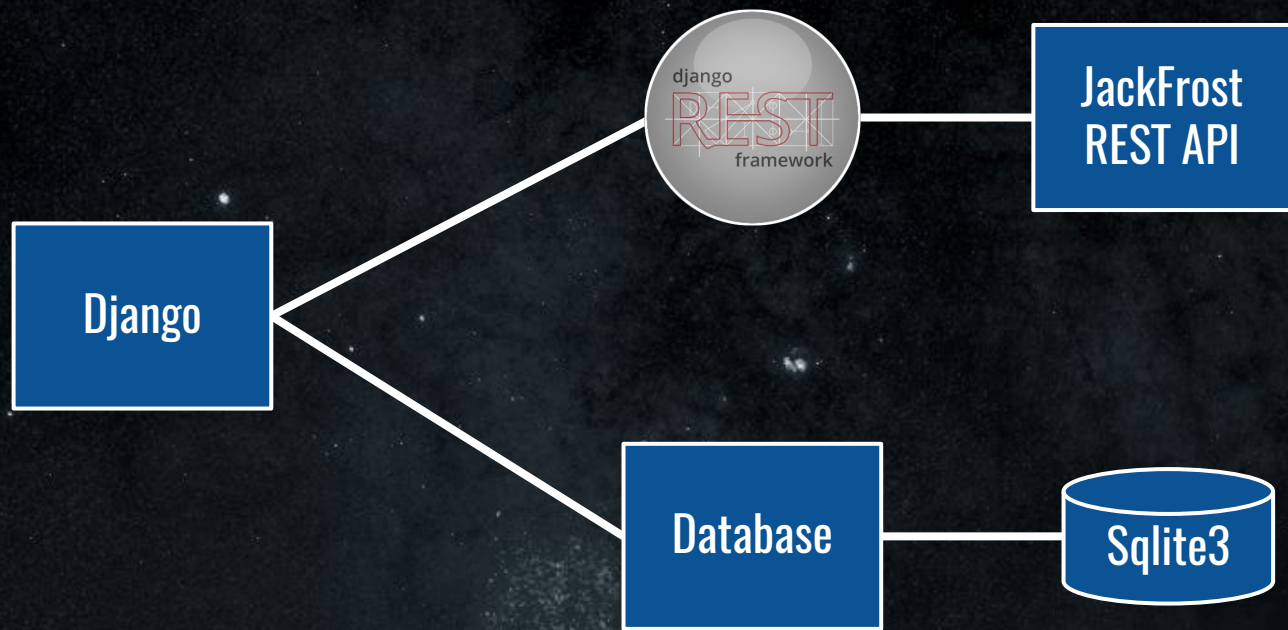


Figure 4: Back-End Components

Solution Overview: Models

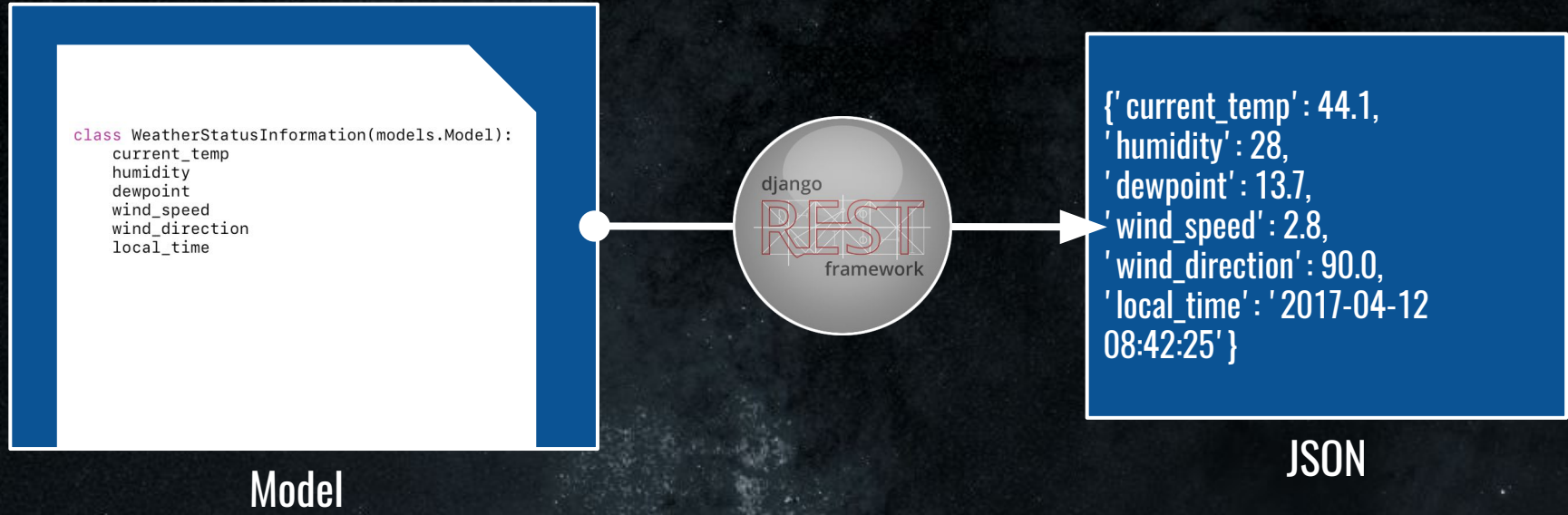


Figure 5: Data Serialization

Solution Overview: Interaction

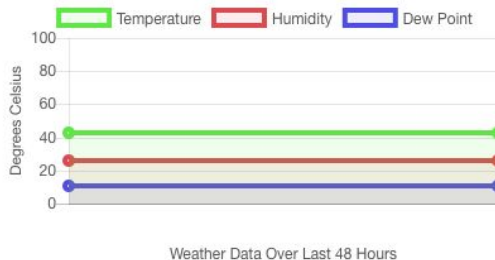
```
{'current_temp': 44.1,  
'humidity': 28,  
'dewpoint': 13.7,  
'wind_speed': 2.8,  
'wind_direction': 90.0,  
'local_time': '2017-04-12  
08:42:25'}
```

JSON

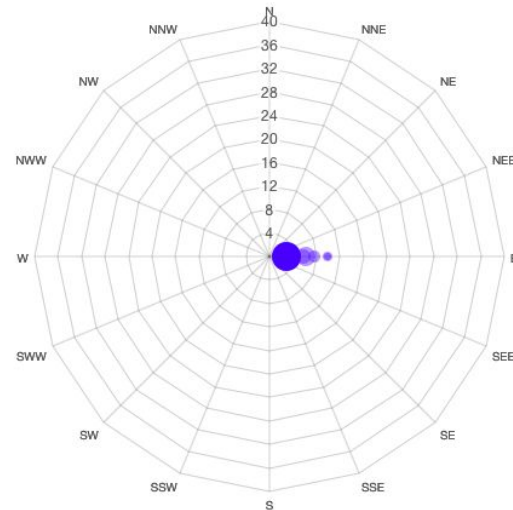
Current Weather Status

- Temperature: 44.10 F
- Humidity: 28.00 %
- Dewpoint: 13.70
- Wind Speed: 2.80 MPH
- Wind Direction: E
- Time Created: April 12, 2017, 1:42:25 AM

48 Hour Weather Plot



Wind



Template / Webpage Output

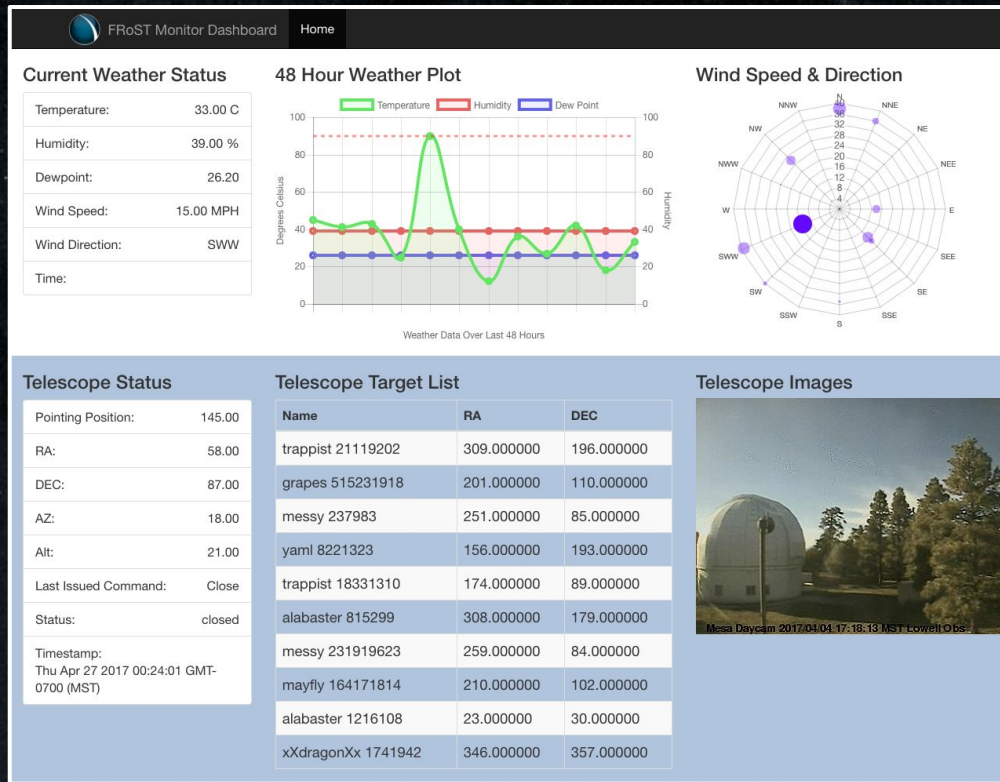
Figure 6: Data Reconstruction

Systems Overview



Figure 7: Systems Map

Implementation: FROST Monitor Dashboard

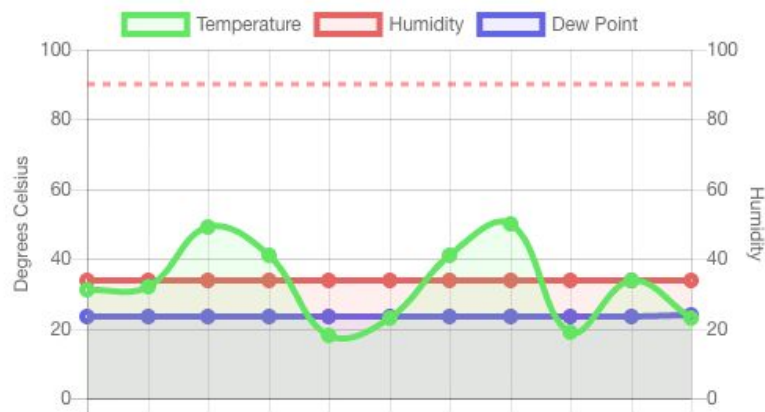


Implementation: Public Dashboard Modules

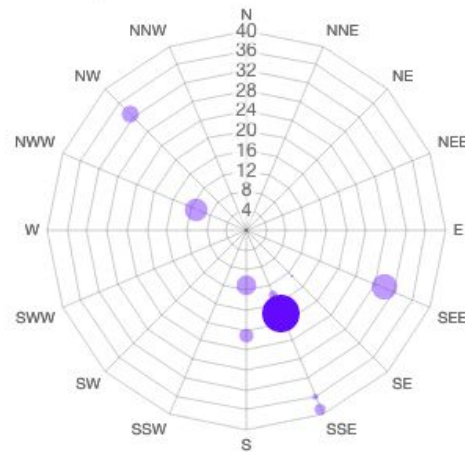
Current Weather Status

Temperature:	23.00 C
Humidity:	34.00 %
Dewpoint:	23.80
Wind Speed:	18.00 MPH
Wind Direction:	SSE
Time:	

48 Hour Weather Plot



Wind Speed & Direction



Updated Weather Information

Implementation: Admin Dashboard

Emergency Telescope Shutdown

Shutdown

Telescope Target List Editor

Object Name	Object RA	Object DEC	
trappist 21119202	309.000000	196.000000	X
grapes 515231918	201.000000	110.000000	X
messy 237983	251.000000	85.000000	X
yaml 8221323	156.000000	193.000000	X
trappist 18331310	174.000000	89.000000	X
alabaster 815299	308.000000	179.000000	X
messy 231919623	259.000000	84.000000	X
mayfly 164171814	210.000000	102.000000	X
alabaster 1216108	23.000000	30.000000	X
xXdragonXx 1741942	346.000000	357.000000	X

Submit

Implementation: Admin Dashboard Modules

Object Name	Object RA	Object DEC	
trappist 21119202	309.000000	196.000000	X
alabaster 815299	308.000000	179.000000	X
yarni 8221323	156.000000	193.000000	X
messy 231919623	259.000000	84.000000	X
mayfly 164171814	210.000000	102.000000	X
trappist 18331310	174.000000	89.000000	X
alabaster 1216108	23.000000	30.000000	X
xxdragonXx 1741942	346.000000	357.000000	X
messy 237983	251.000000	85.000000	X
grapes 515231918	201.000000	110.000000	X

Submit Refresh

Editable Target-List



Telescope Shutdown Button

Testing

Unit Testing



Integration Testing



User Testing



Unit Testing



- Model Validation
- Function Assertion
- Template Formatting

Integration Testing



- Model Serialization
- REST API
- Template Rendering

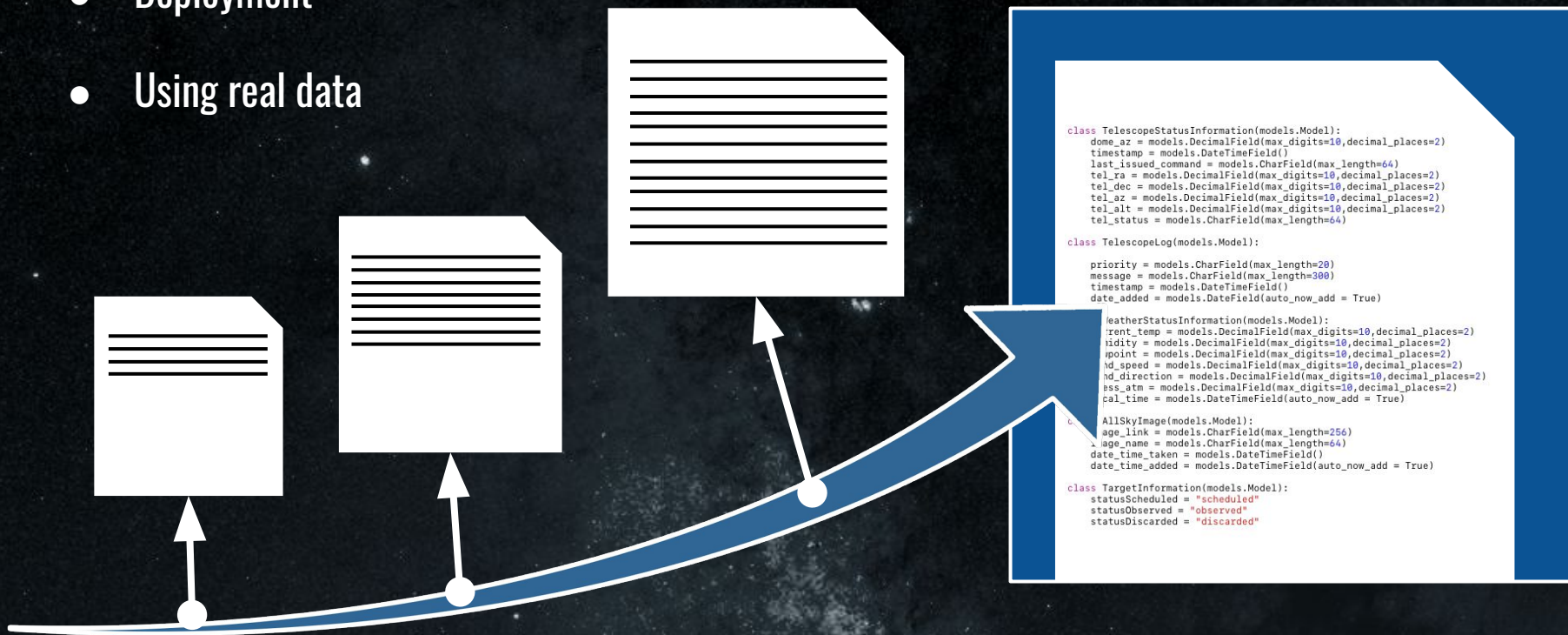
User Testing



- Login
- Element Interaction
- Data Accuracy

Challenges and Risks

- Deployment
- Using real data



Schedule

Schedule For Capstone Project					
Dates	Fall Semester	January	February	March	April
Completed Milestones					
Understand Project Description					
Technical Feasibility Document					
Requirements Elicitation					
Initial Proof of Concept					
Integrate Django, Rest, & Ajax					
Deployment Research					
Upcoming Milestones					
Deploy Django App					
Script Creation					
Deploy Script					
Graphs & Images					
Nice-to-Haves					
User Testing					
UI/UXRefinement					

Conclusion

- Flagstaff Robotic Survey Telescope
observes NEO (near earth objects)
- Multiple Data sources
- Agglomerate Data
- REST API
- Data Accessibility
- Web Application Dashboard
- Huge Success!

