



# Data Reduction and Visualization for the Dragonfly Telephoto Array

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## Introduction

The Dragonfly Telephoto Array is comprised of **48 lenses** and produces thousands of images per night.

Data organization, visualization and monitoring will become increasingly important.

An automated platform is required to keep track of the **performance** of each lens.



Fig 1. Dragonfly Telescope pointed at the sky.

## Hypothesis/Objective

- An interactive platform will ease the transition to further expansions of the instrument.
- Create a dashboard that will constantly update with incoming data from the Dragonfly telescope.

## Methods

- Familiarizing with the Dragonfly data reduction module in Python.
- Using Streamlit Python package to create a simple dashboard.
- Using the Slack API to push the requested information to a Slack Channel.

## Results

### The Dragonfly Telephoto Array

Ultra-low surface brightness astronomy at visible wavelengths

This will be the dashboard where the Dragonfly data is displayed and organized.

Night of observation

2022/04/07

Data from the night of 2022-04-07 is available.

There are 503 light frames, 1945 dark frames, and 619 flat frames.

50.3 % of the light frames are good.

83.0 % of the dark frames are good.

33.0 % of the flat frames are good.

Fig 2. Dragonfly dashboard screenshot. Displays a feature that allows a night to be selected and shows basic information.

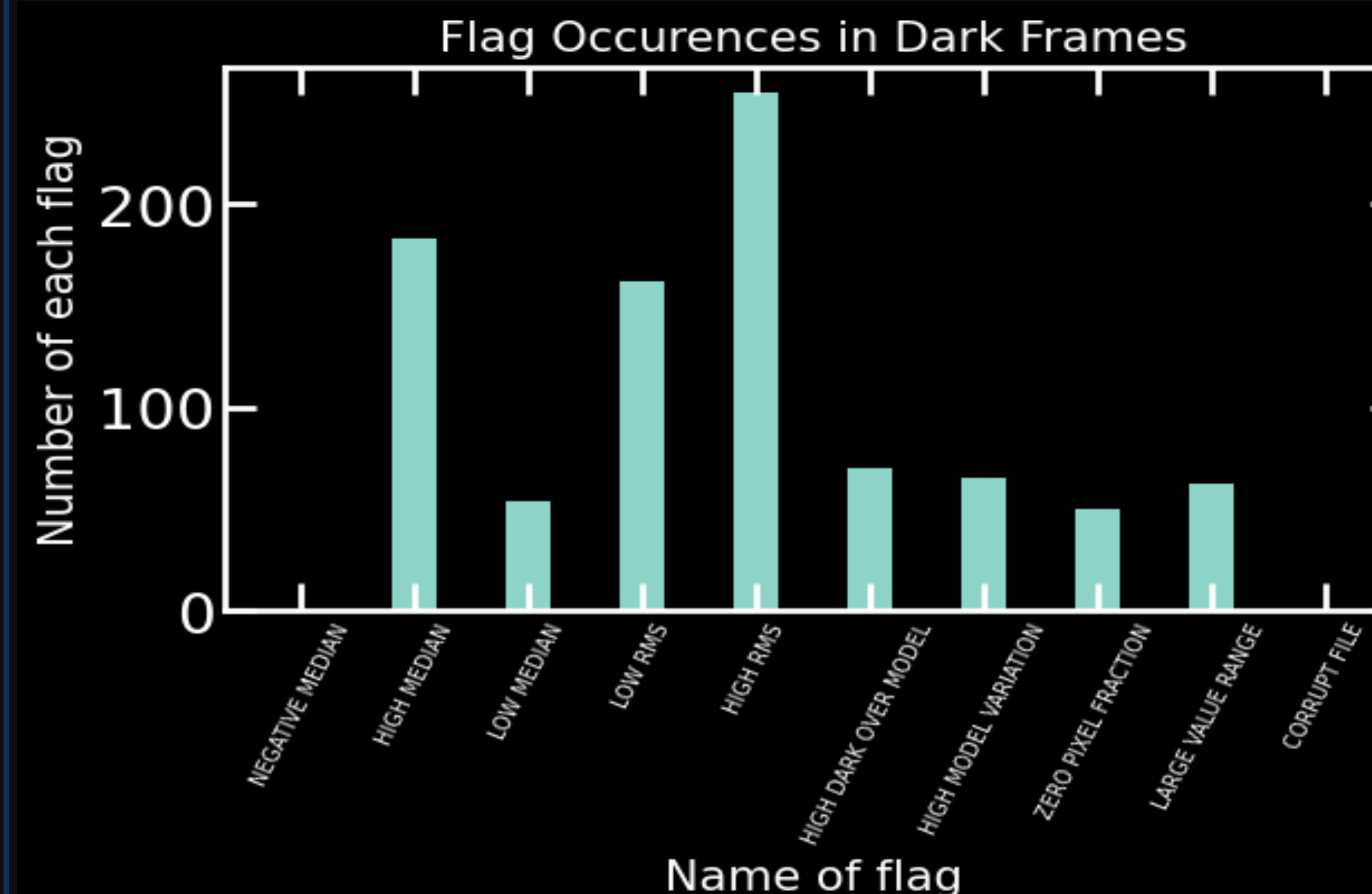


Fig 3. Bar chart of dark image flags. The number of occurrences for each flag in every dark image on a sample night.

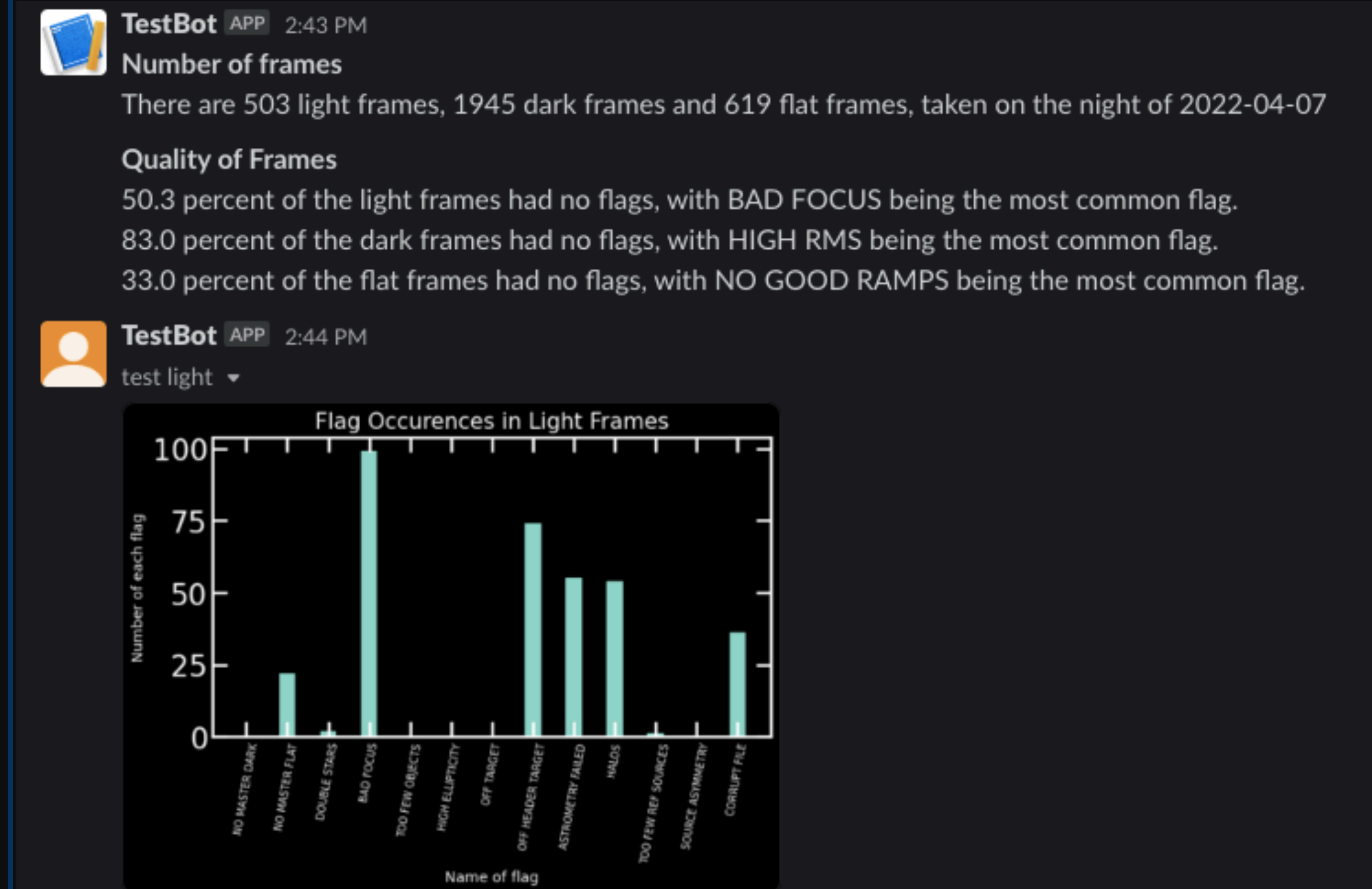


Fig 4. Slack bot sending the dashboard information.

## Conclusion

The automated dashboard has become a useful tool for dealing with the **added complexity** of a telephoto array.

## Future Directions

- Add **more features** to the dashboard requested by the team.
- **Synchronize** the dashboard with the nightly updated Dragonfly data frame.
- Host the Slack bot to a server to push the **daily update** to Slack.

## References

1. Abraham, R. G., & van Dokkum, P. G. (2014). *Publications of the Astronomical Society of the Pacific*, Vol. 128, Issue 935, pp. 55.
2. Shany Danieli *et al.* (2020). *ApJ* **894** 119
3. Streamlit API [documentation](#)