Starshade Exoplanet Data Challenge Timeline and Logistics

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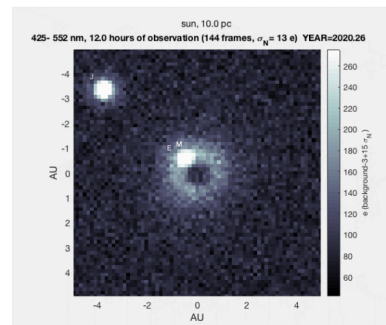
January 27, 2021

CL # 21-0444

EXOPLANET PROGRAM

About   Studies   News   Meetings/Events   Resources   **Technology**   NExScI   ExoPAG | For the Public

Overview   Needs and Gap Lists   SAT Awards   Colloquium Series   iSSA   SCDA   Starshade Technology Development   **Starshade Data Challenge**

Starshade Exoplanet Data Challenge

A key recommendation that emerged from Starshade Science and Industry Partnership (SIP) meetings and discussions is to produce a flow down of requirements from science to key performance parameters based on synthetic images via a data challenge. Responding to the community recommendation, the Starshade Technology Development Activity to TRL5 (S5) is now developing and conducting a Starshade Exoplanet Data Challenge.

The Starshade Exoplanet Data Challenge seeks to quantify the required accuracy of noisy background calibration to detect planets and exozodiacal disks and extract their spectra from synthetic images. The synthetic images simultaneously include multiple sources of background and noise including residual starlight, solar glint, other stray light sources, exozodiacal light, detector noise, as well as variability resulting from starshade's motion in formation flight and telescope's jitter. Many of these terms are specific to starshade observations, and the interplay of these terms of background and noise can be revealed and evaluated with the analyses on synthetic images.

Example synthetic images of starshade-assisted imaging of a hypothetical solar system at 10 parsec.

The images will be generated with the Starshade Imaging Simulation Toolkit for Exoplanet Reconnaissance (SISTER), which takes into account

Upcoming Starshade Exoplanet Data Challenge Telecon

- January 27, 2021
- 2:00-3:00pm PT = 5:00-6:00pm ET
- Join Webex Meeting ID: 199 264 5449 PW: 8yGw7M5kiJH

Announcement and Telecon Presentations

- Selection of Starshade Exoplanet Data Challenge subcontracts

Objectives of Release 1 Analyses

- Detect planets in the synthetic images
    - Astrometry

    - Photometry

    - Planet-star flux ratio

    - Uncertainties of the parameters above are essential

- Measure key aspects of the exozodiacal disk
    - Inclination

    - Brightness or dust level

Preliminary Schedule of Future Releases

- March: Release 2
    1. A second broadband visit in the blue band
    2. Two broadband visits in the green band
    3. Contrast of 10^{-9} and solar glint 2x current best estimate
    4. Resonant structures in the exozodiacal disk
    - Objectives: refine planet detection, compare retrieved S/N with idealized estimates, and detect structures in exozodi
    - Interim meeting before Release 2
- May/June: Release 3
    1. Slit-prism spectroscopy of Roman Starshade
    2. IFS spectroscopy of HabEx
    - Objectives: extract planetary spectra
    - Interim meeting before Release 3
- September: Study report and final meeting/presentations

Communication

- Starshade SIP mailing list
- A dedicated data challenge webpage
- A dedicated Slack channel
- Communication liaison for data challenge (Mario Damiano):
  - Act as a participant of the data challenge
  - Help the teams to familiarize with the data
  - Coordinate questions and discussions, clarify input parameters of the data simulation
- Tag-up/update meetings every two weeks?

E-mail:

mario.damiano@jpl.nasa.gov

slack channel:

Starshade Data Challenge
starshadedata-ett3036.slack.com

The data challenge is a learning opportunity for everyone.
Cooperation is the foundation of success!

Acknowledgement

This work was carried out at the Jet Propulsion Laboratory, California Institute of Technology under contract with the National Aeronautics and Space Administration. © 2021 All rights reserved.

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