



# Appendices



# Brief Review of Our PAR Phase 1 Results



## Science Requirements and Derived Performance Requirements

- Maximize observing spectral bandwidth
- Observe reflected light
- Require multiple revisits to confirm/characterize
- Precursor to determine frequency of earths among candidate stars
- True imaging enhances astrophysics potential



## Technical Innovations

- Generalized coronagraphy offers very high star rejection capability
- Apodized square aperture provides ultra-low diffracted light levels - may eliminate the need for nulling
- Pupil densification yields interferometric resolution with real image and compact PSF
- Rotational fixed pattern rejection suppresses residual star leakage



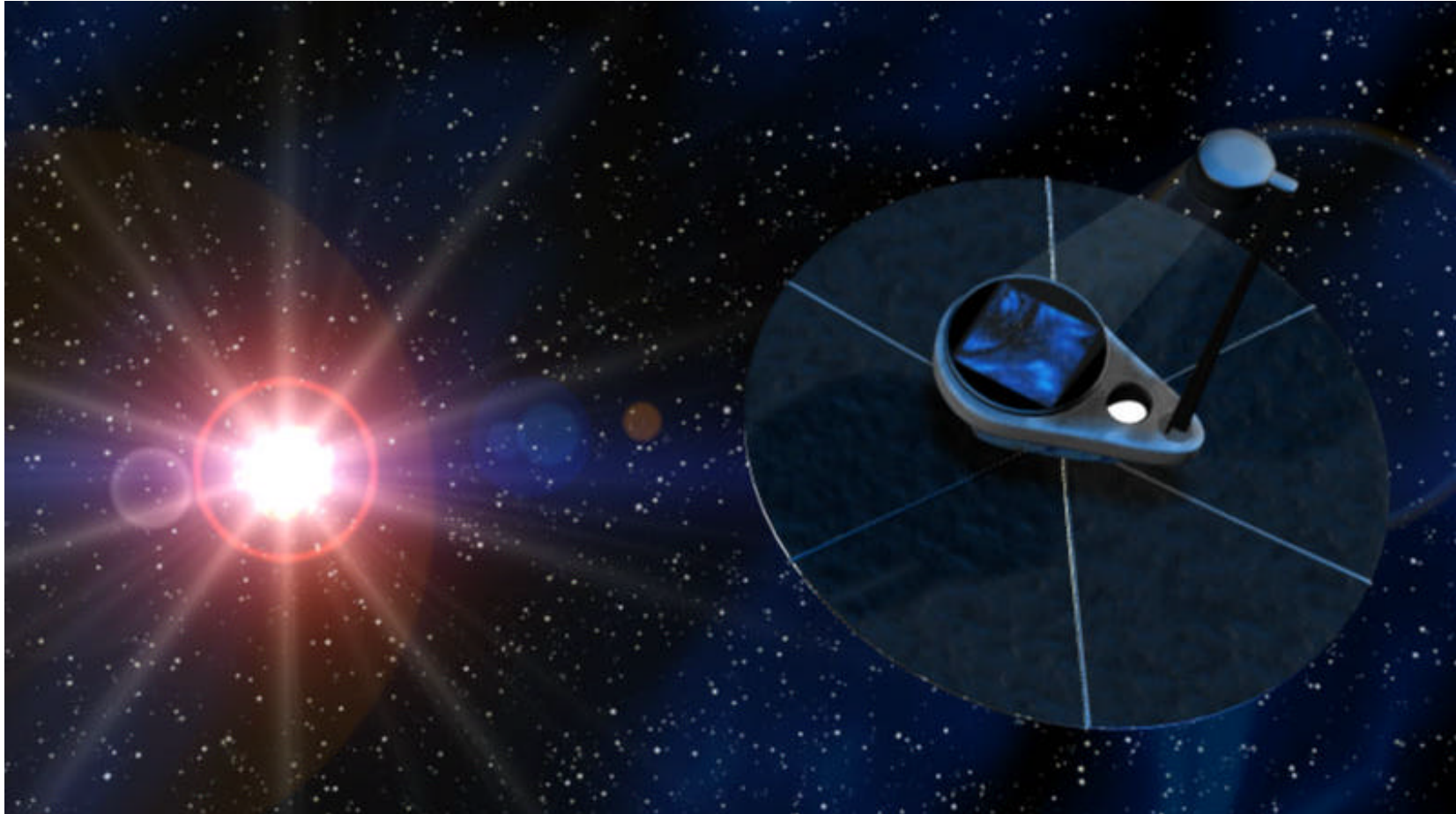
## Promising New Architectures

- Apodized square apertures promise cost effective, visible TPF implementations with precursor detection and characterization of Jupiters @ 5 AU, and then of terrestrial planets with TPF
- Hypertelescopes will carry out the TPF mission, and are scalable to larger, future missions, even Planet Imager

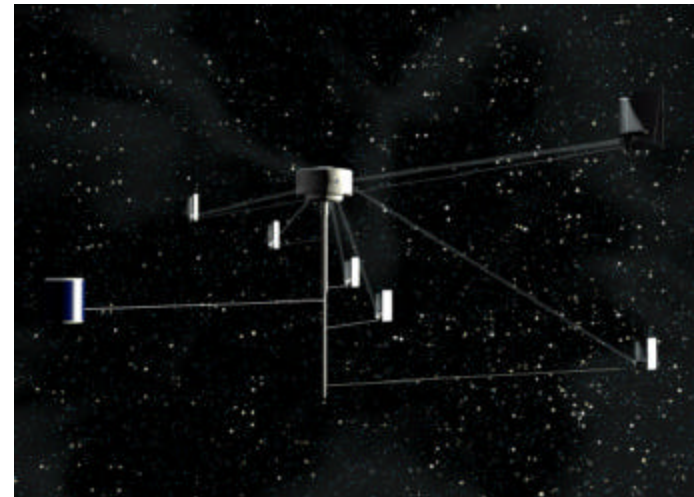
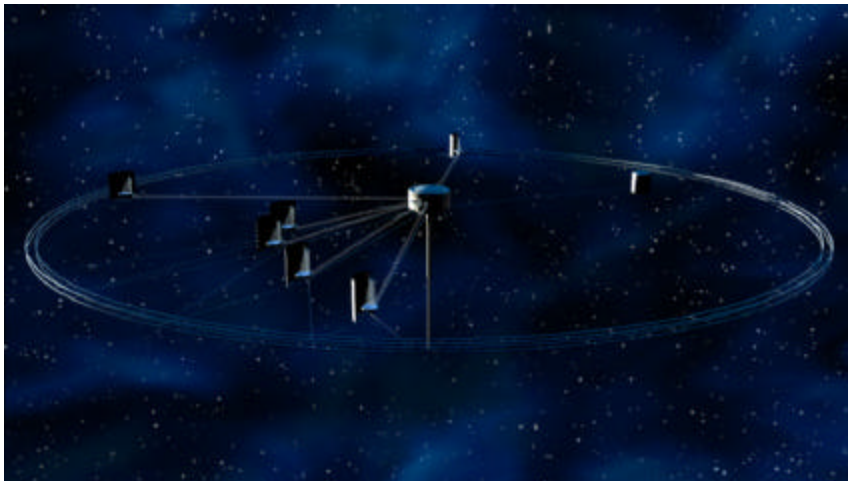
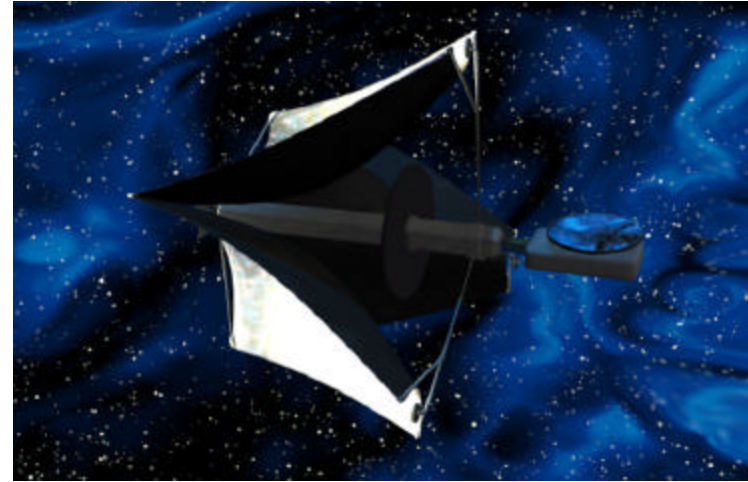
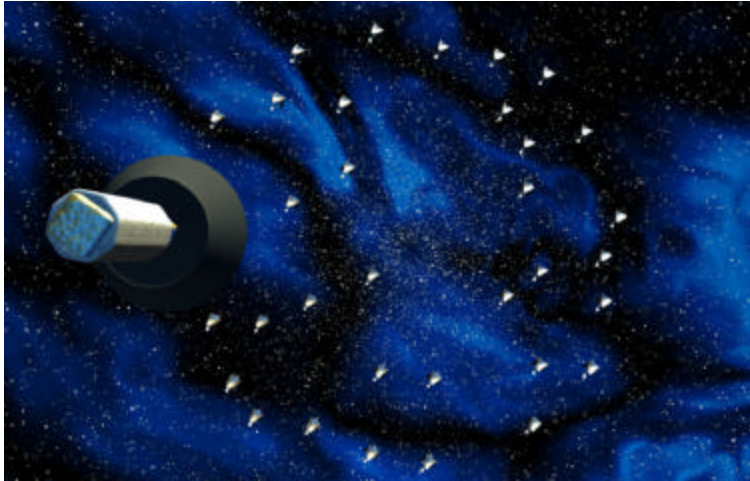
## Priority Ranking of Architectures

- Apodized Square Apertures (ASA)
- Hypertelescope Imagers
- Redundant Linear Arrays
- Interferometric nullers (e.g., "Book Design")
- Laser trapped mirrors
- Occultors

## Apodized Square Apertures



# Hypertelescopes





## Precursors

- TPF Precursors (including ground-based programs) are required to determine the frequency of occurrence of earths among nearby stars
- "TPF-lite" missions can carry out part of the full TPF mission, and serve as scientific and technical precursors



## Recommendations from Phase 1

- We seek to focus our attention on Apodized Square Apertures in Phase 2 as it is our highest priority architecture
- We also seek to study Hypertelescopes in Phase 2 as it was a close 2<sup>nd</sup> in our priority
  - We have the inventor of the Hypertelescope on our team, Antoine Labeyrie
  - We have the principle architect of an alternative implementation of Labeyrie's densified pupil approach on our team along with his grad student, Francois Roddier and Olivier Guyon
- All other architectures are far less attractive for further study by this team

# Comparison of Concepts

