

ExoPAG update

Jim Kasting—Chair

COPAG mtg. on UV/optical telescopes

Baltimore, Sept. 22-23, 2011

Presenter: Alycia Weinberger

- First, the bad news...

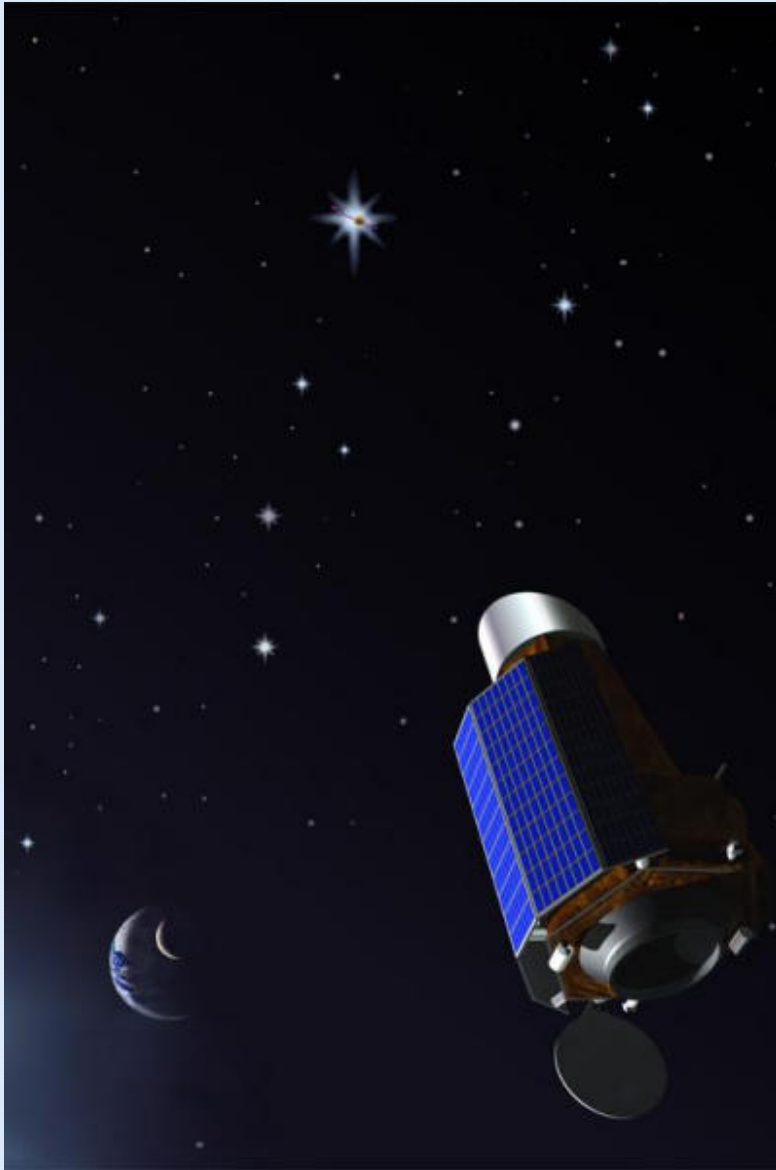
Changes to ExoPAG plans since the Spring

1. The **Instrument Performance Studies (IPS)** planned to begin this Fall have been postponed until next Spring due to uncertainties in NASA's 2012 budget. These studies are supposed to be a preliminary intercomparison between various concepts for a direct imaging mission to find Earth-like planets, i.e., comparing internal coronagraphs with external occulters (starshades), and maybe one or two other concepts, as well.

Changes to ExoPAG plans since the Spring

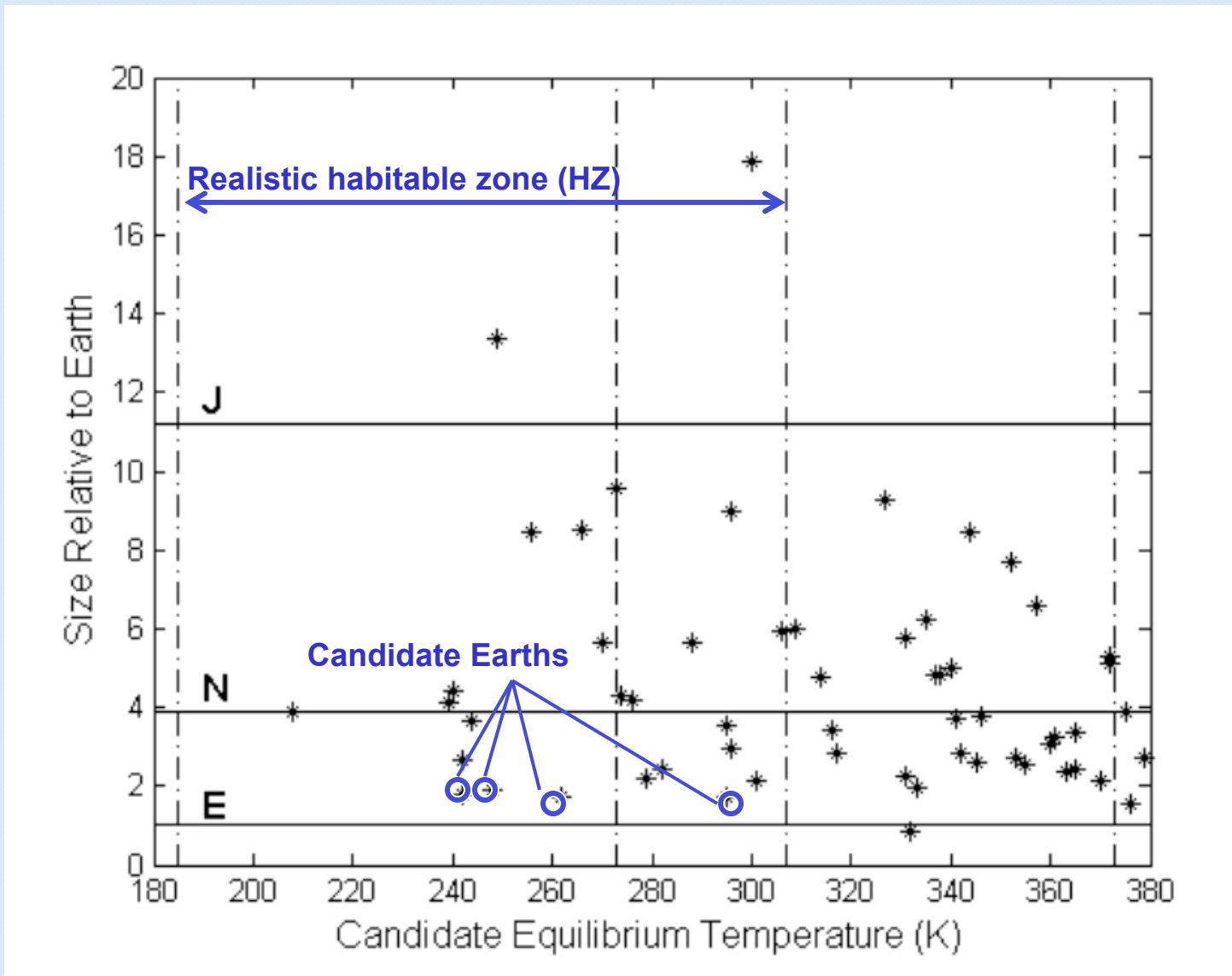
2. The Exoplanet Exploration Office and the ExoPAG are both worried that a flagship direct imaging mission could get pushed beyond the next decade if NASA's funding woes (particularly wrt JWST) continue. As such, we are planning to study **Probe-class (<\$1B) exoplanet missions**, as well. This does *not* mean that we will abandon plans to get ready for a flagship class mission, as previously advocated. We plan to do both.

- Now, the good news...



Kepler Mission

- The Kepler Mission is performing well
- 1235 “planet candidates” announced so far (Feb., 2011)
- 4 or 5 potentially habitable planets are included ⇒



- Earth-like planets must be within the HZ and must have radii $< 2 R_E$ (i.e., masses $< 10 M_E$)

What is the value of η_{Earth} ?

Definition:

η_{Earth} – the fraction of stars that have at least one rocky planet within their habitable zone (the liquid water belt)

What is the value of η_{Earth} ?

- Many groups have given estimates of η_{Earth} based on RV studies and the Feb. 2011 Kepler dataset
- Cantanzarite and Shao (ApJ, in press) estimate 0.01-0.03 (pessimistic)
- Other authors (Mayor, Traub) estimate ~ 0.3 (optimistic?)
- **If η_{Earth} is this large, then a good direct imaging mission can be done with a 4-m telescope**