

ExoPAG Report

APS Meeting, Washington DC

February 24, 2012

James Kasting, ExoPAG Chair

ExoPAG5 mtg: January, 2012

- ExoPAG5 was held in Austin, TX, in conjunction with the winter AAS mtg
- 2 full days of meetings (Sat./Sun.)
- Roughly 70 attendees
- 2-hr joint session with **COPAG** on Sunday
- Talks from 2 ongoing and 1 possible future Explorer class mission studies
 - **TESS**: George Ricker (transit survey of nearby stars)
 - **FINESSE**: Mark Swain (transit spectroscopy)
 - **EXCEDE**: Glenn Schneider (PIAA coronagraph for direct imaging of circumstellar disks—technology development only)

ExoPAG SAG reports

Two SAG reports are nearing completion

1. Exozodi dust (Aki Roberge, chair)

- This report focuses on the issue of how serious a problem exozodiacal dust poses for future exoplanet direct imaging missions and on how this interference can be quantified by ground-based measurements
- The group has produced several drafts and is nearing a consensus. It's not easy, though, because even the definition of the unit of dust absorption, the “zodi”, is controversial

ExoPAG SAG reports

2. Flagship mission requirements (Charley Noecker and Tom Greene, co-chairs)

- This group has drawn up a list of science objectives (not too different from TPF-C) and a spreadsheet of detailed mission requirements
- The requirements list is cast in the form of a **Kepner-Tregoe table**, with separate lists of “musts” and “discriminators”
- Both the objectives and requirements were presented to the full ExoPAG at the January meeting
- A draft report is promised but has not yet appeared

Proposed new ExoPAG Steering Committee members

- 5 members are rotating off the committee, including me
- 5 new members are being proposed
 - **Scott Gaudi** (Ohio State): Chair
 - Expertise in gravitational microlensing
 - **Dave Latham** (Harvard Smithsonian)
 - Transits (Kepler) and RV
 - **Remi Soumer** (STScI)
 - Ground- and space-based direct imaging
 - **Peter Plavchan** (Caltech/NExSci)
 - Observationalist, planets around low-mass stars
 - **Jonathan Fortney** (U.C. Santa Cruz)
 - Planetary atmosphere modeling; interpretation of transit spectra

Some thoughts about where we (exoplanet scientists and astronomers in general) are headed

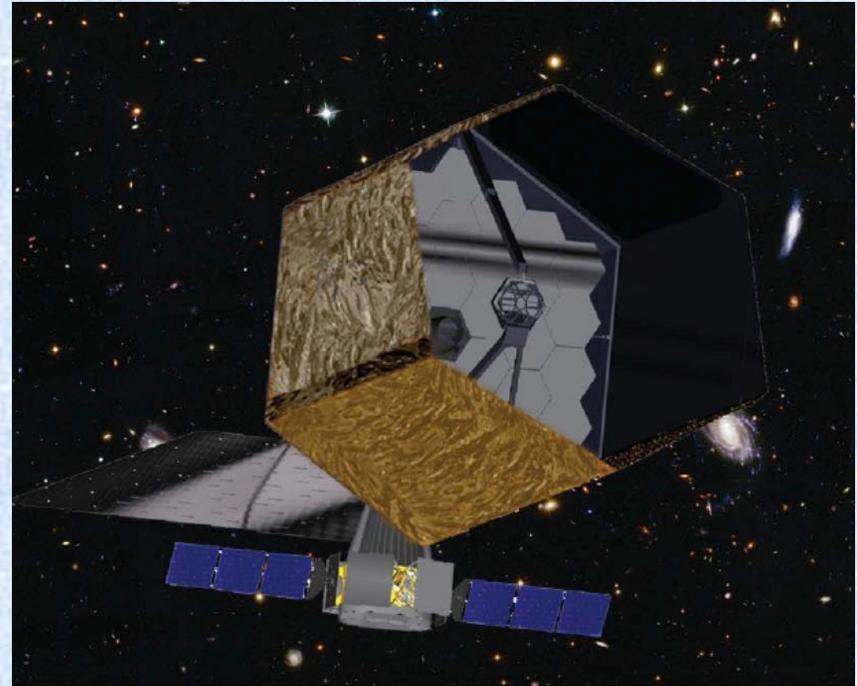
- The plan outlined in the 2010 Decadal Survey looks as if it is completely gone, due to budgetary problems
 - **WFIRST** is zeroed out (not of great concern to most exoplanet scientists, except for microlensers, who are dismayed...)
 - TPF technology development money is back to normal, *i.e.*, relatively low levels
 - Thus, the ambitious New Worlds Observer technology development program highlighted in the Astro2010 Survey is not likely to happen in this decade
 - Consequently, TPF is not likely to happen in the next decade
 - This means we have lots of *time* and can do things properly

Short-term exoplanet strategy: Probe-class missions

- In the short term, the Exoplanet Exploration Program Office, with help from the ExoPAG, is hoping to explore the possibility of “probe-class” missions (\$0.6-\$1B, \$1-\$2B)
 - Even this sounds very ambitious. We’ll be fortunate to see one of the two Explorers, TESS or FINESSE, fly in the near future
- Planning for a future flagship TPF (Terrestrial Planet Finder) mission has pretty much ground to a halt

Long-term exoplanet strategy

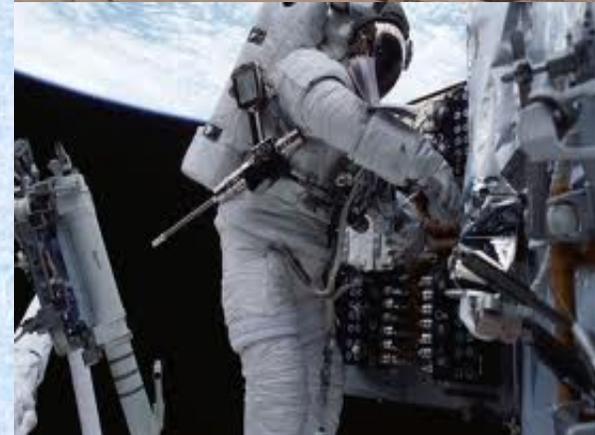
- In the long term, we want to find and *characterize* rocky planets around nearby stars
- We need big, space-based telescopes to do this
 - One very ambitious concept (Marc Postman's ATLAST telescope) is shown at the right
- Putting big telescopes (4-16 m) in orbit at L2 is expensive and *risky*
 - What happens, for example, if JWST fails to deploy successfully?



<http://www.stsci.edu/institute/atlast/images/ATLAST16m.jpg>

Partnering with the manned space program

- The Hubble Space Telescope, arguably NASA's most successful scientific mission ever, was serviced **5 times** by astronauts (including two missions by new Associate Administrator John Grunsfeld)
 - This allowed Hubble to return *great science* for over 20 years
- We should be thinking about the same type of (serviceable) observatory for TPF
 - This means **reinvigorating the manned space program**, but that is something that we ought to be doing anyway
 - This telescope would *not* just be useful for looking at exoplanets. That's why the ExoPAG has been meeting jointly with COPAG



Action item

1. We request approval of the new ExoPAG Chair and Steering Committee members

Thank you, NASA, for creating the ExoPAG and thereby giving us a forum to discuss exoplanet issues and strategy.