Points of Scientific Agreement

1. The exoplanet science community's goal for a flagship space mission should be to find and characterize Earth-sized planets in the habitable zones of nearby F-G-K-M stars.
    - If we don't shoot for this goal, we won't be competitive with large ground-based telescopes in 10-20 years, and we won't satisfy the curiosity of the general public.
2. The next flagship mission should be a large optical telescope, perhaps with UV and near-IR capability as well.
    - The UV capability is not strictly required from the standpoint of exoplanet science but is considered important in gaining broad community support.
    - Because this mission would have broad support from the astronomical community, it should not be viewed as a dedicated exoplanet mission.
    - Such a mission could satisfy Point 1 if equipped with a capable internal coronagraph, external occulter, or both.
    - Interesting atmospheric spectral features are available within this wavelength range, including the O_2 A-band at 760 nm, O_3 bands in both the visible (520-680 nm) and UV (200-300 nm), and several bands of H_2O longward of 700 nm. Additional useful spectral features of CO_2 and CH_4 are available in the near-IR beyond 1000 nm.
    - Gaining support for such a mission, including commitments for contributed components, from the international community should be actively pursued.
3. The size of the aperture needed to satisfy Point 1 above as well as general astrophysics goals remains to be determined, but is likely to be ≥ 4 meters.
    - Some astronomers argue that a larger (8-16 m) telescope will be needed in order to excite the interest of the general astronomical community and to compete with 30 m-class ground-based telescopes.
    - From the standpoint of exoplanet science, making this decision intelligently requires better information about η_{Earth} (which we should get from Kepler) and about typical exozodi levels (for which we will get some, possibly enough, information from LBTI).
4. A significant increase in available time for precision radial velocity work, coupled with a new generation spectrograph(s), could contribute enormously to our general knowledge of exoplanets.
    - Whether this increased capability should be funded by NASA or by NSF is not our decision to make, but it would be an invaluable scientific facility in either case.
    - However, it appears unlikely that a target list of potentially habitable, Earth-mass planets around nearby solar-type stars can be derived from ground-based

radial velocity measurements, despite anticipated improvements in precision. The limiting factor is the noisiness of the host stars themselves.

5. In order to fully characterize an exoplanet, we need to know its spectrum, its actual mass, its orbit (semi-major axis and eccentricity), and perhaps other information, as well.

    - These parameters do *not* all have to be determined simultaneously or in a particular order. Specifically, this means that an astrometry mission need not precede the direct imaging mission. But, a space-based astrometry mission will likely be needed at some point to determine the true mass of any Earth-sized planets that are found.

    - Determining an exoplanet's orbit requires multiple revisits (at least 5 or 6, according to the 2006 TPF-C report). Knowing a planet's semi-major axis is critical for estimating its surface temperature, which is difficult or impossible to determine spectroscopically, and hence for determining whether a planet might be habitable.