**ADDENDUM NO. 4 TO JPL RFP JTD-565939, dated April 10, 2003**

The following additional three issues/questions have been raised regarding the subject RFP. JPL's answers/clarifications follow.

**Q1. Exhibit I states that the nominal end of the basic Contract period is September 2005 (table on page 6). Since Epoch 0 observations must be completed within the first year (by June 2004, assuming a contract start date of July 2003), and since Epoch 2 observations must be completed within 2 years of Epoch 1 observations (by June 2006), then there appears to be an inconsistency regarding the duration of the basic Contract. Please clarify.**

A1. There is no inconsistency. The basic Contract does indeed end in September 2005, due to the length of the current NASA Task Order. This means that, depending on how you schedule your Epoch 0 observations, that some of the Epoch 2 observations may not all fall within the basic Contract period as Epoch 2 observations must occur two years after their respective Epoch 0 observations, but no later than 26 months after date of Contract (see Statement of Work, paragraph 1.1.3 and its footnoted date), and Epoch 0 observations can occur as late as June 2004 (assuming a July 2003 start date).

In light of the above, Exhibit I, page 2, Section 3, third paragraph, where it says "The basic contract will cover the first three epochs;" should be revised to read "The basic contract will cover the first two epochs, and depending on how the Contractor Epoch 0 observations are scheduled, the basic Contract may or may not cover all the Epoch 2 observations;"

Q2. **The RFP states: "Screening candidates adequately will require a minimum of four measurements to a precision of 50 m/s, referred to the Local Standard of Rest (LSR)." Our question is whether you really intended to mean what these words imply. The part that gives us major problems is the clause "referred to the Local Standard of Rest (LSR)". This suggests that you are looking for absolute external accuracy of 50 m/s, rather than a relative internal precision of 50 m/s. If you really do want absolute accuracy to this level, then the question arises as to what you actually mean by "radial velocity". Our definition (and the new IAU definition as well) is that a radial velocity is defined as c*z, i.e. the speed of light times the observed spectral Doppler shift (delta lambda/lambda). Thus, the "radial velocity" of the star refers to apparent radial motion of the stellar photosphere relative to our solar system barycenter. The radial velocity may or may not have anything to do with the actual space motion of the star itself. However, the phrase about the LSR implies that you might be intending to define radial velocity as dR/dt, the time derivative of the radius vector to the star center of mass. If this is true, then it may well be impossible to do what is requested, because the observed photospheric motion would have to be corrected for both the mean photospheric convective blueshift as well as for the stellar**

**gravitational redshift. Both of these quantities are unknown for most stars at the several hundred m/s level.**

**Even if we agree on the IAU definition of radial velocity, making measurements good to 50 m/s referred to the LSR is extremely difficult, if not impossible. Almost all high precision radial velocity programs routinely measure relative velocities, with a separate arbitrary (and often irrelevant) zero point for each star. With some work, it is possible to put all of the different stars on a similar, self-consistent zero point, but even then the overall absolute uncertainty of this zero-point is 100-400 m/s (cf Nidever et al. ApJSuppl, 141, 503, 2002). We don't think that the LSR is even defined to the 50 m/s level that the RFP is requiring!**

**So, we would like to request a clarification of what it is that you really need for the SIM grid stars. As a minimum, you certainly want barycentric radial velocities with the internal velocity uncertainty for each star (i.e. the "precision") to be 50 m/s. But, do you need all of the stars to be on the same absolute zero point? If so, what is the accuracy required for the zero-point correction of each star? What is the accuracy required for the overall zero-point accuracy of the entire system (relative to what well defined standard)?**

A2. First, here is JPL's "interpretation" or summary of the above question:

"The RFP states 'Screening candidates adequately will require a minimum of four measurements to a precision of 50 m/s, referred to the Local Standard of Rest (LSR).' Do you really need the radial velocity of the stars measured to an absolute external accuracy of 50 m/s, and do you need all of the stars to be on the same absolute zero point?"

The answer is:

All that is desired is to 'screen out' companions, and relative measurements with a precision of at least 50 m/s (and with implied consistency for repeat measurements, relative to whatever reference is picked) will be fine for that purpose. It follows that for our purpose, there is no need for the **same** velocity reference from star to star.

**Q3. How many sources have indicated an interest in proposing to the subject effort?**

A3. JPL cannot reveal that information, but suffice it to say that the number is between 2 and 6000+ (the latter number being the estimated total number of sources made aware of the Request for Proposal via e-mail); i.e., we have a competitive situation but JPL will not reveal how many have given an intend to propose.