The Effects of Observation Strategy on Zonal Errors in the SIM Astrometric Grid

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Abstract

The Space Interferometry Mission (SIM) relies on a global "grid" of 1302 red giants whose positions must be known to 4 microarcseconds in order to establish the science interferometer baseline vector during observations. This grid will be determined via a global fit of observation of these stars taken during the mission. Holding other mission parameters constant, we find that the order in which the grid observations take place has a significant effect on the excitation of local "zonal" errors in the grid solution. That is, the errors on each fitted grid star position varies in a systematic way over the celestial sphere. We describe some of these zonal errors and ways in which they may be minimized by adjusting the observation sequencing. This work is funded by the Jet Propulsion Laboratory, California Institute of Technology under a contract with the National Aeronautics and Space Administration.