

Memo on Spitzer pointing over long integrations  
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We have recently discovered a new systematic behavior in the Spitzer pointing data which may affect a small fraction of Spitzer observations. This memo is intended as an initial step in publicizing this behavior in order to allow those contemplating Spitzer GO3 proposals to be aware of the behavior. If your science does not require exquisitely accurate pointing during an AOR (stability better than 0.3"), you can stop reading. This memo is only a preliminary characterization of the effect we have discovered - we expect to update the memo when we have a more complete understanding.

The behavior in question was discovered during long, staring observations with IRAC. What we find is that the location of stars in the IRAC field-of-view shows a periodic modulation of a sawtooth shape, with a peak-to-peak amplitude of about 0.15 arcseconds and a period of order 3000 seconds. The attached figures show the x,y location of a bright star during a long (8 hour) observation where the spacecraft was simply commanded to point at a specific RA/DEC and told to stare at that spot without moving - with short integration IRAC images obtained continuously during the 8 hour period. Note that as well as the sawtooth modulation, there is a slow, approximately linear drift in the y position over the entire AOR, with total displacement of order 0.1 pixel (0.12 arcsec) in 8 hours. Based on several similar AOR's, both of these behaviors can be expected to occur during any long staring observation with IRAC.

We do not yet know if these behaviors are confined to IRAC or if they are present in the spacecraft pointing, in which case they should also be present when using IRS or MIPS. It is worth emphasizing that the pointing variations we see are well below both the required pointing stability and accuracy to which the Spitzer pointing system was designed and the pointing stability numbers we have documented in the SOM. Therefore, for the vast majority of observations, the behavior shown in the Figures would have no significant effect on Spitzer data (because the pointing variation is much smaller than the PSF size).

