ALG-AP-005: Astrometric reduction of moving objects from natural satellite search

Authors:

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History:

- 2013-July-30 - Draft
- 2013-Nov-05 - Baseline
- 2016-Mar-28 - minor modifications

Description:

Astrometry involves the measurement of an object relative to the stars. A list of detected point sources in instrumental X, Y coordinates will be compared with astrometric catalog stars. Given a good approximation of camera pointing, image field of view, plate scale and rotation, the list of detected point sources will be matched with catalog stars expected to be in the field of view. Depending on the curvature of the OCAMS field, a nth order polynomial fit will be made. The output will include Right Ascension and Declination in J2000 coordinates.

Parameters:

infile – Internal Astrometrica file

outfile – Internal Astrometrica file

Algorithm equations:

Astrometrica has been used to obtain apparent and absolute photometry. Both tools are COTS products and have an extensive history of use supporting ground-based and space-based observation and analysis of astronomical point sources. Astrometrica was also used by the

NASA Dawn mission in support of their search for natural satellites around the asteroid Vesta (McFadden et al. 2016). The algorithms used by Astrometrica for the photometric calibration of point sirces have been tested and proven over ~20 years of asteroid study. Since the software is extensively used and has been vetted by the astronomical community, the algorithms to be used do not need to be specifically presented here.

Proposed software:

Astrometrica

Additional references:

McFadden et al. 2016. Vesta's missing moons: comprehensive search for natural satellites of Vesta by the Dawn spacecraft. Icarus 257, 207-216.