



ALG-AP-004a: Detection of moving objects from natural satellite search

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History:

- o 2013-Jul-30 - Draft
- o 2013-Nov-05 - Baseline
- o 2016-Mar-28 - minor mods

Description:

The detection of moving objects involves finding, which if any of the detected point sources are a natural satellite orbiting around Bennu. Each natural satellite survey field will be observed at least 5 times over the course of 4.5 hours. Each field visit will produce a list of all point sources detected within the field. The Astrometrica software will search for detections moving in a consistent linear manner.

Parameters:

infile – Internal Astrometrica file containing extracted sources from the

outfile – Internal Astrometrica file containing astrometry and photometry of candidate natural satellite candidates to the Manual Validation of Satellite Candidates (ALG-AP-004b)

Algorithm equations:

The Astrometrica software has been used for ~20 years to support ground-based astronomical observations of asteroids, comets and stars. As a COTS product, it is one of the primary tools used by asteroid observers. The software was also used by the NASA Dawn mission to conduct

their search for natural satellites around asteroid Vesta (McFadden et al. 2016). 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 (<http://www.astrometrica.at/>)

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.