Detection and recognition of moving objects with Gaia

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During its 5-year observing mission, Gaia will survey some 350,000 solar system objects down to 20 mag. The set of moving objects will comprise primarily main-belt asteroids, but also NEOs, faint satellites of giant planets and few comets. The objects will first be detected on-board as point-like sources and later identified as non- stellar during the ground-based processing. It is expected that a small fraction of this set, probably below 5 %, will be really new sources, while the other 95 % will be already referenced in existing data bases with orbital elements accurate enough to match an observation to a definite source. For really new sources, observations taken at different epochs must be mapped to sources with an iterative procedure, until a preliminary orbit can be constructed allowing to match all observations without ambiguity. We will present the various issues identified for Gaia, given the peculiarities of its time sampling and single-observation accuracy and discuss the methods and performances of the algorithms specifically developed for this purpose.