Gaia as a Solar System observatory

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The astrometric and spectro-photometric capabilities of Gaia enables it to produce a large, homogeneous data set of observations of Solar System bodies, only limited in magnitude. The basic properties of the instruments and the onboard processing show that Gaia will not observe extended sources such as the main planets, but it will provide observations of 3.5×10^5 asteroids, planetary satellites, and cometary condensations. The performances remain excellent over the whole brightness range, from bright objects down to $V = 20$ mag.

The distribution of the observations in space and time, for different categories of objects, and the peculiar properties of each single observation will be described, as they will affect the subsequent exploitation of the mission data. We will review the expected performances of Gaia, basically a function of magnitude and proper motion of the sources [1].

Over the years, starting from 2003, a work group gathering European planetary scientists has explored the main capabilities of the mission, defining the expected scientific impact on Solar System science [2–5]. Later on, these results have served as a basis for developing the data reduction pipelines in the frame of the Data Processing and Analysis Consortium (DPAC). Such pipelines are going to provide very soon science alerts for asteroid follow-up and the first results in some intermediate data releases.

By considering the general properties and limitations of the observations by Gaia, we will focus on the areas that will benefit from complementary observational campaigns to improve the scientific return of the mission, and on the involvement of the planetary science community as a whole in the exploitation of the Gaia survey. We will thus mentions current and future opportunities for ground-based observers and forthcoming changes brought by Gaia in some observational approaches, such as stellar occultations by transneptunian objects and asteroids [6].

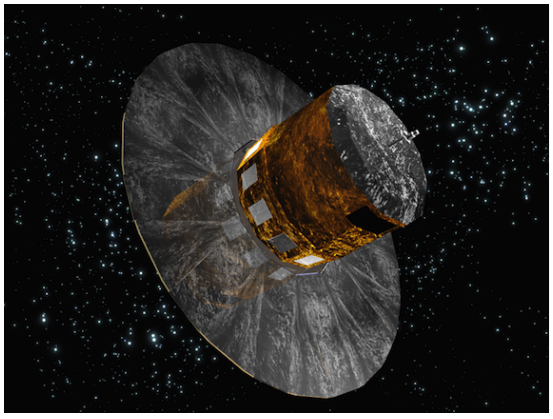

Figure: Artist's impression of the Gaia satellite.

Acknowledgements: We acknowledge all the members of the DPAC/CU4 development units involved in Solar System data processing, and the Gaia team at the CNES center of Toulouse, where the data reduction pipelines for the Solar System will be run.

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