

Gaia: Scientific In-orbit Performance (Presentation Video)

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ABSTRACT

Gaia is a European Space Agency cornerstone mission launched 19 December 2013 from French Guyana. Gaia will map the sky down to the 20th magnitude for point sources. Astrometry and photometry is done for all detected objects and spectroscopy down to magnitude limit 16. At the moment of writing this abstract Gaia is being commissioned. All subsystems have been successfully operated. Gaia is in its operational orbit around L2 point. The attitude control with use of the stars from the science instrument has been successfully executed. The alignment of optical elements is ongoing with an iterative process involving focusing and spin speed adjustments as well. The Focal Plane Assembly is fully functional with all 106 CCDs operational and the Phased Array Antenna can transmit all science data down. The commissioning phase is anticipated to last till May 2014. The nominal operations are scheduled for 5 years. The scientific yield is expected to contain a billion stars with positions, distances and proper motions based on astrometry. With photometry the stellar properties of this sample can be deduced. Finally from the spectroscopy Gaia allows extraction of some 150 million radial velocities for the brightest stars. This information will allow addressing the main scientific goals of Gaia concerning the structure, history and evolution of our Milky Way Galaxy. In addition to Galactic structure, Gaia will allow addressing various other science areas. For stellar astrophysics Gaia will provide the long awaited distances and census of multiple star systems. Gaia is expected to discover few thousand exo-planets. The main belt asteroid orbits will be improved significantly. Eventually even fundamental physics can be done with tests on general relativity. The presentation will summarize the status of the spacecraft and provide updated scientific performance estimates based on the in-orbit data from the commissioning phase.

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