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A very small astrometry satellite mission: Nano-JASMINE

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Abstract. The current status of the nano-JASMINE project is presented. Nano-JASMINE–a very small satellite weighing less than 10 kg–aims to carry out astrometry measurements of nearby bright stars. This satellite adopts the same observation technique that was used by the HIPPARCOS satellite. In this technique, simultaneous measurements in two different fields of view separated by an angle that is greater than 90 degrees are carried out; these measurements are performed in the course of continuous scanning observations of the entire sky. This technique enables us to distinguish between an irregularity in the spin velocity and the distribution of stellar positions. There is a major technical difference between the nano-JASMINE and the HIPPARCOS satellites–the utilization of a CCD sensor in nano-JASMINE that makes it possible to achieve an astrometry accuracy comparable to that achieved by HIPPARCOS by using an extremely small telescope. We have developed a prototype of the observation system and evaluated its performance. The telescope (5cm) including a beam combiner composed entirely of aluminum. The telescope is based on the standard Ritchey-Chretien optical system and has a composite f-ratio of 33 that enables the matching of the Airy disk size to three times the CCD pixel size of 15um. A full depletion CCD will be used in the time delay integration (TDI) mode in order to efficiently survey the whole sky in wavelengths including the near infrared. The nano-JASMINE satellite is being developed as a piggyback system and is scheduled for launch in 2008. We expect the satellite to measure the position and proper motion of bright stars ($m_z < 8.3$) with an accuracy of 1 mas, this is comparable to the accuracy achieved with the HIPPARCOS satellite.

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