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Development of a very small telescope for space astrometry surveyer

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Abstract. We report an outline and a current status of developing a small, all-aluminum made telescope for Nano-JASMINE. Nano-JASMINE is a nano-size astrometry satellite that is to be launched in 2008 and will demonstrate some key technologies required for JASMINE (Japan Astrometry Satellite Mission for Infrared Exploration) in a real space environment. It also measures absolute positions of bright stars ($z \leq 8$ mag) with accuracies about 1 milli-arcsecond in a few years mission. It has a Ritchey-Chretien type telescope with a 5-cm effective aperture, a 167-cm focal length and a field of view of 0.5x0.5 degree. The telescope only occupies a volume about 15x12x12 cm, and weighs two kilograms or less. Almost all of the structures and the optical elements of the telescope, including two aspherical mirrors three flat mirrors and a dual-angled flat mirror that combines the beam from a relative angle of 99.5 degrees into the primary mirror, are made out of aluminum alloy, being figured by diamond turning machines. The Bread Board Model (BBM) of the telescope is found to be achieving a diffraction-limited performance at room temperature.

Key words. Stars: Astrometry – Galaxy: Astrometry

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