Observing Simulations of Far-Infrared Surveyor on-board ASTRO-F: Extragalactic Point Sources

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The Far-Infrared Surveyor (FIS) is one of the on-board instruments on the ASTRO-F satellite, which will be launched in early 2004. First one half year of 500 days of its mission period is dedicated for the whole sky survey in four bands between 50 and 200 μm. On the basis of present hardware specifications and configurations of the FIS, we write a computer program to simulate the FIS. The current version considers the point spread function of the telescope, the responsitivity of detector system (including the optical components), and the geometrical characteristics of the detector. The source photon noise, thermal emission (fromthe telescope) noise, and readout noises are included. Using the power-law extrapolation of the IRAS extragalactic source count results, we have generated the artificial catalogue of point sources down to 10 mJy at 60 μm, which is well below the detection limit. The SEDs are assumed to follow the Rayleigh-Jeans tail of the black body radiation. We have simulated the survey mode observations for the artificial sources over 3.3′×3.3′ area and constructed the image data based on the simulation. The simulated data are examined using the existing data reduction software packages such as IRAF/DAOPHOT and SExtractor. More realistic behavior of the instruments, such as the transient effects of the detectors and the cosmic ray effects, will be implemented in the future.