Development of digital circuits for an infrared imager for observation of planetary atmospheres

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We are developing an infrared imager for observation of planets. A detector of the imager is a 256x256 InSb array to 1-5um. When coupled to a Cassegrain focus of the 60cm telescope at Iitate observatory, the imager has Field-of-view of 110” and the resulting spatial resolution is 0.43”/pixel.

Mechanical integration of the imager was completed by Takahashi [2005], and test observation was made with the Venus as a target, using a detector control unit prepared by the manufacture. Analysis of observed images showed that signal count did not correspond to the exposure time. By close checking of electronics system, the detector array was found to be not operating properly because of failure in digital circuits.

Therefore, we decided to develop a completely new unit for controlling the infrared detector. Development is being jointly made with a group of Prof. Ichikawa of Tohoku University Astronomical Institute. The group of Prof. Ichikawa is in change of the analog circuits and we are developing the digital circuits that drive the infrared detector. We are also developing a digital circuit for image processing, as well as software development for controlling the digital circuits which employ on FPGA. In this presentation, structure of the digital circuits and their characteristics will be presented along with development time schedule.