## Performance Requirements for the SAFARI Detector System

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*Abstract*— The SAFARI instrument is a far-infrared imaging Fourier transform spectrometer (FTS) for JAXA's SPICA mission. Taking advantage of the low thermal emission of SPICA's 5 K telescope, SAFARI will provide background-limited, Nyquist-sampled spectroscopic imaging of a 2'x2' instantaneous field-of-view over 34-210 µm. The extremely low-noise detector performance that SAFARI requires is provided by 3 large-format Transition Edge Sensor (TES) detector arrays operating at 50 mK base temperature, with operation of 4000 pixels within SPICA's tight thermal constraints enabled by a unique frequency division multiplexed SQUID readout system in which 160 pixels are simultaneously read-out using a single SQUID amplifier chain.

This paper presents the flow-down of SAFARI science requirements to functional and performance requirements for the instrument's TES detector system, taking into account the instrument's dual-model operation as both an imaging Fourier transform spectrometer and a photometer. Beyond the driving requirement of sensitivity, important issues include detector frequency response, baseline and gain stability, non-linearity, the timing between the detector and FTS metrology readouts, and the effect of glitches in the detector readout due to cosmic ray hits on the detector arrays.