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2.56 High-Speed Solid-State X-ray Framing Camera Improvements and Performance Testing

Monday, 16 April 2018 10:46 (120)

The Icarus sensor is the newest version of the hybrid-CMOS high-speed x-ray framing camera that has been under development at Sandia for over a decade. Icarus can store 4 images per pixel, has improved soft x-ray detection sensitivity, and an option to independently trigger each half of the sensor to effectively operate as two closely-spaced framing cameras with 1024x256 pixels each. Icarus maintains the 25µm pixel pitch, nearly 100% detector fill factor, and sub-2ns minimum integration time of our previous sensors: Griffin, Furi, and Hippogriff. We use a combination of pulsed visible and x-ray sources to measure the sensor performance. Results will be presented of gate time profiles for a variety of timing configurations, frame-to-frame cross talk, trigger jitter and insertion delay, spatial resolution, pixel response uniformity, dynamic range, and absolute x-ray sensitivity. We will also describe recent measurements of sensor performance when illuminated with multiple closely-spaced light pulses and with continuous illumination spanning multiple frames to determine effective on/off rejection ratios. Sandia is a multimission laboratory managed and operated by NTESS LLC, a wholly owned subsidiary of Honeywell Int., Inc., for the U.S. DOE's NNSA under contract DE-NA0003525.

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