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

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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 25 μ m 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.

Primary author(s) : KIMMEL, Mark (Sandia National Laboratories)

Co-author(s) : COLOMBO, Anthony (Sandia National Laboratories); LONG, Joel (Sandia National Laboratories); LOOKER, Quinn (Sandia National Laboratories); STAHOVIK, John (Sandia National Laboratories); CLAUS, Liam (Sandia National Laboratories); ENGLAND, Troy (Sandia National Laboratories); FANG, Lu (Sandia National Laboratories); MITCHELL, Brandon (Sandia National Laboratories); MONTOYA, Andrew (Sandia National Laboratories); ROBERTSON, Gideon (Sandia National Laboratories); SANCHEZ, Marcos (Sandia National Laboratories); ROCHAU, Greg (Sandia National Laboratories); PORTER, John (Sandia National Laboratories)

Presenter(s) : KIMMEL, Mark (Sandia National Laboratories); COLOMBO, Anthony (Sandia National Laboratories); LONG, Joel (Sandia National Laboratories); LOOKER, Quinn (Sandia National Laboratories); STAHOVIK, John (Sandia National Laboratories); CLAUS, Liam (Sandia National Laboratories); ENGLAND, Troy (Sandia National Laboratories); FANG, Lu (Sandia National Laboratories); MITCHELL, Brandon (Sandia National Laboratories); MONTOYA, Andrew (Sandia National Laboratories); ROBERTSON, Gideon (Sandia National Laboratories); SANCHEZ, Marcos (Sandia National Laboratories); ROCHAU, Greg (Sandia National Laboratories); PORTER, John (Sandia National Laboratories)

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