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Characterizing Event-based Sensors for use with the Falcon Neuro Project COLIN MALONEY, DAVID HOWE, USAF Academy — Event-based sensors (EBS) feature a design based on biological sight, and have many potential applications, including in Space Domain Awareness (SDA). Event-based sensors utilize less power, have lower bandwidth requirements, possess higher temporal resolution, and have higher dynamic ranges than their traditional camera counterparts. Falcon Neuro is a system currently under development that aims to use an EBS system mounted on the International Space Station (ISS) to obtain recordings of sprites, lightning, and the limb and nadir views of Earth. Falcon Neuro will use two DAVIS 240C cameras with a custom field programmable gate array (FPGA) that will allow for a feasible data-transfer procedure on the International Space Station (ISS). To properly quantify the effects of this custom FPGA, we completed baseline testing with an independent DAVIS 240C camera by characterizing its frequency stimulus cutoff, threshold limitations, and noise to signal ratio performance. We also completed the same testing of the independent camera, but under space-like conditions by placing the camera in a vacuum chamber and cooling it down to near-zero Celsius. We compare these results to that of the Falcon Neuro and discuss other potential applications of EBS.

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