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## Commercializing high rep rate burst mode hCMOS imagers

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Nanosecond scale, burst mode hCMOS imagers developed at Sandia National Laboratories (SNL) have provided revolutionary insight and data to a limited few research facilities. As these High Energy Density Physics research facilities typically operate on a shot-per-hour to shot-per-day timescale, little effort has been devoted to fast replication-rate circuitry for hCMOS image sensors. Advanced hCMOS Systems (AHS) was founded by former DOE laboratory employees who developed the hCMOS image sensor and camera concept; their intention is to make these image sensors available to a broader community. For hCMOS to impact an expansive user base, the replication rate needs to be increased and the Read Out Integrated Circuit design must be migrated from the proprietary SNL CMOS7 foundry process to a commercially available foundry process. hCMOS imagers are single die (non-tiled), high spatial resolution, and large pixel count sensors. This pixel count poses a complicated design problem to read out such a large data stream. Existing sensors have 2.1 megapixels equivalent (1024 x 512 x 4 frames) and typically operate at two Frames-Per-Second (FPS), which translates to 4.19 megapixels/s (the sensor has a theoretical maximum of 8 FPS). AHS plans to increase the rep rate to >120 FPS or 251 megapixels/s for an increase of 60x, while porting the design to a radiation-hardened commercially available foundry process.

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