

Development of a thermal camera



Purpose and aim

- The aim is to create a reliable and stable thermal camera system that produces clear, sharp, and high-contrast images.
- The central research question is: how can the camera output be stabilized against the self-heating effect of the ROIC, focusing on physics-based control of circuit parameters rather than purely computational post-processing.

Results and important findings

- Implemented a real-time pipeline: FPGA raw 16-bit capture -> RTP streaming -> PC application with GPU-accelerated NUC and colorization.
- Developed one-point shutter calibration (NUC) to correct pixel-level non-uniformity.
- Identified that ROIC self-heating causes a row-dependent vertical drift. Modelled the drift per row and validated against experimental data.
- Work is ongoing on persistent calibration storage and automatic bias voltage control based on substrate temperature, to enable fully autonomous thermal stabilization.



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