DIGITAL READOUT INTEGRATED CIRCUIT FOR SMALL PIXEL PITCH COOLED INFRARED DETECTORS IN LYNRED

01. Imaging and Systems

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Introduction

LYNRED is the worldwide leader on the cooled and uncooled IR detector market for high-performance and cost effective sensing solutions. It mostly covers all IR market needs from high-end space missions to IR smart sensing for buildings. The actual trend in cooled IR detector development for defense applications in MWIR domain is the design of very small pixel, large format and higher operating temperature while keeping high image quality.

Discussion

State of the art performances for IR detection and imaging will be presented for Daphnis MW product, 10µm pitch XGA/HD720 operating at 110K with Modulation Transfer Function (MTF) and the Residual Fixed Pattern Noise (RFPN) results.

The main focus will be done on the optimizations of the readout integrated circuit. The ROIC architecture and the main features will be described.More particularly, we will demonstrate how the integration of the anologue to digital conversion in the ROIC contributes to the performances improvement of the detector. Some performances such as readout noise, linearity, power consumption and frame rate directly related to ROIC will be detailled.

Conclusion

As a conclusion, we will detail how the ROIC architecture of DAPHNIS could be derived for the design of larger format or smaller pitch IR detectors.