Latest developments of SWIR detectors for space applications at LYNRED

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Speaker biography

Alexandre Gaucher graduated in 2010 from the French engineering school PHELMA (Physique Electronique Matériaux) and holds a PhD in semiconductor physics from the CEA LETI.
He joined LYNRED in 2015 as electro-optical test engineer for space programs, in charge of the MTG FCI infrared detectors. He then worked as a Product Architect in charge of the infrared detectors development for various programs such as CO2M, LSTM, Sentinel2-NG. Alexandre is currently Head of the Space Products Architecture Team.

Abstract

LYNRED is a global leader in designing and manufacturing high quality infrared technologies for space, defense and commercial markets. Its vast portfolio of infrared detectors covers wavelength range from near to very far infrared, especially thanks to well-mastered wavelength tunable MCT technology. In addition, space radiation robustness of MCT technology combined with space hardened detectors architecture enables LYNRED to be the leading European manufacturer for IR detectors deployed in space.

SWIR spectral range is of main importance in earth observation applications. Spectro-imager, multispectral imager and hyperspectral imager instruments all use detectors operating in the SWIR domain. LYNRED has been proposing SWIR detectors for space applications for a long time. Many of them are currently used in operating missions, such as ESA SENTINEL 2, ESA MTG FCI, JAXA HAYABUSA, ASI PRISMA, ISRO CHANDRAYAAN ... Over the last 20 years, LYNRED has delivered more than 100 SWIR detector flight models.

More recently, LYNRED has developed a new family of SWIR detectors for space applications: either multi-linear detectors for pushbroom or whiskbroom applications such as CAPYORK (ESA LSTM) and Sentinel2-NG, or staring array detectors such as NGP (CNES MicroCARB, ESA Sentinel-5, ESA CO2M) and COBRA-S. While NGP and CAPYORK detectors are now in production for flight models delivery of the CO2M and LSTM missions, Sentinel2-NG and COBRA-S have respectively completed the design and electro-optical validation development phases. After a recall of each detector architecture, this paper presents the main results of CO2M and LSTM flight models, and the verified electro-optical performances of the COBRA-S detector.

In parallel of these IRFPA activities, LYNRED is developing a new compact and lightweight IDDCA configuration called Cryo XS for space applications. A first prototype equipped with a COBRA S IRFPA will be available before the end of the year 2025.

Summary of abstract

Over the last 20 years, LYNRED has delivered more than 100 SWIR detector flight models. More recently, LYNRED has developed a new family of SWIR detectors for space applications: either multi-linear detectors such as CAPYORK (ESA LSTM) and Sentinel2-NG, or staring array detectors such as NGP (CNES MicroCARB, ESA Sentinel-5, ESA CO2M) and COBRA-S. After a recall of each detector architecture, this paper presents the main results of CO2M and LSTM flight models, and the verified electro-optical performances of the COBRA-S detector.

Keywords

Detector, Infrared, HgCdTe, SWIR, LYNRED