

COBRA CRYOXs: NEW COMPACT & LIGHTWEIGHT IDDCA CONFIGURATION FOR HYPERSPECTRAL & SPECTRO-IMAGING SPACE APPLICATIONS

Quentin Chable^{1*}, Emmanuel Larique¹, Léa Junay¹, Frederic Mousseau¹, Sandra Eynard Machet¹, Antoine Genies¹, Diane Sam-Giao¹, Sebastien Aufranc¹

¹LYNRED, Actipole - CS 10021, 364 route de Valence, 38113 Veurey-Voroize, France

*quentin.chable@lynred.com

Forty years of heritage have shaped Lynred into a leading provider of advanced infrared detectors for defense, space, and civilian applications. As a global leader, Lynred delivers high-quality II-VI, III-V, and bolometer-based infrared detectors from near to very far infrared. 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. To date, more than 80 flight models incorporating these detectors have been successfully launched into 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 generation of SWIR staring array detector for space applications named COBRA to address future hyperspectral and spectro-imaging applications. This detector has a larger format (1380x640, 20µm pitch) than previous generation, allowing a higher spatial and spectral resolution, as well as optimized gains and new functionalities to increase electro-optical performances (e.g. on chip CDS). In this paper, detector design is first recalled and then verified electro-optical performances and environmental validation are presented.

Additionally, LYNRED has been developing an Integrated Detector Dewar Cooler Assembly (IDDCA) architecture fitted for space environment in order to provide a ready to use solution compatible with COBRA detector for its customers. Detailed architecture is presented before presenting environmental stress results. Possible geometry variations such as cryocooler or optics alternative designs will also be discussed.



Figure 1: COBRA in CRYOXs IDDCA