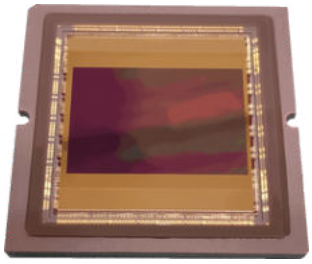
HIGH DYNAMIC

Newsletter

Dec. 2023



SPACE IMAGING WITH PYXALIS

EXPLORE SPACE WITH UNMATCHED PRECISION

When it comes to space imaging, Pyxalis is your go-to partner for innovative, reliable, and high-performance sensor solutions. Join us on the journey to explore space with unmatched precision and clarity. Explore our Cutting-Edge Products for standard and New Space's approaches.

TABLE OF CONTENT

TDI IMAGING INNOVATION: UNVEILING BREAKTHROUGHS

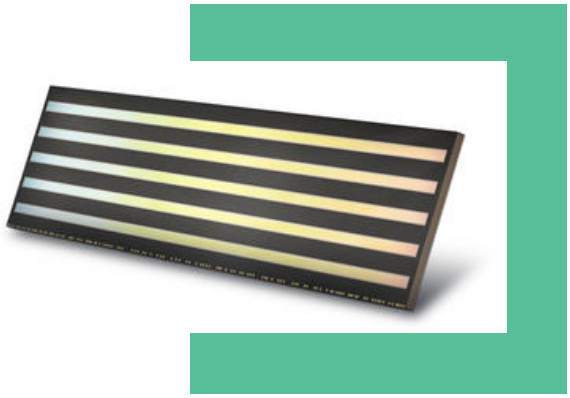
JULIEN MICHELOT, OUR INNOVATION & PIXEL EXPERT, EXPLAINS THE BREAKTHROUGHS IN EARTH OBSERVATION WITH 2-PHASE CCD-ON-CMOS SENSORS

We recently had a significant opportunity to present our latest advancements in linear sensors dedicated to earth observation from space at the International Image Sensor Workshop (IISW) in Crieff, Scotland. More specifically, our presentation focused on the results obtained from our backside-illuminated, 5 µm pixel pitch, CCD-on-CMOS, time-delay integration (TDI) image sensor.

Our in-house developed technology effectively emulates a 2-phase CCD, utilizing a 65 nm CMOS technology. Our 2-phase CCD architecture delivers exceptional dark current performance, reaching an astonishing 3.5 nA/cm² at 60 °C and minimizing charge transfer inefficiency to less than 5.10-5 at a line rate of 100 kHz. Furthermore, our developed pixels can operate in both scanning directions and incorporate a dedicated anti-blooming device to prevent column blooming effects.

The use of a 65 nm CMOS technology for sensor fabrication allows for reduced power consumption, as the phases are driven with a reduced power supply swing of 3.1 V. This technology is highly scalable, enabling small ground sampling distances (GSD) and larger pixel pitches for multispectral applications. Additionally, the developed pixels are compatible with a stitched technology, allowing for the design and fabrication of sensors that can scan large swaths. The manufacturing technology employs deep trench isolations, resulting in excellent modulation transfer function (MTF) performance measurements.

The low dark current leads to outstanding readout noise in low-light conditions, measuring at 3.6 e- rms. This makes our technology an ideal choice for photon-starved applications and for new-generation satellites that require a consistent signal-to-noise ratio (SNR) while minimizing payload.



For more information about this technology, please visit our website.

A PROJECT TECHNICAL LEADER'S LIFE AT PYXALIS

JOFFREY PAILLE, OUR PTL SPECIALIZED IN SPACE PROJECTS, TELLS US MORE ABOUT PYXALIS AND HIS FIELD OF EXPERTISE

"... we're working on high-end and high-performance sensors for clients with extremely demanding specifications."

Can you tell us more about your position and your professional journey at PYXALIS?

I have been working at PYXALIS for 5 years now. I started as a characterization engineer working on earth observation projects and have occupied this position for 4 years. Now, I am a Project Technical Leader for Earth Observation projects, managing the wide scope of technical solicitations from design to qualification.

What do you find most challenging about your position?

I would say what's most challenging is the technical management of the team when the scope of technical demands is as wide and when we're working on high-end and high-performance sensors for clients with extremely demanding specifications.

Dr. Joffrey Paille, current PTL at Pyxalis

What do you wish other people knew about PYXALIS?

PYXALIS has high abilities to provide custom solutions for its clients in a large variety of fields including space, machine vision, security, medical field, biometrics and more. It provides high flexibility and support that fits the customer's demands and has off-the-shelf solutions that can also be tailored to fit perfectly what the client wants.

What makes working with PYXALIS different from working with other companies?

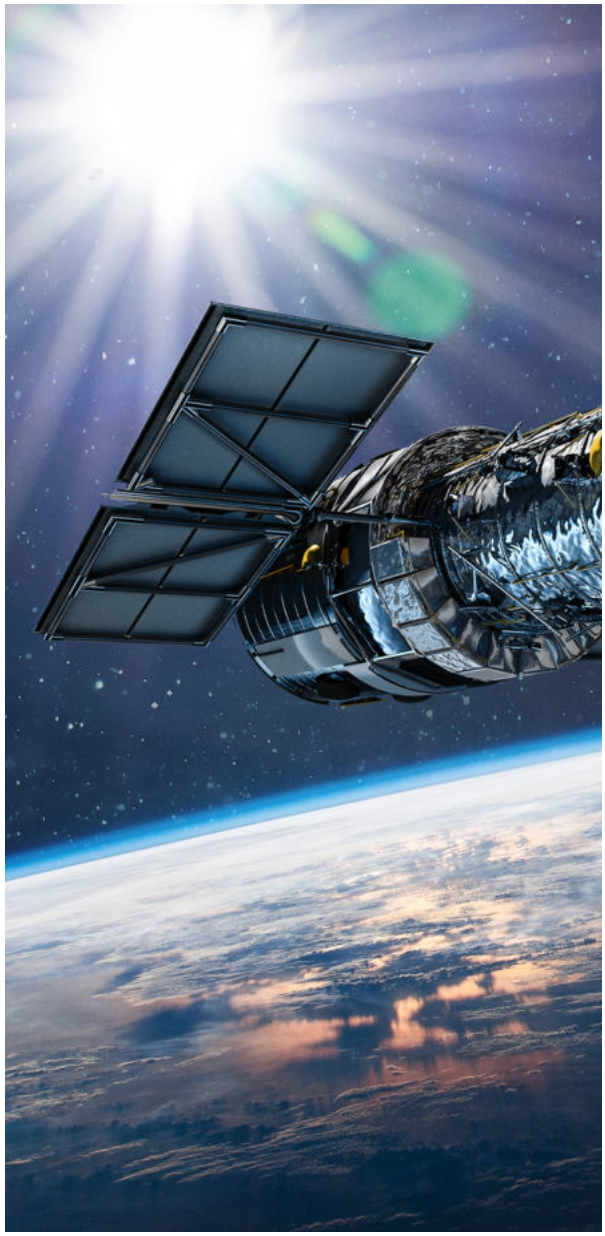
Being an SME gives us a high flexibility that puts the client at the center of our work, we build hence our actions according to his needs and demands. We make sure to build a close relationship with our customers and provide support during different phases of the project.

What makes your team the best one?

I think what makes my team the best one is the combination of the technical expertise that we have, the pluridisciplinarity that is very present in our work and the good vibes we share daily.

The interest in Space imaging techniques seems to be growing fast, do you think PYXALIS has the technical abilities to follow such a fast growth?

Since many clients have trusted us with their projects and have provided challenging requests in the Space field, it was necessary for us to constantly grow technically and acquire experience, to be able to answer their demands. Keeping up this technical growth pace will allow us to face even more challenging requests and handle this fast growth in Space imaging techniques both in "traditional" space programs and "NewSpace" oriented ones.



Can you give us an example?

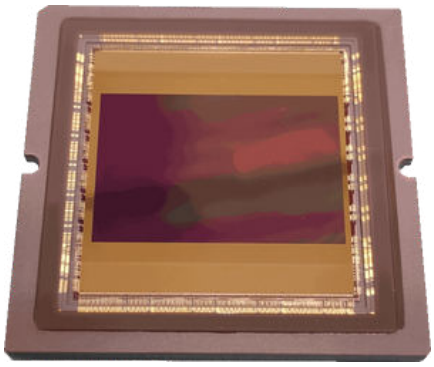
We can't give many examples due to confidentiality, but we currently have projects that are in their final stages for Space applications. We are also part of some ESA and CNES programs such as ITT AUI, D3S and Aurora-D.

GIGAPYX: A FAMILY OF BIG SENSORS FOR SPACE APPLICATIONS

GIGAPYX 4600 is the first release of a large Back-Side illuminated (BSI) image sensor family, designed for those applications that demand the best of image quality a CMOS sensor has to offer.

The GIGAPYX 4600 is a Full-Frame (35 mm) sensor, with 46 Megapixels.

The device operates in Rolling-Shutter, with up to 150 frames per second and 12 bits per pixel acquisition mode at full resolution, and up to 200 FPS with 8K format (8320 x 4320).
The sensor provides up to 92 dB intra-scene dynamic-range thanks to the in-pixel true HDR (linear output in 2x13 bits and single shot acquisition). The HDR reconstruction has to be performed out of the sensor as well as the FPN and the RTN corrections (with the outputted dark lines and columns).



GIGAPYX 4600

GIGAPYX 4600 can be used in different applications (cinematography, photography, industrial inspection…) and its high-end characteristics make it also ideal for Space applications such as telescopy or earth observation. Thanks to its ROI capabilities, the image matrix can be divided into several bands for addressing multispectral vision : This is also an advantage for a Time-Delay Integration (TDI) usage of this sensor. As an example, a TDI period of 140µs can offer the possibility of outputting 6 spectral bands with 16 stages of TDI lines for each band.

The GIGAPYX family proposes image sensors going from 14MP up to 220MP with different formats able to cover a large number of applications thanks to the 2D stitching technology. If you have a project targeting a space application for an high resolution sensor with multispectral capabilities, please contact us at contactweb@pyxalis.com

AGENDA

LET'S MEET !

1ST QUARTER 2024 AGENDA

It is important for us to move around and meet up face to face with the image sensor community members. Always insightful presentations & discussions in the end !

PHOTONICS WEST - SAN FRANCISCO

27 January - 1 February

We will be present at Photonics West 2024 ! We invite you to visit our booth #5029G, where we will showcase our latest innovations, cutting-edge technologies, and solutions in the field of CMOS imaging solutions.

IMAGE SENSOR EUROPE - LONDON

20-21 March

Let's meet at ISE 2024, the industry's premier event, taking place in London next March. Join us at this leading gathering to explore cutting-edge technology and discover the latest advancements in image sensor technology.

Looking forward to seeing you in person!

YOU HAVE A PROJECT THAT NEEDS A CUSTOM IMAGE SENSOR DEVELOPMENT, A STANDARD CMOS SENSOR OR A COMPLETE SOLUTION ?

WE MAY HAVE A SOLUTION FOR YOU.

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DON'T HESITATE TO CONTACT OUR LOCAL PARTNERS IF YOU HAVE ANY QUESTION

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