



CMOS Image Sensors for High Performance Applications



WORKSHOP

21st & 22nd NOVEMBER 2017

TOULOUSE, FRANCE
Auditorium CLS

8-10, rue Hermès - Parc Technologique du Canal - Ramonville Saint-Agne

Co-organised by CNES, ESA,
AIRBUS DEFENCE & SPACE, THALES ALENIA SPACE, SODERN

PROGRAMME

CNES, ESA, AIRBUS DEFENCE & SPACE, THALES ALENIA SPACE, SODERN are pleased to invite you to the 5th Toulouse CMOS image sensors workshop entitled "CMOS Image Sensors for high performance applications" to be held in Toulouse on November 21st and 22nd 2017 within the framework of the Optics and Optoelectronics Technical Expertise Centre (CCT).

TUESDAY NOVEMBER 21st

9:30 **WELCOME INTRODUCTION**
A. Materne, CNES

SESSION 1 **CMOS TDI. Part I**
Chairman : A. Pelamatti, Airbus Defence & Space

9:45 **A 256 stage Charge Domain TDI CMOS imager with 12-bit column parallel AD Conversion supporting up to 300 kHz line-rate**
Laurens Korthout, Hyun Jung Lee, Tsung-Hsun Tsai, Paul Donegan, David Atos, Feng-Hua Feng, Eric Fox, Roula Ghannoum, Jason Guan, Tihomir Hodalin, Willy Maes, David Marchesan, Matt Moser, Mark Ruiter, Teledyne DALSA Inc.

10:10 **Time Delay Integration CCD-in-CMOS platform development**
Pierre Boulenc, Linkun Wu, Vasyi Motsnyi, David San Segundo Bello, Luc Haspeslagh, Stefano Guerrieri, Maarten Rosmeulen, Jonathan Borremans, Piet De Moor, IMEC.

10:35 **BREAK**

11:00 **TUTORIAL**
Overview on 3D Integration
Sandrine LHOSTIS, (STMicroelectronics)

SESSION 1 **CMOS TDI; Part II**
Chairman : A. Pelamatti, Airbus Defence & Space

11:40 **Intense Light Source Effects on a CMOS TDI Sensor**
*Oren Ofer, Omer Cohen *, Gal Gershon, Gil Abramovich, Nimrod Ben-Ari, Claudio Jakobson, Semiconductor Devices (SCD)*

12:05 **eCCD TDI with CMOS Sensor readout**
*Chi-pin Lin¹, Weng-Lyang "Bill" Wang¹; Po-Yen Huang², Ming-Yuan Yeh²
¹CMOS Sensor Inc; ²National Space Organization (NSPO).*

12:30 **LUNCH**

TUESDAY NOVEMBER 21st

SESSION 2 CMOS Image Sensors Optical Layers

Chairman : D. Hervé, SODERN

- 14:00** **Microlenses for improved Space imagers.**
¹F. Zanella, ¹G. Basset, ¹C. Schneider, ¹A. Luu-Dinh, ¹F. Herzog, ¹F. Lütolf, ¹J. Schleuniger, ¹O. Fernández, ¹S. Fricke, ¹M. Schnieper, ²M. Zahir. ¹CSEM, ²ESA-ESTEC
- 14:25** **CHIEM: a hyperspectral image sensor for the miniaturized earth observation instrument CHIEM**
Klaas Tack(1), Pilar Gonzalez(1), Nick Spooren(1), Andy Lambrechts(1), Joris Blommaert (2), Bavo Delauré(2), Stefan Livens(2), Dirk Nuyts(2), Kyriaki Minoglue(3) and Atul Deep (3), (1) IMEC, (2) VITO, (3) ESA-ESTEC.

SESSION 3 Space Applications, Radiations & In-flight Heritage

Chairman : D. Hervé, SODERN

- 14:50** **Qualification philosophy of the Supercam Micro-Imager for the MSL 2020 mission**
Cédric Virmontois, CNES
- 15:15** **Evaluation results on HAS3, Next Generation CMOS Image Sensor for AOCs Star Tracking**
*¹Petros Chrysogelos, ¹Ioannis Thanasopoulos, ¹Thomas Cools, ¹Manuel Innocent, ¹Patrick Pintens, ¹Christophe De Roover, ¹Joost Decupere, ¹Tomas Geurts
²Steeve Kowaltschek, ²Marc Poizat, ¹ON Semiconductor, ²ESA ESTEC.*
- 15:40** **Single Event Transient and Functional Interrupt in Readout Integrated Circuit of Infrared Image Sensors at Low Temperatures**
L. Artola, ONERA
- 16:05** **BREAK**
- 16:30** **Radiation Induced Defects in a Commercial Image Sensor for Space Application**
¹Alexandre Le Roch, ²Cédric Virmontois, ¹Vincent Goiffon, ²Laurie Tauziède, ²Jean-Marc Belloir, ¹Clémentine Durnez, ¹Pierre Magnan, ¹ISAE, ²CNES
- 16:55** **Total ionising dose impact on the performances of the Large Format Array NIR detector for future ESA Astronomy missions**
Pierre-Elie Crouzet, Sebastien Tetaud, Brian Shortt, Thierry Beaufort, Sander Blommaert, Bart Butler, Frederic Lemmel, Thibaut Prod'homme, Hans Smit, Joerg Ter Haar, Ivo Visser, Cornelis Van Der Luijt, ESTEC
- 17:20** **Radiation Tolerance of a Charge Domain TDI CMOS Imager**
Owen Cherry, Rebekah Astley, Tyler Brown, Hyun Jung Lee, Paul Donegan, David Atos, Jason Guan, Dorel Terpenka, Jerome Pralong, Sukhbir Kullar
Teledyne DALSA Inc. and *Teledyne e2v*
- 17:45** **Characterization of classical and crosscorrelating performance parameters of the MCT SWIR FPA for the german EnMAP hyperspectral mission**
A. Neuzner, C. Neumann, M. Mücke, H. Ceeh, B. Sang, OHB System

- 18:10** **COCKTAIL**

WEDNESDAY NOVEMBER 22ND

TUTORIAL

09:20 **Comparison between Global Shutter Architectures allowing CDS operation**
Frederic MAYER (Teledyne e2V)

SESSION 4 CMOS for INFRA-RED DETECTION

Chairman : N. Nelms, ESA

10:00 **A high dynamic range architecture for uncooled infrared thermal sensors**
Roger PETIGNY, Patrick ROBERT, Christel Ioic TISSE, Alexia GORECKI, ULIS

10:25 **ROIC Development for Prototype NIR/SWIR Large Format Array**
Sébastien AUFRANC, Frédéric SALVETTI, Philippe MEJEAN, Frédéric Advent, Nicolas RICARD, SOFRADIR

10:50 **BREAK**

11:15 **Daphnis HD720 10µm Pitch Digital Cooled Infrared Product Overview and Way to Space Applications**
Gilbert DECAENS, Laurent Baud, Vincent BADET, Philippe MEJEAN, Yves ROYER, Régis COTTE, Gautier VOJETTA, Franck PONTHENIER, Nicolas RICARD, SOFRADIR

11:40 **NIRCA ICs for external read-out of image sensors**
Hans Kristian Otnes Berge, Alf Olsen, Amir Hasanbegovic, Jörg Ackermann, Mehmet A. Altan, Jahanzad Talebi, Suleyman Azman, Dirk Meier, Petter Øya, Jan-Erik Holter, Arne Fredriksen, Codin Gheorghe, Tor Magnus Johansen, Gunnar Mæhlum, Integrated Detector Electronics AS

12h05 **LUNCH**

SESSION 5 CMOS Image Sensor architecture

Chairman : F. Pistone, Thalès Alenia Space

13:30 **Developments in high Performance Image sensors at Teledyne**
Paul Jerram and Jérôme Pratlong, Teledyne e2v

13:55 **Characterization of the highly-integrated, backside illuminated CMOS image sensor for the EnMAP VNIR Camera**
H. Ceeh, C. Neumann, A. Neuzner M. Mücke, B. Sang, OHB System

14:20 **Techniques for Pixel-Level Linearity Optimization**
Fei Wang¹, Albert J. P. Theuwissen^{1,2} ¹Delft University of Technology, ²Harvest Imaging

14:45 **CMOS compatible Fully-depleted Imaging**
Andreas Süss, Luc Haspeslagh, Maarten Rosmeulen, Stefano Guerrieri, IMEC

15:10 **Characterisation results from METimage VISNIR FM built detector**
¹Alice Pelamatti, ²Jérôme Pratlong, ²Georgios Tsiolis, ²Robert Simpson, ²Natalie Krzizok, ¹AIRBUS, ²Teledyne

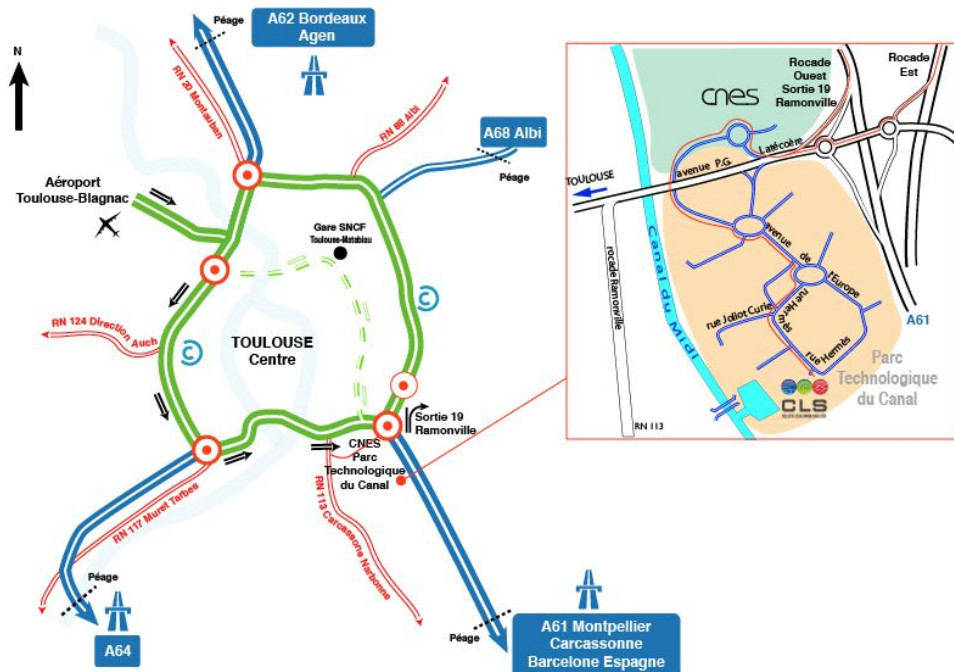
15:35 **European Low Flux CMOS Image Sensor (ELFIS) – Preliminary results**
*¹W. Wang, ¹Ajit Kumar Kalgi, ¹B. Dierickx, ¹D. Van Aken, ¹K. Wu, ¹A. Klekachev, ¹G. Ruttens, ²K. Minoglou, ³F. Riedlberger, ³G. Di Nicolantonio, ³F. Palumbi, ⁴A. Pelamatti
¹. Caeleste, ². European Space Agency, ³. LFoundry, ⁴. Airbus Defense and Space*

16:00 **The challenges of using advanced consumer market-focused CMOS imaging technology for large pixels**
*P. Magnan, M. Estribeau, Ph. Martin-Gonthier, V.Goiffon, R.Molina, S. Rolando, F.Corbrière
ISAE-Supaero, Toulouse*

Workshop location

CLS auditorium

8-10, rue Hermès - Parc Technologique du Canal - 31520 Ramonville Saint-Agne.



Toulouse metro lines: <https://www.tisseo.fr/en>

Bus line from nearest metro station: <https://www.tisseo.fr/sites/default/files/ligne111.html>

Registration

	Speakers & Organization committee	Attendees
Registration fee	free	15 € per day

On line registration link: <http://cmos-image-sensors-for-high-performance-applications.eventium.net>

Calendar

October 6th	Author notification
October 10th	Preliminary Programme & Opening of the on-line registration
November 10 th	Final Programme
November 14 th	Deadline for registration
November 21 st , 22 nd	Workshop

Organization committee

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