Space & Scientific
CMOS Image Sensors

WORKSHOP

26th & 27th NOVEMBER 2019

TOULOUSE, FRANCE
Auditorium CLS
8-10, rue Hermès - Parc Technologique du Canal - Ramonville Saint-Agne

PROGRAMME

TUESDAY NOVEMBER 26TH

9:00   **WELCOME COFFEE**

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

9:45   **TUTORIAL**
SPAD image sensors: a technology learning to fly
Matteo Perenzoni, Fondazione Bruno Kessler

SESSION	*HIGH DYNAMIC RANGE*
	Chair : *A. Materne* CNES

10:35   **A rad-hard, global shutter, true HDR, backside illuminated image sensor**
B. Dierickx, A. Kalgi, D. Van Aken, A. Klekachev, J. Basteleus, P. Stampoglis, Caeleste
G. Di Nicolantinio, LFoundry   *A. Pelamatti* Airbus D&S

10:55   **A novel high-performance HD sCMOS Detector for challenging Space Application**
T. Behnke, J. Ligus, H. Michaelis, DLR
A. Holland, M. Soman, CEI Open University

11:15   **BREAK**

11:45   **A 700 µW 120 dB intra-scene dynamic range 320x320 pixel image sensor**
P.F. Ruedi, R. Quaglia, P. Heim, H.-R. Graf, C. Monneron, B. Schaffer, CSEM

12:05   **Charge Transfer Pixels for Low Noise Imaging**
J. Michelot, M. Guillon, A. Lesire, J. Paille, P. Lienhard, P. Monsinjon, Pyxalis

SESSION	*PROCESS*
	Chair : *A. Pelamatti* Airbus Defence & Space

12:25   **ST CIS BSI Technology: from mobile phone market to spatial application**
E. Huss, T. Lachaud, Cyrille Gachon, Olivier Gonnard, ST Microelectronics

12:45   **Wafer Level Thin Film Image Sensor Integration**
Y. Li, D. Cheyns, L. Moreno Hagelsieb, E. Georgitzikis, MJ. Lim, M. Mao, P. Boulenc, J. Lee, PE. Malinowski, D. Sabuncuoglu Tezcan, S. Guerrieri IMEC

13:05   **LUNCH**

SESSION	*CMOS for INFRA RED APPLICATIONS*
	Chair : *S. Demiguel* Thales Alenia Space

14:30   **NIRCA MkII Control ASIC for EO IR image sensors**
A.Hasanbegovic, HK. Otnes Berge, J. Ackermann,JM. Sandvik, J. Talebi, S. Azman, AE. Olsen, A. Kohfeldt, D. Meier, P. Øya, JE. Holter, A. Fredriksen, C. Gheorghe, TM. Johansen, G. Mæhlum IDEAS

14:50   **Small pixel pitch digital Cooled Infrared Detectors in Lynred**
N. Ricard, G. Decaens, V. Badet, J. Roumegoux, J. Osmanian, L. Rubaldo Lynred

15:10   **Monolithically integrated quantum-dot based Image sensor for low cost high resolution NIR/SWIR applications**
Jiwon Lee, P. Boulenc, E. Georgitzikis, Y. Li, PE. Malinowski, D. Cheyns and S. Guerrieri IMEC

15:30   **Optimized ASIC Development for Space Large Format NIR/SWIR Detector Array**
P. Gao, A. Keefe, B. Dierickx, Q. Yao, W. Wang, Caeleste
T. Morlion, B. Van Thielen, R. Valvekens, EASICS

15:50   **BREAK**

SESSION	*HIGH SPEED APPLICATIONS*
	Chair : *C. Virmontois* CNES

16:20   **The Teledyne e2v CIS124 large-format, high rate CMOS sensor**
R.G. Otero, J. Pratlong, Teledyne e2v

16:40   **DARWIN-CU : A demonstration of high speed on-board image processing based upon off-the-shelf CMOS image sensors**
A. Materne, JP. Millerioux, S.Petit, C. Virmontois, C. Thiebault, F. Languille, L. Lebegue, CNES,
L. Boukris, U. Kirchgaessner, S. Angebault, C. Maquin, A. Boursier, NEXVISION,
A. Bougrine, Intitek

17:00   **A 67 Mpixel 60fps 2.5eRMS GS CIS with 2.5um for snapshot observation**
J. Segovia, *P. Fereyre, L. Pardo, A. González, R. Dominguez* Teledyne e2v

17:20   **10b 1MS/s column parallel SAR ADC for high speed CMOS image sensors with offset compensation technique using analog summation method**
Jaekyum Lee, TU Delft *, A. J. P. Theuwissen,* Harvest Imaging

17:45   **COCKTAIL**

WEDNESDAY NOVEMBER 27TH

9:30   **TUTORIAL**
A CCD on CMOS overview
Olivier Marcelot, ISAE

SESSION	*MULTISPECTRAL & HYPERSPECTRAL (I)*
	Chair : *N. Nelms* ESA

10:20   **A Large Scale TDI CMOS Image Sensor Development**
Po-Yen Huang[1], WY. Lo, YK. Huang[1], J. Ling[1], D.C Chang[2] and MY. Yeh[1]
1 National Space Organization, National Applied Research Laboratories, Taiwan,
2 National Chip Implementation Center, National Applied Research Laboratories,

10:40   **Multispectral Time Delay Integration CCD-in-CMOS image sensor for high resolution Earth observation**
S. Mahato, S.Thijs, P. Boulenc, J. Bentell, L. Wu, P. De Moor, IMEC

11:00   **BREAK**

11:30   **Digital multispectral TDI CMOS detector for earth observation**
Thales Alenia Space, CNES, PYXALIS, STMicroelectronics, Institut Supérieur de l'Aéronautique et de l'Espace,

11:50   **The Teledyne e2v Capella - CIS120 general purpose CMOS sensor for space applications CMOS sensor.**
R.G. Otero, J. Pratlong, P. Jerram, Teledyne e2v

12:10   **Radiation-Tolerant Multispectral Charge Domain TDI CMOS Imagers with Integrated Filters for Earth Observation**
O. Cherry, HJ. Lee, E Atkinson, T. Brown, P. Donegan, W. Toews, V. Arkesteijn, D. Groeneveld, S. Helfferich, T. Schaink, L. Korthout, S. Ahmed, Z. Liu, F. Haider, D. Orbe, C. Morgan and S. Kullar Teledyne DALSA

12:30   **LUNCH**

SESSION	MULTISPECTRAL & HYPERSPECTRAL (II)

13:40 **Characterization of hyperspectral CMOS image sensors based on step-wise filters**
C.Virmontois[1], B. Delauré[2], K. Tack[3], S. Petit[1], P. Panuel[4], D. Fiore[1],
1. CNES, 2. VITO, 3. IMEC, 4. Sophia Conseil

14:00 **Hyperspectral CMOS BSI Image sensor**
D. Gautam[1], Q. Yao[1], D. van Aken[1], B. Dierickx[1], B. Luyssaert[1], W. Wang[1], D. Uwaerts[1], K. Liekens[1], G. Cai[1], K. Minoglou[2], A. Bourdoux[3], D. Baudoux[3], V. Moreau[4], E. Callut[5], J. Nuttin[5]
1. Caeleste CVBA 2. ESA 3. Spacebel 4. AMOS 5. Deltatec

SESSION	RADIATIONS & EVALUATIONS & SIMULATIONS
	Chair : D. Hervé SODERN

14:20 **Pyxel – The detection simulation framework**
PE. Crouzet , D. Lucsanyi, T. Prod'homme, F. Lemmel, H. Smit, ESA
Benoit Serra, ESO

14:40 **Results of Microlens Testing on Back-illuminated Image Sensors for Space**
F. Zanella[1], G. Basset[1], C. Schneider[1], A. Luu-Dinh[1], I. Marozau[2], S. Fricke[1], A. Madrigal[2], D. Van Aken[3], M. Zahir[4]   1 CSEM Center Muttenz, 2 CSEM Headquarters, 3 CAELESTE, 4 ESTEC

15:00 **Commercial off-the-shelf CMOS image sensors for space applications: radiation testing on SONY and Teledyne-E2V sensors**
V. Lalucaa,   ALTEN. C. Virmontois, A. Bardoux,   CNES

15:20 **Scientific CMOS image sensors with high QE for near IR and X-ray imaging**
K. Stefanov, A. Holland, M. Soman, J. Heymes, C. Crews
Centre for Electronic Imaging, the Open University.

15:40 **END OF THE WORKSHOP**

Workshop official language
Oral presentation shall be requested for the workshop. The official language for the workshop is English.

Slide submission
After abstract acceptance notification, the authors will be requested to prepare their presentation in pdf or powerpoint file format, to be presented at the workshop and give a copy to the organization committee with an authorization to make it available for attendees, and on-line for the CCT members.

Registration

	Organization committee	Speakers & Attendees
Registration fee	free	25 €/day

On line registration link : http://space-and-scientific-cmos-image-sensors.evenium.net

Exhibitors
The Workshop will host industrial exhibitors:

Pyxalis, Centr'Alp, 170 rue de Chatagnon, BP 40034, 38346 Moirans Cedex. www.pyxalis.com
email : contact-business@pyxalis.com

Pyxalis specializes in advanced CMOS image sensor solution developments and sales for niche to high volume markets including aerospace, machine vision, medical, science, security, automotive, biometry, cinematography…
Pyxalis offers unique expertise in low noise, high dynamic range, high speed, large sensors (up to 1die/wafer), TDI sensing, on-chip image processing… in global and rolling shutter sensor architectures. Hyperspectral imaging is one of the new areas where Pyxalis proposes advanced solutions.
Our team experience and the methodology we've been optimizing for years guarantee short-time-to-product and first-silicon right sensors.
Funded in 2010, Pyxalis is now a 40 people company located in Moirans-France in the Grenoble ''Imaging valley'' and is ISO 9001: 2015 certified.

Teledyne e2v, *Avenue de Rochepleine, BP123, 38521 Saint-Egrève Cedex*, France.
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email : ims.e2v@teledyne.com

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3Dplus, 408 Rue Hélène Boucher, 78532 BUC, France. www.3d-plus.com
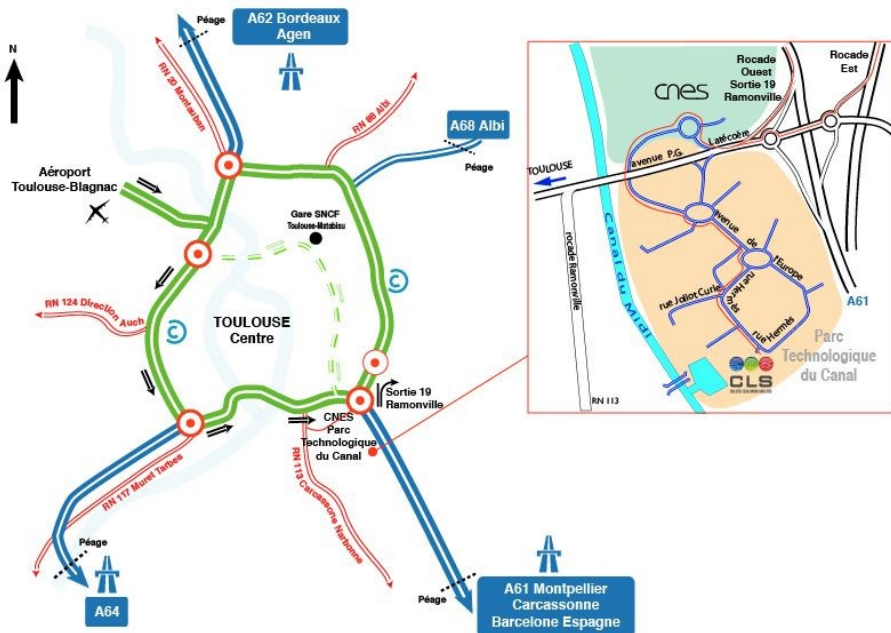email : wmouallem@3d-plus.com

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The technology enables stacking heterogeneous active, passive and opto-electronic devices in a single highly miniaturized package.
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Workshop location

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

Transport Network

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

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

Accommodation

Location	Hotel	Address Tel.	Price breakfast included for workshop attendees	Access to workshop
Toulouse City Center	Hôtel Castellane	17, Rue Castellane Toulouse 33 (0)5 61 62 18 82	95 €	Metro Line B + Bus line 111
In the Workshop vicinity	Comfort Hôtel	5, Avenue des Crêtes Ramonville Saint Agne 33 (0)5 62 19 22 22	63 € (single) 72 € (double) Code : CNES 2019 CHEZ COMFORT	Bus line Linéo 6 + Bus line 111

Organization committee

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