



CENTRE NATIONAL D'ÉTUDES SPATIALES



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

PRELIMINARY PROGRAMME

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

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

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 Nicolantino, 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 A 700 μ W 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

11:35 BREAK

SESSION PROCESS

12:00 ST CIS BSI Technology: from mobile phone market to spatial application
E. Huss, T. Lachaud, Cyrille Gachon, Olivier Gonnard, ST Microelectronics

12:20 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*

12:40 Curved Sensors for compact and high-performance imaging systems
*K. Joaquina, E. Hugot, T. Behaghel, S. Lombardo, M. Ferrari, LAM
W. Jahn, California Institute of Technology, S. Hugot Curve-One*

13:00 LUNCH

SESSION CMOS for INFRA RED APPLICATIONS

14:20 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*

14:40 Small pixel pitch digital Cooled Infrared Detectors in Lynred
N. Ricard, G. Decaens, V. Badet, J. Roumegoux, J. Osmanian, L. Rubaldo Lynred

15:00 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

15:20 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*

15:40 BREAK

SESSION HIGH SPEED APPLICATIONS

- 16:10** **The Teledyne e2v CIS124 large-format, high rate CMOS sensor**
R.G. Otero, J. Pratloug, Teledyne e2v
- 16:30** **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. Augebault, C. Maquin, A. Boursier, NEXVISION, A. Bougrine, Intitek
- 16:50** **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
- 17:10** **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
- 17:30** **COCKTAIL**

WEDNESDAY NOVEMBER 27TH

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

SESSION MULTISPECTRAL & HYPERSPECTRAL (I)

- 10:20** **A Large Scale TDI CMOS Image Sensor Development**
Po-Yen Huang¹, WY. Lo, YK. Huang¹, J. Ling¹, D.C Chang² and MY. Yeh¹
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**
M. Foucher, T. Gilbert, A. Ghiglione, S. Demiguel, Thalès Alenia Space
S. Petit, A. Materne CNES
- 11:50** **The Teledyne e2v Capella - CIS120 general purpose CMOS sensor for space applications CMOS sensor.**
R.G. Otero, J. Pratloug, 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)

13:50 Characterization of hyperspectral CMOS image sensors based on step-wise filters
C. Virmontois¹, B. Delauré², K. Tack³, S. Petit¹, P. Panuel⁴, D. Fiore¹,
1. CNES, 2. VITO, 3. IMEC, 4. Sophia Conseil

14:10 Hyperspectral CMOS BSI Image sensor
D. Gautam¹, Q. Yao¹, D. van Aken¹, B. Dierickx¹, B. Luyssaert¹, W. Wang¹, D. Uwaerts¹, K. Liekens¹, G. Cai¹, K. Minoglou², A. Bourdoux³, D. Baudoux³, V. Moreau⁴, E. Callut⁵, J. Nuttin⁵
1. Caeleste CVBA 2. ESA 3. Spacebel 4. AMOS 5. Deltatec

SESSION RADIATIONS & EVALUATIONS & SIMULATIONS

14:30 Results of Microlens Testing on Back-illuminated Image Sensors for Space
F. Zanella¹, G. Basset¹, C. Schneider¹, A. Luu-Dinh¹, I. Marozau², S. Fricke¹, A. Madrigal², D. Van Aken³, M. Zahir⁴ 1 CSEM Center Muttentz, 2 CSEM Headquarters, 3 CAELESTE, 4 ESTEC

14:50 Commercial off-the-shelf CMOS image sensors for space applications: radiation testing on SONY and Teledyne-E2V sensors
V. Lалуcaa, ALTEN. C. Virmontois, A. Bardoux, CNES

15:10 Pyxel – The detection simulation framework
D. Lucsanyi, T. Prod'homme, F. Lemmel, H. Smit, PE. Crouzet, ESA
Benoit Serra, ESO

15:30 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>

Calendar

October 4th	Author notification
October 8th	Preliminary programme
November 8th	Final programme
November 26 th ,27 th	Workshop

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.

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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.



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Teledyne e2v is providing its customers with advanced and innovative CMOS image sensors. We serve high end, demanding, markets with standard, semi-custom, or fully custom imaging solutions. We bring increased value to our customer's systems.



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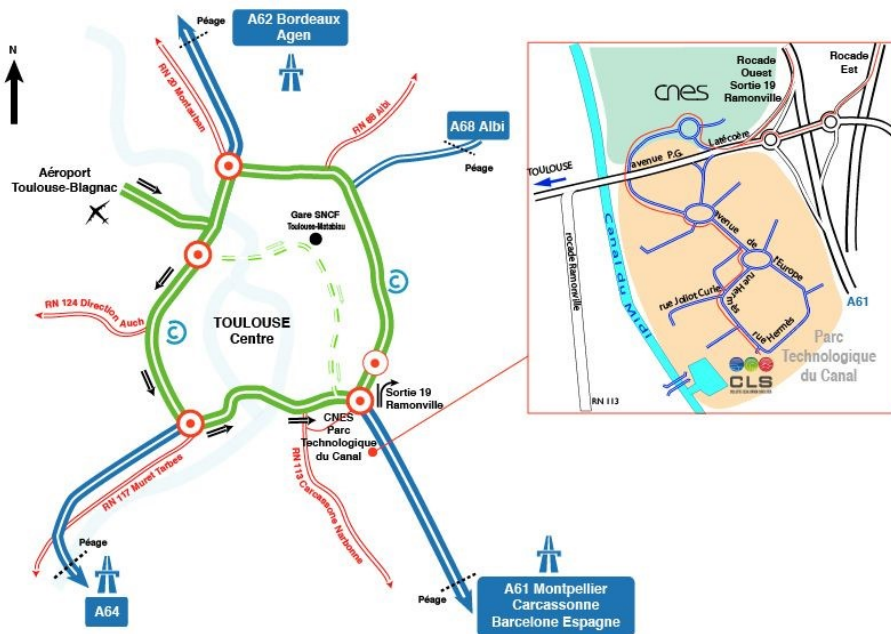
3D PLUS is a world leading supplier of advanced high density 3D microelectronic products and die/wafer stacking technology.

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

3D PLUS offers in its catalogue a fully space qualified CMOS micro-camera for several applications such as monitoring, science, and spectroscopy.

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	Le domaine de Montjoie	63, Av de l'Aéropostale Ramonville Saint Agne 33 (0)5 61 14 15 00	115 €	Bus line 112 + Bus line 111
In the Workshop vicinity	Comfort Hôtel	5, Avenue des Crêtes Ramonville Saint Agne 33 (0)5 62 19 22 22	85 €	Bus line Linéo 6 + Bus line 111

Organization committee

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