

## Training Opportunity for Belgian Trainees

Reference	Title	Duty Station
BE-2016-TEC-MME(3)	Modeling CMOS imagers for Space Applications	ESTEC
<p><b><u>Overview of the unit's mission:</u></b></p> <p>The Optoelectronics Section (TEC-MME) of the TEC-M department is dealing with technology developments in the fields of:</p> <ul style="list-style-type: none"> <li>• Detectors from the ultra-violet, via visible, the near infrared to the far and thermal infrared wavelength.</li> <li>• Lasers, laser amplification and stabilization systems</li> <li>• Photonics sensors and devices, optical integrated switches and filters</li> <li>• Lidar systems for planetary approach and landing and probing of the atmosphere</li> <li>• Laser communication systems</li> <li>• Cold atom interferometry, atomic clocks and their time and frequency distribution</li> </ul>		
<p><b><u>Overview of the field of activity proposed:</u></b></p> <p>Since the past few years, the technology of complementary metal oxide semiconductor (CMOS) image sensor has taken the place of charged coupled device's (CCD) technology in many applications. To exploit the potential advantages of CMOS imagers for space applications, the developed imagers should exhibit very high quality properties in terms of high quantum efficiency, low crosstalk and high radiation tolerance. One way to understand the behavior of CMOS imagers and to propose further improvement is by using simulation models. Different Technology Computer-Aided Design (TCAD) software tools are available, which are able to solve numerically complex physical equations and predict the performance of such devices.</p> <p>The goal of this internship is to study the physical mechanisms of the photodiodes, get familiar with the TCAD tool software, implement the physical models and the actual device design into the simulator and confirm the accuracy of the developed model by comparing simulations to measurements. Simulations will be done with existing software packages, e.g. Process and Device simulators of the Sentaurus Synopsys TCAD software.</p> <p>The student will start from developing a basic CMOS imager model and will focus on potential specific improvements and modifications. His work will be driven by currently running R&amp;D (Research and Development) activities and also by Science/Earth Observation Projects, targeting the development of new detectors. For this internship, the student is expected to have a strong interest and/or background in semiconductor physics. ESA will provide access to the device modeling tools and introductory material. Previous experience with the tools is not required. However, knowledge of TCAD software and/or physics of optoelectronic devices is an advantage.</p>		
<p><b><u>Required education:</u></b></p> <p>Master in Microelectronics and/or Master in Engineering</p> <p>Student majoring in: Electrical engineering, physics Graduation option: Engineering</p>		