

## Training Opportunity for Portuguese Trainees

Reference	Title	Duty Station
PT-2014-TEC-EDM(4)	Electrical and Radiation Evaluation of Mixed-Signal ASICs for Space Applications	ESTEC
<p><b><u>Overview of the Unit missions:</u></b></p> <p>The unit of destination of the trainee is TEC-EDM, microelectronics section. The section is in charge of providing ASIC and FPGA technical support to ESA projects and of undertaking and coordinating R&amp;D activities for new microelectronic technologies, including radiation-hard ASIC digital and analogue libraries, IP cores both digital and analogue, mixed-signal design, HW-SW co-design, design methodology, EDA tools, etc. The section is leading the development of mixed-signal ASICs like ADCs, DACs, analogue front-ends for instrumentation and control and transceivers.</p>		
<p><b><u>Overview of the field of activity proposed:</u></b></p> <p>The training opportunity identified concerns the evaluation of the performance of the newest developed mixed-signal space ASICs, in particular the ADCs, DACs, instrumentation front-ends and transceivers in the laboratory and in a reference instrumentation satellite payload and/or platform space application.</p> <p>The activity envisages the adaptation and automation of the laboratory testbench to measure the performance of the ADCs and DACs under development operating from 1kSps to 1GSps to the IEEE 1241-2000 standard. With the new ultra low jitter signal and clock generators in the testbench higher precision measurements for SNR, SFDR, THD, ENOB, INL, DNL and the other parameters defined in the test standard have to be realised and automated. The increased precision should be used to refine the calibration procedures for the ADC and DACs and verify their improved performance.</p> <p>With reference to the architecture of the devices new radiation test procedures have to be developed that can detect effectively SET and SEU events for devices in excess of 18 bit accuracy, which to date in the space industry is only possible to 12bit.</p> <p>For the instrumentation front-end and transceivers an effective test set-up has to be created that can evaluate the electrical physical performance of the devices to their specification or standard, like in the case for the CAN transceiver. For the latter being the first of its kind an effective radiation SEU and SET test set-up should be defined to characterise its radiation behaviour in space.</p> <p>These mixed-signal building blocks are envisaged for further integration into future space mixed-signal system on chips (SoCs) and should therefore be completely functionally tested. To that purpose a reference space platform or payload application has to be defined, designed and realised that exercises the full functionality of the devices and that can be used as demonstrator and development platform for the future mixed-signal SoCs.</p>		
<p><b><u>Required Education:</u></b></p> <p>Applicants should have just completed, or be in their final year of a University course at Masters level in Electronic, Electrical, Physics or Computer Engineering. A strong background in analogue design is required and knowledge of Hardware Description Languages (mainly VHDL) is welcome.</p> <p>Candidates must be fluent in English and/or French, the official languages of the Agency.</p> <p>Candidates should have a high degree of autonomy together with an attitude to work in an international team environment. They should have good communication skills and an interest into innovative technologies.</p>		