Training Opportunity for Portuguese Trainees

Reference	Title	Duty Station
PT-2017-TEC-SWS(1)	Bootloader via RMAP – a new way to load Onboard computers	ESTEC

Overview of the Unit missions:

The Software Systems division has the responsibility in domain of software engineering 0TUhttp://www.esa.int/Our_Activities/Space_Engineering/Software_SystemsU0T In particular the division covers verification and validation techniques for checking mission-critical software, software technology for flight as well as ground systems, real-time software embedded in spacecraft systems and payloads; ground facilities software, including electrical ground support equipment, testbenches, databases and simulation and modelling tools;
The division is supporting all ESA satellite projects in the above domains.
The Flight Software Systems Section offer a training opportunity:

Overview of the field of activity proposed:

Most computers used onboard todays spacecraft are traditionally initiated through a Bootloader function which resides in each computer. The Bootloader executes basic tests of various logical functions as well as memory before loading and starting application sw. The Bootloader provides a highly critical function and might jeopardise the spacemission if not correctly executed. The SpaceWire protocol http://www.spacewire.esa.int which is becoming more frequently used onboard has a dedicated low level protocol, RMAP, Remote Memory Access Protocol, which enables capability to remotely load memory and thereby bypass or override a Bootloader.
The objective of the training opportunity is to evaluate the capability of RMAP to support implementation of Bootloader functionality and to identify and assess limitation wrt to operability, functionality and performance.

The training opportunity will compile the following tasks:

- Analyse the Booloader functions identifying the mandatory functions needed
- Anayse RMAP capability as well as limitations in general as well as dedicated target processor LEON3FT or alternative processor
- Outline and define a number of Bootloader strategies utilising RMAP especially considering functionality, operability, performance and robustness
- Implement and test a selection of the defined strategies as use cases
- Characterise functionality as well as performance of use cases.
- Elaborate on operability wrt to a satellites operational scenarios (Safe Mode and availability)

Required Education:

Applicants should have just completed, or be in their final year of a University course at Masters Level (or equivalent) in a technical or scientific discipline preferable Electronics .

Applicants should have good interpersonal and communication skills and should be able to work in a multi-cultural environment, both independently and as part of a team.

Applicants must be fluent in English, the working languages of the Agency.