# Training Opportunity for Portuguese Trainees

| Reference | Specialist Area | Duty Station |
|---|---|---|
| **PT-2010-TEC-ECM** | **Trajectory optimization for the GNC function** | **ESTEC** |

## Overview of the Division missions:

The Control Systems Division is responsible for project support and technology development of space applications covering the fields of

- Control systems and Sensors, including
  - Attitude Control system design, modelling, analysis, testing and verification, covering both operational and FDIR aspects
  - Control law algorithm analysis, design, implementation (S/W and H/W) and testing
  - Attitude Sensors design development testing and verification
- Navigation, Guidance and control, including
  - Rendezvous system design, analysis and verification
  - Entry, Descent and Landing guidance and control system design, analysis and verification
  - Planetary navigation and ascent vehicle system design, analysis and verification
  - Formation flying control systems
  - Advanced control and estimation techniques
- Dynamics and Mathematical Analysis including
  - Trajectory analysis (ascent, re-entry, low thrust) and optimisation
  - Spacecraft dynamics modelling and analysis

The division hosts Avionics Laboratory and computing facilities that allow hands on work in the above fields

## Overview of the field of activity proposed:

- Provide technical support to ESA space programmes in the definition, implementation and use of optimal trajectories within the guidance function of a GNC system.
The main areas of project support are the following: rocket ascent and entry flight, rendezvous and docking and formation flying and low thrust trajectory optimization.
- Provide support in executing R&D activities in the domain of optimal trajectories and mathematical modelling;
- Provide support in executing internal TEC-ECM software tools activities in the domain of optimal trajectories and mathematical modelling. In particular, the support shall include the Space Trajectory Analysis development and the update of the ALMA software suite. TEC-ECM is developing a software tool called STA (http://sta.estec.esa.int). The STA software suite is conceived as a research tool to support the analysis phase of a space mission having the ability to analyze, determine, simulate, and visualize a wide range of space trajectories. TEC-ECM has a software tool called ALMA. ALMA stands for Automatic Knowledge-Based Generator of Launcher Performance Maps.

## Required Education:

University degree or equivalent qualification in aerospace, control engineering or mathematical methods for aerospace applications. Command of MATLAB and knowledge of STA and C++ computer programming languages. A good knowledge of English is required.