

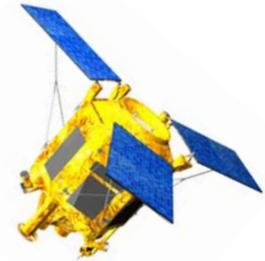
Training title: *Model satellite guidance to optimize mission capabilities*

Field: Operations and R&D

Speciality: Satellite guidance and mission optimisation

Subject

Earth observation satellites are acquiring images in difficult geometrical conditions: high orbiting satellite speed, Earth projection effects, optical distortion, and so on. In order to optimize the image quality, the satellite orientation is controlled on its 3-axes. Such control is called "guidance" and is the result of a complex optimization with respect to geometrical criteria. This computation may lead to non-linear ground projection trajectory or non-predictable acquisition duration.



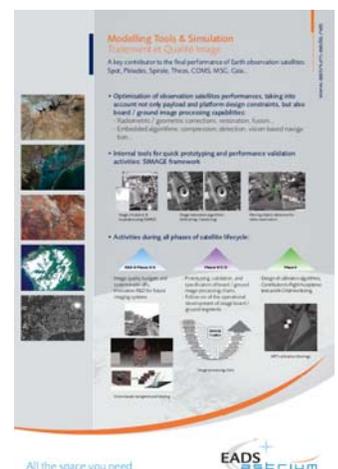
While guidance is computed with precision for satellite control, there is a need for fast guidance computation. Mission department of Airbus DS is using guidance method to compute the plan of a satellite for several requests. Fast guidance allows the mission chain to develop new algorithms evaluating multiple guidance solution to select the best solution in multi-satellites context.

Therefore the internship consists, on one hand, in the design of the fast-guidance method based on a neural-network method and deep learning techniques. On the other hand, it consists in the integration of this procedure in mission chain algorithms and to measure the error of this fast-prediction method. This internship is a unique opportunity for the trainee to discover, learn and work in two complementary departments: mission and image chains.

Company background

The Space System business line of Airbus Defence & Space is the European leader in the field of optical Earth Observation systems. The company, through its history, is a pioneer of space industry, responsible for the development of the first Earth Observation space systems in Europe, starting with the SPOT family. Since this time, the company has led the major European developments in the fields, through programs such as METOP, ERS, ENVISAT, HELIOS, PLEIADES or SPOT6. This experience developed is now applied on export turn-key programs such as FORMOSAT, THEOS, ALSAT, CHILI or KazEOSat-1, involving up to sub metric resolution systems, or such as COMS, a geostationary meteorological satellite for Korea.

This evolution conveyed Airbus Defence & Space to develop a strong expertise in Image Quality, Image Processing and Image Simulation through a group of about 50 engineers in 2016, constituting the Image Chain department (TSOTU2). The Image team carries out activities in fundamental image domains such as image simulation, ground processing, image quality, in-orbit testing, embedded processing, vision-based navigation and dedicated R&D activities.



Required knowledge

- Generic knowledge in image processing as well as numerical analysis,
- Matlab or C/C++; Windows & Linux OS
- CNN, cloud computing

Desired education

- Engineering school or Master, with specialisation in signal and image processing, or applied mathematics.

Training period length: **5-6 months in 2017**

Location	Airbus Defence & Space – Space Systems 31 rue des cosmonautes 31402 Toulouse Cedex 4, France
Unit	TSOTU2 – Image Chain department
Deadline	31/03/2017
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