

REF: 10381438

Training title: Studying new technological enabler for Computer Vision algorithms**Field: Operations and R&D****Speciality: Software development**

Subject

Computer Vision is an enabler for many space applications like in orbit servicing, landing on asteroids, debris removal, object or change detection, and image analysis. However the processing required for such needs shall deal with the limited resources of the spacecraft: algorithms have to be heavily optimized in that perspective. Besides, the need for precision remains important.

One lead to reach new performance levels is to rely on machine learning; the tremendous evolution in this domain (e.g. **deep learning**) opens new possibilities. Yet, most algorithms in this domain show heavy computational requirements.

In this perspective, new technologies like **VPU** (Vision Processor Unit) or **IPU** (Image Processor Unit) promise to specifically tackle image processing and deep learning computational requirements at a small power cost, and the past few years have seen the rapid growth of suppliers in this domain such as Intel's Movidius. Indeed, these disruptive technologies radically change the cost of many primitive functions at the heart of both classical and state-of-the-art algorithms, overturning conventional complexity.

The training period will consist in studying the impact of these new technologies on the performances of **Computer Vision algorithms**, redefining the pertinence of their **design and architecture**. The trainee will be part of the Computer Vision team of the Image Chain department of the Space System business line of Airbus Defence & Space, and will receive support from its experts.

The trainee shall have a solid image processing or deep learning background, as well as demonstrating computer programming skills (C/C++ or Python). Knowledge of a deep-learning back-end (like Tensor Flow or Caffe) would be a significant asset. Initiative spirit and rigor are appreciable qualities.

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, KazEOSat-1 or PeruSat, 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 80 engineers in 2017, constituting the Image Chain department (TESUI). 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, deep learning, and dedicated R&D activities.

Required knowledge

- Generic knowledge in image processing as well as numerical analysis,
- Generic knowledge or first experience with machine learning
- C/C++, Python; Windows & Linux OS

Desired education

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

Training period length: **5 to 6 months in 2018**

+ Possibility of a one year internship.

Location	Airbus Defence & Space – Space Systems 31 rue des cosmonautes 31402 Toulouse Cedex 4, France
Unit	TESUI – Sensor Processing Chain department
Deadline	15/12/2017
Contact	stages-image-airbus@airbus.com
