



**ASSETS+**  
Alliance for Strategic Skills addressing Emerging Technologies in Defence

**EDUCATION & TRAINING**

**Prototyped programme:**

**Data science for defence – remote sensing image analysis**



Co-funded by the  
Erasmus+ Programme  
of the European Union



**POLITÉCNICA**

## Learn from the basics to some advanced techniques in this 30-hours free course:

A remote sensing image analyst deals with large amounts of optical and radar remote sensing images. He has the responsibility of store the data in a secure and efficient way and to exploit them to extract useful information for intelligence and defence.

In this course, the quality factors of images obtained with different sensors are compared and some modern techniques for storing and processing large amounts of imaging information are presented. Also, some algorithms that make use of machine learning techniques are introduced for the segmentation and parametrization of images, extraction of information and object recognition.



## This programme is focused on:

- Professionals working in Defence and AeroSpace Industry (up-skilling and re-skilling activities) and
- University Master students

**IMPORTANT:** This prototyped programme is **EXCLUSIVE FOR** partners of the [ASSETS+](#) [consortium](#) and [associated stakeholders](#).

If you want to join the ASSETS+ Stakeholders Group and become part of our ecosystem, please, [click here](#).



## General information:

**Format:** Online

**EQF level:** 7

**Language:** English

**Hours:** 30

**Instructors:**

Mateo Burgos, José Manuel Menéndez, Alberto Belmonte

**Host institution:**

Universidad Politécnica de Madrid (Spain)

**Pre-requisites:**

Mathematics (basic algebra), basic signal processing theory and techniques, computer programming



May 23	May 24	May 25	May 26	May 30	May 31	June 1	June 2	June 6	June 7	June 8	June 9
16-19	16-18	16-19	16-19	16-18	16-18	16-18	16-18	16-18	16-18	16-18	16-18

Contents	Hours
<b>1. Introduction to Remote sensing</b>	<b>1</b>
1.1 Characteristics of RS optical and radar and images	2
1.2 Introduction to multimedia analytics: content analysis and applications	2
<b>2. Efficient storage of massive imaging data</b>	
2.1 Compressive sensing for images	6
2.2 Content handling: search and retrieval at big scale	2
2.3 Lab session: Compressive sensing	2
<b>3.- Machine learning tools for multimedia analysis</b>	
3.1 Content descriptors extraction	1
3.2 Classification and regression	1.5
3.3 Clustering	1.5
3.4 Lab session: Exploratory data analysis	2
3.5 Lab session: inference on the data	2
<b>4.- Object detection/recognition</b>	
4.1 Sparse representation and dictionaries	3
4.2 Dimensionality reduction	2
4.3 Lab session: Object detection/recognition	2



## Learning outcomes:

### Highly specialised theoretical and practical knowledge of:

- Differences of the quality factors and features of optical and radar remote sensing images
- Recent and relevant techniques for massively processing images

### Skills

- Develop algorithms and systems for reformatting remote sensing images in an efficient way using compressive sensing, and random projection
- Develop and evaluate machine-learning techniques and to design big data learning systems dealing with large amounts of remote sensing images.
- To develop algorithms and systems for automatic segmentation, classification and object recognition



## More information and registration:

<https://assets-plus.eu/education-training/data-science-for-defence-remote-sensing-image-analysis-course>



[www.assets-plus.eu](http://www.assets-plus.eu)



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