



# EO-ALERT

## Next Generation Satellite Processing Chain for Rapid Civil Alerts

### INTRODUCTION

EO-ALERT is an **European Commission H2020 project** coordinated by Deimos Space that proposes the definition and development of the **next-generation Earth Observation (EO) data processing chain**, based on a novel flight segment architecture that **moves optimised key EO data processing elements from the ground segment to on-board the satellite**, with the aim of delivering the EO product to the End User with very low latency (quasi-real-time).

EO-ALERT aims to provide the technological building blocks for this next-generation EO data processing chain, with a view to future **autonomous EO satellites**. The EO-ALERT satellite concept is based on the establishment of an **on-board data handling and processing capability**, that enables the generation of EO products on-board the satellite and their direct transfer to the End User. This overcomes the typical bottleneck problem with the raw data transfer to ground in the classical EO data chain, avoids the transfer of EO data that is not of value, and allows for the provision of EO data with very low latency. EO-ALERT targets the provision of high-priority EO products from observations, made globally, to the ground and End User, within 5 minutes.

### KEY AREAS OF INVESTIGATION

The proposed EO-ALERT satellite data handling architecture is shown to solve the very low latency EO data challenge through a combination of innovations in the on-board elements of the data chain and the communications. Namely, the architecture introduces innovative technological solutions, including

- **on-board image generation and processing** for the generation of EO products and alerts
- **on-board data compression and encryption**
- **on-board reconfigurable data handling**
- **high-speed on-board avionics**
- **reconfigurable high data rate communication links to ground.**

While the employment of **AI-based technologies** is not a basic aim of the EO-ALERT project, the project does showcase some areas where AI-based technologies have been employed and provide benefits, as well as some of the challenges associated with their employment.

### APPLICATIONS

These novel technologies are applied to two user scenarios of high interest:

- **ship detection** (maritime surveillance)
- **extreme weather observation/nowcasting**

