

30th IAA SYMPOSIUM ON SMALL SATELLITE MISSIONS (B4)  
Small Earth Observation Missions (4)

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## THE FIRE LOCALISATION AND MITIGATION FOR EMERGENCIES SATELLITES (FLAMES), A CONSTELLATION OF CUBESATS IN LEO FOR MONITORING WILDFIRES IN NEAR REAL-TIME.

### Abstract

The effects of global warming are already taking a toll on our planet. According to the US congressional research service an average of 7 million acres are being burnt every year in the USA alone. The European Commission's "European Forest Fire report" has shown that the deforestation rates are increasing at an alarming rate and with hotter years and drier climates the number of burnt land is only expected to increase.

This paper outlines the Fire Localisation And Mitigation for Emergencies Satellites (FLAMES), a constellation of 16 CubeSats (6U) in Low Earth Orbit (LEO) designed to monitor wildfires in near real-time with the ability of having worldwide coverage 24/7. The constellation consists of 8 High FOV (Field Of View) - Low Resolution satellites and 8 Low FOV - High resolution satellites observing in the thermal infrared spectrum. The mission is designed to be launched by a single Vega-C rocket making use of the Small Spacecraft Mission Service (SSMS) platform and placed into a single plane Sun-synchronous orbit (SSO).

FLAMES is a Phase 0 mission designed by university students during ESA Academy's CubeSat Summer School 2022 in the Training and Learning Facility at ESEC-Galaxia, Belgium. This mission study was a deliverable of the Concurrent Engineering Workshop guided by ESA System Engineers. The students were divided into several disciplines, each group dedicated to a different subsystem and worked together, making use of the Concurrent Model-based Engineering Tool (COMET) and supervised by ESA System Engineers. As a result, each different group showed a detailed analysis of their respective subsystem and reported on the lessons learnt during the Concurrent Engineering process.

This paper provides an overview of the preliminary design of FLAMES and the Concurrent Engineering process applied during ESA Academy's CubeSat Summer School 2022 to develop this mission.