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THE LIGHTNING IMAGER FIRST FLIGHT MODEL, ON BOARD OF THE METEOSAT THIRD GENERATION MISSION, PROVIDES FIRST FLIGHT DATA FOR WEATHER NOWCASTING DURING ITS FIRST YEAR IN ORBIT.

Abstract

Lightning Imager (LI) on board of the **Meteosat Third Generation (MTG)** mission is an innovative instrument that detects lightning during night and day, which is a key feature for weather forecasting and atmospheric research. After a development and manufacturing phase carried out by **Leonardo SpA**, the instrument was launched at the end of 2022. Once the Instrument's Commissioning and Fine Tuning phase was successfully achieved, LI entered in the **nominal operative phase** at the beginning of 2024.

LI is located in a geostationary orbit and covers around **84% of the Earth disc**. During its first year of mission, LI provided observations of lightning over the hemisphere centred on Europe, Africa and portions of Asia and South America, at about **4.5 km spatial resolution** at SSP.

The basic working principle behind the LI lightning detection consists in triggering events on pixels where and when a sudden increase of energy is measured over the background radiance image, with a succession of on-board and on-ground filters to discard false events, while keeping the true lightning information. A digital simulator (**LI E2E Simulator**) correlated with the flight model has been created

for the performance verification of the instrument, as the detection performance requirements cannot be always validated in-flight by direct methods or setups.

The data received during last year demonstrate the capability of LI to **detect space debris** due to its high sensitiveness, proving that the instrument is adaptable also for the detection of events beyond lightning.

LI currently delivers a constant flux of in flight data, giving useful insights about the lightning environment of our planet.