

The EUMETSAT Meteosat Third Generation Lightning Imager (MTG-LI): Applications and Product Processing

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The Meteosat Second Generation (MSG) system has become the primary European source of geostationary observations over Europe and Africa with the start of nominal operations in January 2004, and delivering observations and services at least until 2015. However, considering the typical development cycle for a new complex space system, it was already for a longer time necessary to plan for and define the Meteosat Third Generation (MTG) system. MTG needs to be available around 2015, before the end of the nominal lifetime of MSG.

One of the new missions selected for MTG is the lightning Imagery (LI) mission, detecting continuously over almost the full disc the lightning discharges taking place in clouds or between cloud and ground with a resolution around 10 km. The LI mission is intended to provide a real time lightning detection (cloud-to-cloud and cloud-to-ground strokes) and location capability in support to NWC and VSRF of severe storm hazards and lightning strike warning. As lightning is strongly correlated with storm related phenomena like precipitation, hail and gust, a further objective of the LI mission is to serve as proxy for intensive convection related to ice flux, updraft strength and convective rainfall. Lightning can also serve as proxy for adiabatic and latent heating to be assimilated in global/mesoscale NWP models. Finally, for atmospheric chemistry, lightning plays a significant role in generating nitric oxide. The natural nitric oxide budget is a matter of great uncertainty at this time, and long-term observations of one of its sources will prove valuable as the subject develops.

The LI mission requirements give the highest priority to detecting flashes with a Detection Efficiency (DE) of better than 90%. This is in line with one of the main objective of the mission, i.e. detecting risk areas for heavy convection which requires information on total lightning but not on individual events. A flash is linked with discharges forming one or more groups of one or several events each. The analysed statistics indicate that 90% of all flashes are linked with a group having at least one event of energy above $10 \mu\text{Jm}^{-2}\text{sr}^{-1}$.

One task during the MTG preparatory program (Phase B) for EUMETSAT is the development of the L2 product processors, together with the user community. The primary L2 products are the groups and flashes, while the more advanced products are based on these (e.g. flash densities and flash rates, storm related lightning characteristics, lightning warning, cell tracking, quantitative precipitation estimate, NOx production estimate).

The paper discusses the MTG LI status, foreseen products and the status of the processor development.