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On 20 February this year, the Twin Anthropogenic Greenhouse Gas Observers (TANGO) mission got its ‘go-ahead’ for mission implementation. TANGO is a pioneering Cubsat satellite mission within ESA’s SCOUT program comprising two satellites, TANGO-Carbon and TNAGO-Nitro, to be launched in the year 2027. The mission inherits directly from TROPOMI and envisages a unique European contribution to monitoring globally and independently the emission of anthropogenic greenhouse gases CO2 and CH4 over the period 2027-2031. To this end, breakthrough technology will be used to quantify emissions of the greenhouse gases methane (CH4) and carbon dioxide (CO2) at the level of individual industrial facilities and power plants. The mission will demonstrate a distributed monitoring system that will pave the way for future larger constellations of Cubsats allowing for enhanced coverage and temporal resolution. The TANGO mission consists of two agile satellite buses flying in formation, each carrying one spectrometer. The first satellite measures spectral radiances in the shortwave infrared part of the solar spectrum (1.6 µm) to detect moderate to strong emissions of CH4 (? 4.0 kt/yr) and CO2 (? 2.5 Mt/yr). The instrument will observe scenes of 30 x 30 km2 at spatial resolutions small enough to monitor individual large industrial facilities (?300 x 300 m2), with accuracy to determine emissions based on a single observation. Using the same strategy, the second satellite yields collocated NO2 observations from radiance measurements in the visible spectral range, supporting plume detection and exploiting the use of CO2/NO2 ratio. TANGO will provide surface fluxes of specific emission types based on the combination of CH4, CO2, and NO2 observations at a high spatial resolution following a strictly open data policy. Mission operation will be open for input from the science community on target selection. In doing so, TANGO aims to uniquely complement the large, planned Copernicus monitoring missions like Sentinel-5 and the CO2M mission by providing unrivaled high-resolution monitoring of the major anthropogenic greenhouse gas emissions regularly. In this presentation, we will discuss the TANGO mission concept and its synergy with future Copernicus missions.
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