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PRELIMINARY DESIGN OF A PLURI-APPLICATIONS & OPERATIONS EXAMINATION SATELLITE (PANOPTES)

Abstract

Geostationary Earth Orbit is very coveted and includes numerous satellites that offer crucial services. These satellites are particularly profitable for the operators, so their lifespan optimization is a potential large market. Nowadays satellite operators have access to telemetry data. However, Beginning of Life (BoL) checks, regular checks, damage estimation and failure origin analysis are limited. Having other sources of information would enable the customer to better understand the origin of the incidents and thus contribute to the continuous improvement of its satellites. This paper is a feasibility study of ARGOS, a lightweight (<300kg) satellite placed in GEO. It has several instruments on-board to improve the analysis of the satellite: optical, infrared, radio frequency, electrical field and space weather instruments. This enables ARGOS to visualize the satellite to detect anomalies such as micro-fissures, impacts and thermal leaks, sense the frequencies emitted, capture electrical defect and get precise data on space environment around the satellite. Because of the high data rate need and frequencies allocation issue, the communication of the satellite is partly ensured by laser. The instruments choice and complementarity have been studied to find the best compromise to allow an optimal mission. An inspection process carried out at a constant distance from the target of 150m is discussed in the paper. To ensure a high inspections rate (>16/year) over a long lifetime (>20 years) while remaining light, ARGOS benefits from an in-orbit refueling capability with a dedicated geostationary platform.