

## **Preliminary design of a laser retroreflector payload for the MARTINLARA mission**

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The MARTINLARA Program is a Research Project financed by the Government of the Community of Madrid. Its main objective is the design of a demonstration space mission in orbit, and the development of a nanosatellite platform for airborne validations as well as several technologies to be airborne validated, namely radio astronomy and earth observation instrumentation, space photonics and plasma micropropulsion. Among its five main goals, the one for the demonstration of several functional space oriented technologies includes onboard retroreflectors acting as the space segment of a SLR system.

Both the definition of the mission orbit and the platform are activities still in progress. With respect to the orbit, the current baseline is a down-dusk orbit of altitudes in the range 400-500 km. Regarding the platform concept, a 12U CubeSat nanosatellite has been chosen as baseline.

A first version of the preliminary design of this payload based on retroreflectors has been generated. Its main objective is to provide the necessary preliminary information to evaluate its integrability in the platform, mainly due to its impact on the mass budget, volume/area allocation and elimination of any physical or functional interference with the rest of the payloads. The final version of the preliminary design will be carried out at a later stage, once the platform design is closed.

Three payload concepts have been proposed, each for a different application: precise orbit determination (POD), satellite attitude determination, and space debris tracking. The possibility of overlapping some of them has also been considered. For some, development models have been manufactured and a dedicated optical test bench has been outlined to verify their performance.

The mission, platform design and preliminary design of this payload as well as its location on the platform will be described in this contribution.