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3.7 MORAL: Alt-Azimuth one meter class mount for SLR

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MORAL, MOunt Robotic ALt-azimuth , is a project led by N.P.C. New Production Concept S.r.l. in collaboration with the University of Rome "La Sapienza". The system is a 1 m class telescope mount conceived to offer an high quality and affordable solution for space debris monitoring having its strength in fast and precise pointing and tracking capabilities. A distance between plates of approximately 1350 mm permits to host 1 m class telescopes up to 1000 Kg weight.

MORAL is a suitable solution for SLR thanks to the presence of a hollow structure and through hole shafts on both axes that permit the identification of multiple light paths to project laser (Coudé path configuration option).

Innovative technologies has been exploited to determine the motion units and sensors configuration to be compliant with the design drives: absolute encoders with a resolution of 0.0024 Arcsec and the high torques provided by two direct drive motors are the key technologies to achieve the high level of performances in terms of accuracy and velocity.

The mechanical design is also an innovative aspect of the product: aerospace methodology has been used to optimize dynamic behavior of the structure reducing possible pointing errors due to vibration during operations, reaching therefore a first frequency mode of 25Hz. In parallel an important research has been conducted in order to define an innovative methodology in manufacturing procedure in order to obtain the required level of accuracy on each part to be assembled.

MORAL is based on the use of first quality commercial components and manufactured parts: the result is a flexible solution with high level of modularity that permit easy customization as well as handling and inspection of each component without the need of a full disassembly of the mount: this constitutes an important feature also considering applications in harsh accessible locations.

The aerospace approach merges with the industrial methodology of lean production, offering high quality with low costs also in terms of maintenance. The first prototype has been assembled within facilities of NPC and is currently undergoing testing phase.