PROVIDENCE: toward a 2.5m adaptive telescope for Optical Space Domain Awareness (but not only …)

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ABSTRACT

Optical Space Domain Awareness (SDA) aims to provide high-quality angular (and possibly spectral/polarimetric) information on LEO and GEO satellites for object characterization and identification. In terms of spatial resolution, the goal is to achieve decimetric resolution for low-Earth orbit and decametric resolution for geostationary orbit (in order to monitor the satellites' immediate environment). This ambitious objective can only be achieved by combining a large telescope, a dedicated AO system optimized for the specific characteristics of SDA, differential imaging capabilities and post-processing techniques ranging from Point Spread Function estimation to data fusion, including multi-frame deconvolution. We will present an overview of the key ingredients required to achieve an efficient and operational system and the status of ONERA's new project called PROVIDENCE. It is based on a 2.5 m adaptive optics telescope optimized for SDA activities. It will be installed at Observatoire de Haute Provence (in south of France) and should see its first light at the end of 2028.

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