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# MICADO SCAO: to be or not to be... in MAIT

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## Abstract

MICADO is the ELT first light instrument, an imager working at the diffraction limit of the telescope thanks to two adaptive optics (AO) modes: a single conjugate one (SCAO), available at the instrument first light and developed by the MICADO consortium, and a multi conjugate one (MCAO), developed by the MORFEO consortium.

The MICADO project started the final design review process two years ago, in Feb. 2021, and has been through four successive review sessions since then, covering the different MICADO subsystems, including the SCAO module. This final design review process should come to an end this year in 2023, allowing to enter into the manufacturing, assembly, integration and tests phase.

Though, without waiting for the issue of the full review, manufacturing, integration and related tests have actually already started for several SCAO subsystems, first in order to validate the design of several parts by prototyping at "full scale", and second to avoid a loss of motivation of people being involved for a long time only on paper studies. This strategy hence allows to optimize the project resources and to save time on the planning. It concerns its K-mirror (allowing to compensate for the pupil derotation), its "WFS core" (i.e. the pyramid optical component, the WFS camera and the pupil imaging lenses that compensate for

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the axial pupil movements), its field selector, its modulation system, its real-time computer, its instrument control software, but also more basically its various motors. This contribution will present the requirements of these subsystems and their on-going prototyping, focusing on the encountered difficulties but also on the test results, very encouraging for the MAIT of the full SCAO. We also received from ESO the authorization to order in advance the project long-lead items, i.e. for the SCAO its optics. Hence the SCAO dichroic blank (a 300 mm CaF<sub>2</sub> plate) is already ordered and all the SCAO optics (14 optical subsystems) are about to be. Details will be given about these optics, the strategy followed for their supply and the lessons learnt from their ordering.

This contribution will finish by presenting the next steps in the SCAO MAIT plan, i.e. the MAIT phase while being still in France at Observatoire de Paris before shipping SCAO to Germany for MICADO system integration.

**Keywords:** MICADO, SCAO, MAIT