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ATLAS-Teide: the next generation of ATLAS units at Teide Observatory

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Keywords: *NEO, discovery.*

ABSTRACT

In this work we present the design of the ATLAS (Asteroid Terrestrial-impact Last Alert System) unit that will be installed by the Instituto de Astrofísica de Canarias (IAC) at Teide Observatory in Tenerife island (TO, Spain) and the first results of the prototype unit installed at the TO late November 2022. ATLAS-Teide will be operated as part of the ATLAS network in the framework of an operation and science

exploitation agreement between the IAC and the ATLAS team at University of Hawaii.

ATLAS is an asteroid impact early warning system developed by the University of Hawaii and funded by NASA. It consists of four telescopes (Hawaii ×2, Chile and South Africa). Each ATLAS unit maps ¼ of the night sky making 4 observations of each field at hourly intervals, reaching the detection of V=19.5 with the aim of detecting small (~20 m) asteroids in impact trajectories several days before the impact, and a 100 m asteroid several weeks before. In its current setup, an ATLAS unit consist of a 50cm Wright-Schmidt telescope and a CCD camera capable of imaging 30 deg^2 in a single shot.

ATLAS-Teide setup is completely different. It will be the first ATLAS unit based on COTS. Its design is modular, each module ("building block") consist of four Celestron RASA 11 telescopes that point to the same sky field, equipped with QHY600PRO CMOS cameras on a equatorial Direct Drive mount. Each module is equivalent to a 56cm effective diameter telescope and provides a 7.5 deg2 field of view and a 1.25 "/pix plate scale. ATLAS-Teide will consist of four ATLAS modules in a roll-off roof building. This configuration allows to cover the same sky area of the actual ATLAS telescopes. This design is cheaper to build and maintain, and more flexible than the actual one allowing, e.g. to point all modules to the same field (resulting in an effective aperture equivalent of a 1.1m telescope) allowing to detect fainter NEOs, or use much shorter exposure times and different detection techniques (e.g. track and stack) allowing to better detect very fast NEOs.
The first ATLAS prototype module is in commissioning since late November 2022, and will be used to do all the software developments and test for the new ATLAS. First results show that it is well above the expectations and requirements. The aim is to complete the four modules of ATLAS-Teide by the end of 2023 beginning of 2024.

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