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THE NEOROCKS “RAPID-RESPONSE EXPERIMENT”

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ABSTRACT

The “NEO Rapid Observation, Characterization and Key Simulations” (NEOROCKS) project is funded by the EU H2020 programme with the aim to improve our knowledge on the characterization of the Near Earth Object (NEO) population. The project connects expertise in performing observations of solar system small bodies and the related modeling needed to derive their dynamical and physical properties, to the pragmatic planetary defense approach. A specific challenge for NEOROCKS is to keep the physical characterization up with the increasing NEO discoveries dominated by small-size objects, yet capable of producing damage in case of impact. Among them are the so-called “imminent impactors” characterized by short warning times before impact.

Therefore, one of the ambitions of NEOROCKS is the organization of a “rapid response experiment”, in order to put to test our ability to face the imminent impactor threat by resorting to existing assets. This implies to be able to react promptly when a potential object of this kind appears on the MPC NEO Confirmation Page, tasking astrometric follow-up for improving orbit determination and triggering the Consortium telescope network for physical characterization. Particular care has been taken to reduce as much as possible human intervention by resorting to remote telescope tasking procedures and fast data dissemination techniques.

In Spring 2022 the “detect-and-characterize” chain described above has been successfully implemented thanks to the experience of the NEOROCKS Consortium Partners in NEO and Space Debris monitoring as well as in accessing upon short notice large-aperture telescopes equipped with state-of-the-art instrumentation. In particular, we obtained light-curve and spectro-photometric data of several imminent impactor candidates using the 3.6-m INAF-TNG (Telescopio Nazionale Galileo, Canary Islands) and other facilities, thus demonstrating the feasibility of our approach. The details and results of such experiment will be presented and discussed in the wider context of the actions needed to set-up an operational rapid response system for civil protection purposes.

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