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**Near-Earth Object (NEO) Discovery**

# NEOMIR: A SPACE-BASED INFRARED MISSION FOR NEO DETECTION, CHARACTERISATION AND EARLY WARNING

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## ABSTRACT

Most current and planned NEO surveys are ground-based and carried out in the visible wavelength range. However, this approach has some limitations, such as (1) weather dependency, (2) that only a portion of the night sky is visible from any given location on Earth, (3) NEOs are difficult to detect at low galactic latitudes and (4) that visible-light surveys can only determine the motion and apparent magnitude of an object, but its physical properties (such as size) can only be inferred indirectly and therefore require additional observations for characterisation.

The first two points can be overcome by having, for example, a network of telescopes deployed in various locations of the planet. However, there is an intrinsic limitation to observing at very low solar elongations, which prevents the detection of potential impactors coming from the direction of the Sun (as in the case of the Chelabinsk bolide). Additionally, accurate assessment of the impact risk requires knowledge of the size, which in turn requires additional albedo measurements.

The presentation will describe NEOMIR (NEO Mission in the Infra-Red), a space-based mission operating in the thermal infrared and placed in the Sun-Earth Lagrange point (L1) currently being studied by ESA and European industry.

The main objective of NEOMIR is to detect and characterise objects of at least 40 m (i.e. similar to the Tunguska event) coming from the region inside the Earth's orbit and with sufficient warning time to prepare appropriate mitigation measures. This is achieved by regularly scanning an area not accessible by ground or other space-based NEO surveys. The thermal infrared data will allow both initial orbit assessment and direct size measurements. We will present initial results on how to optimise the survey in order to increase its ability to detect possible Earth impactors.

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