

Characterization of Near-Earth Objects via polarimetry, astrometry and photometry aided by state-of-the-art tooling for data analysis in the Big Data era. Agnieszka Sybilska¹, Stanisław Kozłowski², Agnieszka Słowikowska^{3,1}, Piotr Sybilski⁴ Andy Shearer⁵ ¹*Baltic Institute of Technology, Al. Zwycięstwa 96/98, 81-451 Gdynia, Poland, a.sybilska@baltech-gdynia.pl,* ²*Cilium Engineering Sp. z o.o., ul. Łokietka 5, 87-100 Toruń, Poland, s.kozlowski@cilium.pl,* ³*Centre for Astronomy, Faculty of Physics, Astronomy and Informatics, Nicolaus Copernicus University in Toruń, Grudziadzka 5, 87-100 Toruń, Poland, aga@umk.pl,* ⁴*Sybilla Technologies Sp. z o.o., Ul. Toruńska 59/004, 85-023 Bydgoszcz, Poland, sybilski@sybillatechnologies.com,* ⁵*National University of Ireland Galway, University Road, Galway, Ireland H91 TK33, andy.shearer@nuigalway.ie.*

We will present the status of the NEOPol project whose goal is to build and validate a prototype polarimeter for Near Earth Object (NEO) observations, together with a dedicated automated pipeline for polarimetric data processing and a web service for data storage and visualization. When it comes to the assessment of asteroid physical properties, polarimetry is one of the most effective tools to measure their albedo (and from that - spectral type, i.e. composition). It also allows, coupled with photometric measurements, to determine effective diameters of asteroids, which is crucial e.g. for assessing the effect of a potential collision with the Earth or future exploitation of raw materials. The outcome of the project will be 1) a polarimeter dedicated to NEO observations, 2) one adapter to a prospective telescope interface where the instrument will be mounted, 3) data processing chain to reduce and analyze the data from the polarimeter, 4) a web service for data storage, reduction, visualization and results browsing, 5) desktop UI for polarimeter's CCD camera and polarimeter sensory data. The NEOPol project will reach its Critical Design Review in Jan 2020. The instrument will first be tested at the Piwnice Observatory in Poland and it will subsequently be relocated to the Observatorio del Teide in Tenerife, Spain, for a test campaign at the European Space Agency's Optical Ground Station 1.0m telescope. Once commissioned, the system will be a unique asset to NEO studies providing an efficient way of polarimetric data acquisition and analysis, with the dedicated DPC adaptable to other similar instruments.