Around 1500 near-Earth-asteroid orbits improved via EURONEAR

O. Vaduvescu[1,2,3], L. Hudin[4], M. Birlan[2], M. Popescu[5,2], A. Tudorica[6], and R. Toma[7,3]

[1]Isaac Newton Group, Spain (ING, UK+SP+NL)
[2]IMCCE, CNRS UMR 8028, Observatoire de Paris, France
[3]The Romanian Society for Meteors and Astronomy (SARM), Romania
[4]ROASTERR-1, Romania
[5]The Astronomical Institute of the Romanian Academy (AIRA)
[6]Argelander Institute for Astronomy, Bonn University, Germany
[7]Armagh Observatory, Northern Ireland, UK

Born in 2006 in Paris, the European Near Earth Asteroids Research project (EURONEAR, euronear.imcce.fr) aims "to study NEAs and PHAs using existing telescopes available to its network and hopefully in the future some automated dedicated 1–2 m facilities". Although we believe the first aim is fulfilled, the second was not achieved yet, requiring serious commitment from the European NEA researchers and funding agencies.

Mainly using free labor by about 30 students and amateur astronomers (from Romania, Chile, UK, France, etc), the PI backed up by his associates M. Birlan (IMCCE Paris) and J. Licandro (IAC Tenerife) and a few other astronomers of the EURONEAR network having access to a few telescopes are approaching around 1,500 observed NEAs whose orbits were improved based on our astrometric contributions.

To achive this milestone, we used two main resources and a total of 15 facilities: i) Observing time obtained at 11 professional 1–4 m class telescopes (Chile, La Palma, France, Germany) plus 3 smaller 30–50 cm educational/public outreach telescopes (Romania and Germany) adding about 1,000 observed NEAs; and ii) astrometry obtained from data mining of 4 major image archives (ESO/MPG WFI, INT WFC, CFHTLS Megacam and Subaru SuprimeCam) adding about 500 NEAs recovered in archival images.

Among the highlights, about 100 NEAs, PHAs and VIs were observed, recovered or precovered in archives at their second opposition (up to about 15 years away from discovery) or have their orbital arc much extended, and a few VIs and PHAs were eliminated. Incidentally, about 15,000 positions of almost 2,000 known MBAs were reported (mostly in the INT, ESO/MPG and Blanco large fields). About 40 new (one night) NEO candidates and more than 2,000 (one night) unknown MBAs were reported, including about 150 MBAs credited as EURONEAR discoveries. Based on the INT and Blanco data we derived some statistics about the MBA and NEA population observable with 2m and 4m telescopes, proposing a model to rate the NEO candidates observed close to opposition. Based on this work, 10 papers and around 100 MPC circulars were published since 2006.