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**NEO FOLLOW-UP, RECOVERY AND PRECOVERY CAMPAIGNS
AT THE ESA NEO COORDINATION CENTRE**

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ABSTRACT

Follow-up observations are one of the most fundamental components of the NEO observational process, essential to prevent newly discovered objects from becoming lost.

As of the end of 2014, approximately 11000 NEOs are known, and about 450 of them are considered Virtual Impactors (VIs), having non-zero probability for an impact with Earth in the next century. However, a large fraction of these VIs (~90%) are currently considered lost; their orbits are not known well enough to constrain their position in the sky at the next apparition to a level sufficient to obtain new observations. Therefore, the estimate of their actual threat cannot be improved, unless they happen to be rediscovered by chance in the future.

While large scale surveys are devoted entirely to the discovery of new objects, and some specific projects are focusing on physical characterizations, up to now there has been a lack of a centralized effort to coordinate the follow-up of objects. The recently established ESA SSA NEO Coordination Centre (NEOCC) in Rome, Italy, has among its goals the coordination of a network of observatories that are being alerted when high-relevance objects need follow-up. At the same time, the Centre is directly performing astrometric observations of high-priority targets, both using its own facilities and large aperture telescopes all over the world. The Centre also

maintains the Priority List, a publically available list of NEOs in need of urgent follow-up, originally developed by the Spaceguard Consortium and now hosted on the SSA portal: <http://neo.ssa.esa.int/web/guest/priority-list>.

We will present the results of our observational campaigns, both developed through cooperating partners and directly managed by the NEOCC.

Our most accessible resource is the 1.0-meter ESA OGS telescope in Tenerife, which we routinely use to follow-up and recover NEOs, for about 4 nights per month. The telescope is also used for survey activities, which led to the discovery of a few NEOs in 2014, including 2014 QN266, a small VI in an accessible Earth-like orbit.

In addition to the OGS, we established a very fruitful collaboration with ESO to observe faint VIs, down to magnitude ~ 26 , with the 8.2-meter Very Large Telescope on Cerro Paranal. In 2014 we observed over a dozen VIs, most of which were removed from the risk list thanks to our observations.

We will also discuss the initial results of a new collaboration with the 8.4-meter Large Binocular Telescope, with the support of INAF, one of the main partners of the telescope. LBT, with its twin wide-field cameras and large aperture, is the ideal instrument to recover large-uncertainty NEOs, as evidenced by our detections of 2014 KC46 in October 2014, at $V \sim 26.3$.

Finally, we will present a few interesting cases of archival precovery observations of VIs, and our future plans to develop an ESA-based archive of astronomical images from collaborating observatories.
