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☐ **Impact Consequences**
☐ **Disaster Response**
☐ **Decision to Act**
☐ **Public Education & Communication**

Planetary defence activities at the European Space Agency

Rüdiger Jehn[(1)], **Detlef Koschny**[(2) (3)]

[(1)]*ESA/ESOC, Robert-Bosch Strasse 5, D-64293 Darmstadt, Germany*
[(2)]*ESA/ESTEC, Keplerlaan 1, NL-2201 AZ Noordwijk ZH, The Netherlands, detlef.koschny@esa.int*
[(3)]*LRT / TU Munich, Boltzmannstrasse 15, D-85748 Garching, Germany*

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ABSTRACT

ESA is preparing an ambitious Space Safety programme for which it seeks approval at the next ministerial council in 2019 called Space19+ It encompasses space weather, space debris, clean space and planetary defence. In a preparatory step, the Planetary Defence Office was founded on 1 October 2018. This paper will summarise the main tasks of this office.

The first pillar comprises sky survey, asteroid detection and follow-ups. As of today the Optical Ground Station (a 1-m telescope in Tenerife) is the major optical facility used by ESA for asteroid survey and follow-ups. It is available 4 nights around new Moon. A 56-cm test-bed telescope (TBT) in Madrid is not yet fully operational, and a twin TBT is currently shipped to la Silla in Chile. However, ESA is also sponsoring other national telescopes in Europe, like the CLET in the Czech Republic. In a few years the so-called flyeye telescope shall be deployed in Sicily, Italy. It shall have a limiting magnitude of 21.5 and a field-of-view of 45 square degrees.

The second pillar comprises orbit determination, impact risk calculation and data provision. The NEODyS software developed at the university of Pisa is currently migrated to our NEO coordination centre (NEOCC) at ESRIN (Frascati, Italy). It consists of an orbit

determination tool that runs hourly scripts to continuously digest new observations from the Minor Planet Center, and of an impact monitoring tool, that calculates the impact risk of potential impactors typically for the next 100 years. A more detailed description of the NEOCC will be given in a separate paper.

The third pillar covers all possible mitigation options. A fireball camera is being developed, an impacts database and impact simulation tool is built and deflection techniques are investigated. If the funding is secured a spacecraft called HERA will be sent to Didymoon to observe the crater which was caused by the impact of DART. HERA is currently in Phase B1 with the system requirements review as the next coming milestone in this summer.

Finally a workshop with national civil protection authorities is planned to implement the guidelines developed by IAWN and SMPAG.