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NEODyS services migration to ESA's NEO Coordination Centre: the effort and the improvements

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ABSTRACT

During the last ten years ESA has started the so-called Space Situational Awareness (SSA) programme, which aims to be aware of and mitigate the hazard coming from space, being it of natural or artificial kind. In this framework, the NEO segment of the SSA programme, dedicated to the problem arising from Near Earth Objects in possible route of collision with the Earth, plays an important role.

Since 1999, the only service in Europe able to provide on a daily basis the service of Impact Monitoring is NEODyS (NEO Dynamics Site), based at the University of Pisa and led by the late Prof. Andrea Milani. Therefore, it was a natural process to start the migration of NEODyS to ESA, in particular considering that the continuation of such an important service might not be guaranteed inside a university environment.

Since 2011, SpaceDyS, a spin-off of Milani's team, started to collaborate with ESA in the process of the NEODyS migration, from the precursor services provided to the NEO Coordination Centre (NEOCC) to the fully operational system.

This talk will summarize all the steps, which are bringing the NEODyS system to a new generation. The process has involved a complete rewriting of the code, called AstOD, using state of the art Fortran standards and improved algorithms.

In particular, we will point out:

- the effort to engineer the software according to the ECSS standards;
- the NEODyS legacy;
- the new improvements of the system regarding the orbit determination process and the impact monitoring.

Finally, we will outline possible improvements of the Impact Monitoring activities, which will maintain the cultural legacy and the level of excellence of NEODyS in view of the forthcoming developments in the field.
