

Hazards from asteroid impacts and the Space Situational Awareness programme

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1. Introduction

Asteroids are considered as potential sources for the building blocks of life on Earth. Impacts onto our planet and also other solar system objects may have affected the capabilities of bearing living organisms. A good understanding of the asteroid environment will therefore contribute to understanding habitable worlds.

2. The SSA-NEO programme

Since 2009, ESA has been building up the so-called Space Situational Awareness programme. It consists of three so-called segments: Space Weather, Space Surveillance and Tracking (of artificial space objects) and near-Earth objects. The last one - henceforth called SSA-NEO - deals with asteroids that may come close to the Earth and pose a potential impact threat. While currently focusing on understanding the impact threat onto our planet, one of the requirements stated in the Customer Requirements Document says 'The European SSA-NEO segment shall provide impact assessments (probability, location, brightness of fireball, time) for the Moon and other planets (Mercury, Venus, Mars, Jupiter, Saturn) over a time scale of 100 years'.

This presentation will give an overview of the current state of the SSA-NEO segment. The focus is on being able to collect NEO observations, compute precise orbits from the observations, propagate them 100 years into the future, and predict possible Earth impacts. The segment is building up capabilities to observe and discover new solar system objects by developing a 'NEO Survey Telescope'. It is also extending its capabilities to determine and archive their physical properties of asteroids.

These activities make the SSA-NEO segment an interesting data source for studying habitability issues in our solar system and beyond.

Short Summary

This presentation describes how the SSA-NEO segment can contribute to better understanding asteroids and other solar system bodies as habitable worlds.