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# Space missions for characterisation and deflection of NEOs

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## Résumé

Near-Earth Objects (NEOs) are of particular interest for planetary science, for in space resource (ISRU), and they are the main subject of planetary defence.

Two kind of space missions are useful to characterise NEOs. One as observatory platform, for detection and characterising the population as a whole, and another type as interplanetary mission of in-depth characterisation of a specific target.

Mitigation measure - in particular deflection by space mission - needs to have some deep knowledge of the impacting target.

We will present the principles of mitigation by space mission and different techniques in development.

In case of a deflection mission, reconnaissance missions to the threatening NEO are generally required, before any action for mitigation in space, or possibly for measures on Earth. These are needed to have an in-depth vision of the hazardous object, and so derive the best scenario and approach for mitigation (as for instance kinetic impactor, or gravitational tractor). One of the main parameter to characterise such object - and the effect of an impact on Earth, as well as the mitigation process and technologies to adopt, is the total mass and internal structure. Indeed, given the mass of the target, the impact and entry into the Earth atmosphere are varying considerably. Besides, most mitigation space missions – including the gravity tractor - also need to have a good knowledge of the total mass of the threatening NEO (be it a single body, binary, or multiple system). Moreover, kinetic impactor also needs more inputs on the surface and global structure of the NEO. Such interplanetary space mission can make use of classical instrumentations, and additional landing platforms and nano-orbiters.

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