The main goal of NEO-MAPP is to provide:

Significant advances in both our understanding of the response of NEOs to external forces (in particular a kinetic impact or a close planetary approach), and in the associated measurements by a spacecraft (including those necessary for the physical and dynamical characterization in general).
Kick-off on Feb. 6, 2020  
Duration 3 years:  
Budget: 4 Millions Euros

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<th>Participant no.</th>
<th>Participant organisation name</th>
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<td>1 (CO)</td>
<td>Centre National de la Recherche Scientifique</td>
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<td>France</td>
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</tbody>
</table>

P.I. Patrick Michel (CNRS)
Key observables:
- Dynamical properties and their evolution
- Physical properties and their evolution

Technological capabilities:
- Definition of operational concepts
  - Instrument identification
  - Definition of instrument requirements
  - Increase instrument maturity
  - Demonstrate data processing techniques

Modelling capabilities:
- Predicting the current physical and dynamical states of NEOs
- Predicting and understanding the response of NEOs to external forces (impactor, gravitational)
- Interpretation of observations and data products

(Requires two parallel and inter-dependent approaches)
**Figure 3:** NEO-MAPP timeline in the context of ongoing NEO missions and DART impact.
Development of instruments, technologies and associated data exploitation models in support of missions to NEOs

WP 1
Project Coordination and Management

WP 2
Reference Mission Definition

WP 3
Impact Modelling

WP 4
Dynamics Modelling

WP 5
Physical Modelling

WP 6
Payload H/W Developments

WP 7
Exploitation of scientific & technical data

WP 8
CubeSat μLander technology

WP 9
Dissemination of results and public outreach

Maturation or adaptation to specific use cases of existing modelling capabilities
Advisory Board

Ian Carnelli (ESA)  Michael Küppers (ESA)  Aurélie Moussi (CNES)

Makoto Yoshikawa (JAXA)

Andy Cheng (APL)  Paul Abell (NASA)

Brian May (Queen!)
In the framework of Reference Missions to be defined at the beginning of the project (now that Hera has been selected, the project will focus on Hera)

- **Pushing the limits of numerical modelling** of the response of NEOs to a kinetic impact, as well as of their physical and dynamical properties while maturing European modelling capabilities linked to planetary defence and NEO exploration.
- **Increasing the maturity of multiple spaceborn and landed European instruments** directly related to planetary defence, focusing on measurements of surface, shallow sub-surface and interior properties of NEOs.
- **Developing algorithms and simulators** to prepare for close-proximity operations and payload data analyses and exploitation.
- **Developing innovative and synergetic measurement and data-analysis strategies** that combine multiple payloads, to ensure optimal data exploitation for NEO missions.
- **Developing and validating robust GNC strategies and technologies** enabling surface interaction and direct response measurements performed by Cubesat or small/micro-lander (μLander) architectures.