Image credits: ESA Space in Images – 2015 – Hera in orbit

SMPAG ASI Delegation – NEA related activities

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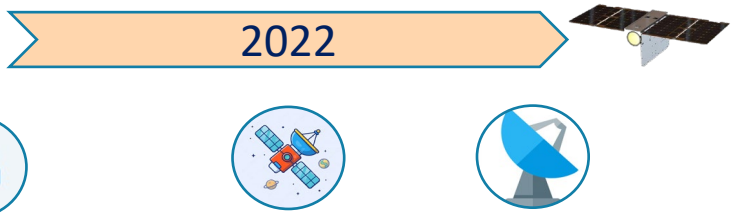
ASI delegation

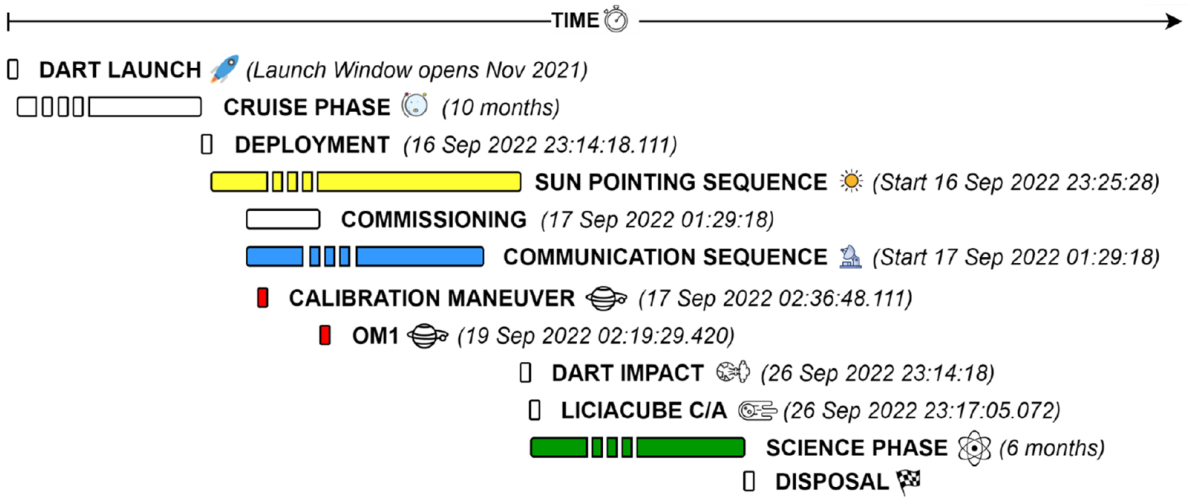
Space Mission Planning Advisory Group, 10/02/2022

LiciaCube

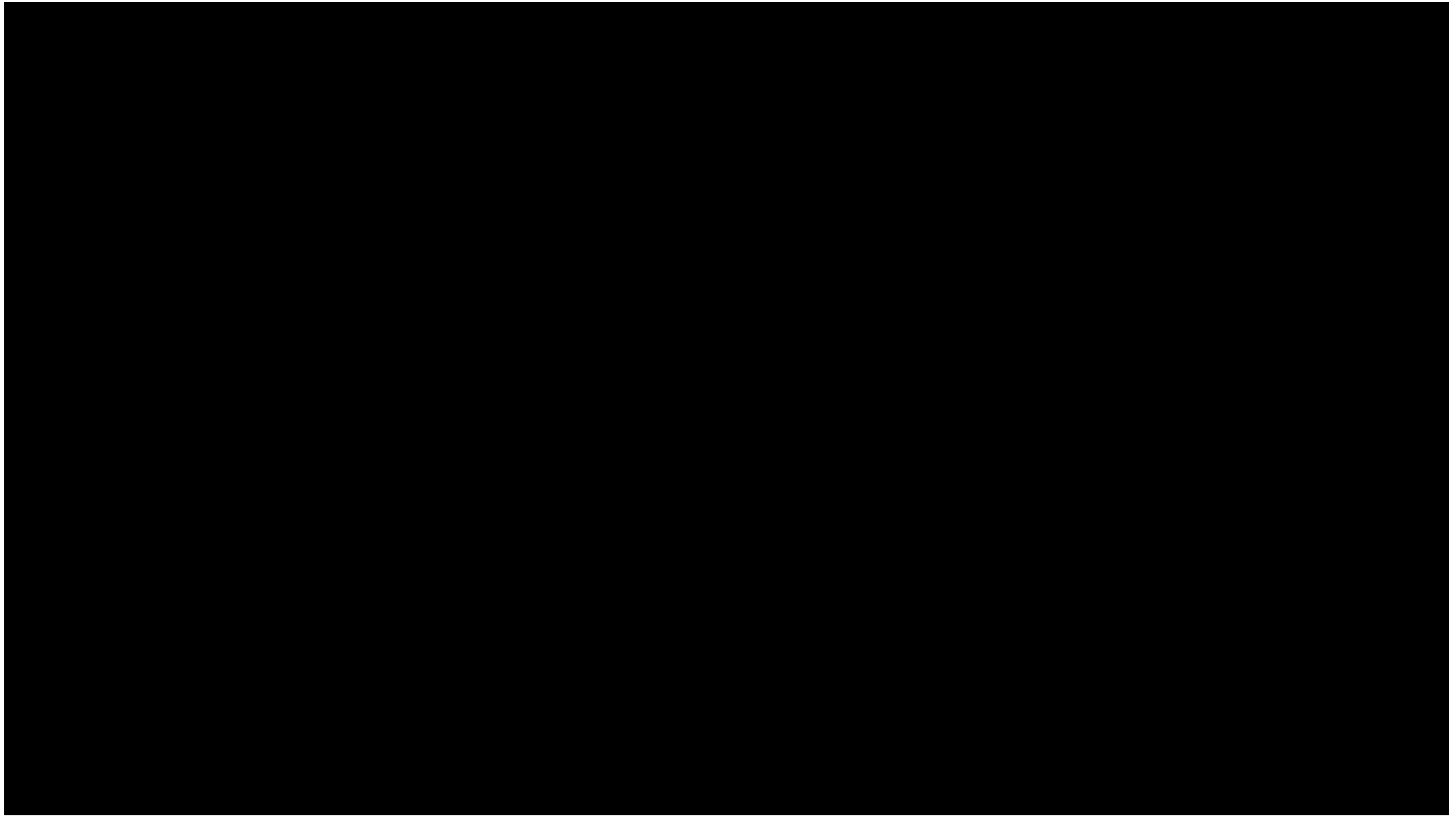
Light Italian Cubesat for Imaging of Asteroids

- To capture unique images of the DART impact effects:
  - Crater formation, material ejecta, debris cloud
  - Morphology characterization
- Scientific observation of the backside hemispheres of both Didymos and Dimorphos
- DTE communication (DSN- Ground Data System-MCC)
- Data archiving and processing is managed by the Space Science Data Center (SSDC) of the ASI





DART/LICIA Cube mission simulation

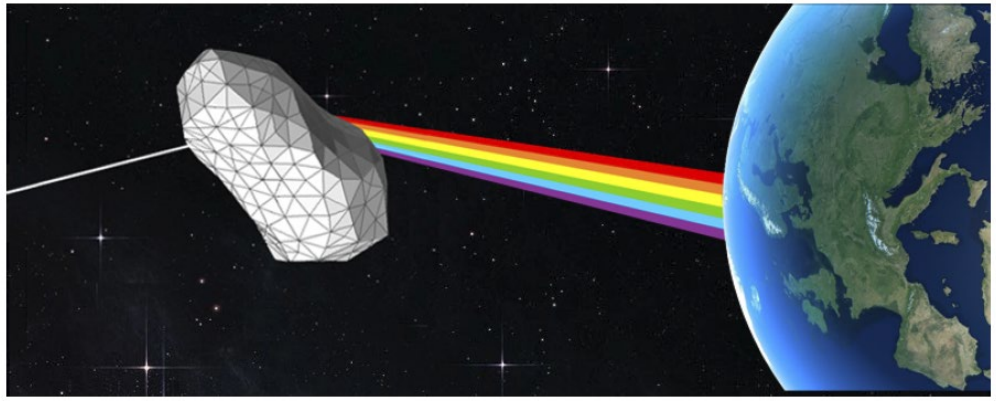


European projects

NEOROCKS-The NEO Rapid Observation, Characterization and Key Simulations

Coordinator: Istituto Nazionale di Astrofisica (INAF)

Collaborative Research Project addresses the topic c) “Improvement of our knowledge of the physical characteristics of the NEO population” of the call SU-SPACE-23-SEC-2019



https://www.neorocks.eu/

Participant No	Participant organisation name	Country
1 (Coordinator)	Istituto Nazionale di Astrofisica (INAF)	Italy
2	Agenzia Spaziale Italiana (ASI)	Italy
3	University of Padova (UniPD)	Italy
4	LESIA-Observatoire de Paris (ObsPM)	France
5	Observatoire de la Cote d’Azur (OCA)	France
6	University of Edinburgh (UoE)	UK
7	Astronomical Institute of the Czech Academy of Sciences (CAS)	Czech Republic
8	Instituto de Astrofisica de Canarias (IAC)	Spain
9	SpaceDyS s.r.l. (SpaceDyS)	Italy
10	DEIMOS Space s.l.u. (DMS)	Spain
11	DEIMOS Space s.r.l. (DMR)	Romania
12	DEIMOS Castilla La Mancha (DCM)	Spain
13	NeoSpace sp z.o.o (NeoSpace)	Poland
14	Resolvo Srl (Resolvo)	Italy

European projects

NEOROCKS-The NEO Rapid Observation, Characterization and Key Simulations

- NEOROCKS will address the challenge of improving our knowledge on the physical characterization of the Near Earth Objects (NEOs) population and of the implications for their origin and evolution as well as for planetary defence.
- Perform small body astronomical observations and the related modelling needed to derive their dynamical and physical properties to the pragmatic approach of planetary defence
- Improve and optimise observational activities, enhance modelling and simulation tasks, foster international coordination and speed-up response times.
- Face the increasing trend of NEO discoveries to be dominated by small-size objects in the vicinity of the Earth, yet capable to produce damages in case of impact (e.g. the so-called “imminent impactors” that allow for an extremely short warning time (hours to weeks)
- NEOROCKS has the potentiality to perpetuate the approach followed during the project and the results obtained, through the in-kind contribution of the ASI Space Science Data Centre (SSDC) in hosting the project products.

European projects

CRADLE project – Politecnico di Milano

- The CRADLE project is funded by the European Union under the Marie Skłodowska-Curie Actions, as part of the Horizon2020 programme.
  - Politecnico di Milano, JAXA

- The project aims at enabling future mission concepts for asteroids exploration and exploitation.
- Dynamics of the ejecta around the asteroids after an impact
- Devise mission strategies for asteroid collection. Can we safely collect particles orbiting around a small body?
- Preliminary design of an instrument to collect them?

https://www.cradle.polimi.it/

CRADLE
Collecting Asteroid Orbiting Samples

European projects

COMPASS project – Politecnico di Milano

- The COMPASS project funded by the European Union under the European Research Council
- Three pillars: Space debris, Orbit transfers, Mission to NEOs
  - The project aims at leveraging the interplanetary and planetary dynamics for asteroid exploitation and exploration missions
  - Swarms dynamics for asteroid gravity field determination
  - Resonant encounter dynamics and deflection of resonant asteroids
  - Planetary protection analysis
    - Deflection action considering uncertainties of the deflection action
    - Deflection action considering failures of the deflection action
    - Momentum enhancement factor

@COMPASS_ERC

www.compass.polimi.it

First SMPAG NEO threat exercise

- The Italian delegation at Italian Space Agency and Politecnico of Milano members of the Space Mission Planning Advisory Group (SMPAG) is leading the **first exercise of the SMPAG** to simulate a case of hypothetical threat caused by an asteroid. In particular, the exercise will simulate an inter-agency procedure to organise a coordinated response to an invented, albeit realistic scenario of impact threat.
- The **primary objective** will be to define the tasks required for a SMPAG coordinated response; which entity or entities would be responsible for these tasks; and the internal procedures of each SMPAG member to be proposed to the SMPAG as a response to the threat.
- A **secondary possible** objective would be to simulate and perform the actual tasks, or part of them, for the selected threat scenario. This secondary objective can be done collaboratively between contributing SMPAG members.
- The exercise will be run in 2022 with delegations and space agencies involved.

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SMPAG ASI Delegation – NEA related activities

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