



POLITECNICO
MILANO 1863



Agenzia Spaziale Italiana



European Research Council
Established by the European Commission

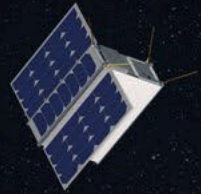
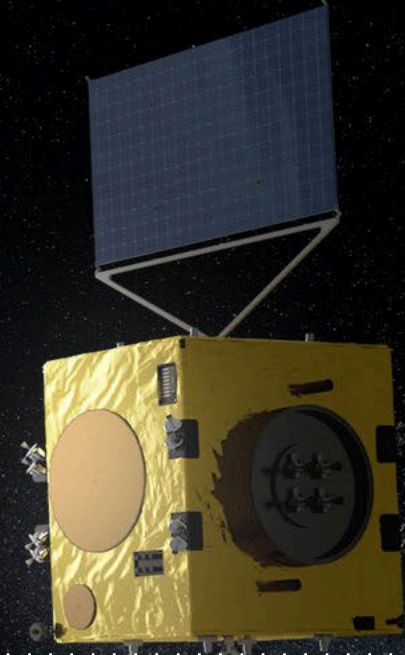


Image credits: ESA Space in Images – 2015 – Hera in orbit



Sprint #2 First SMPAG hypothetical threat exercise

Camilla Colombo, Eduardo Maria Polli, Marco Castronuovo

ASI delegation

Space Mission Planning Advisory Group, 31/01/2024

- The **first sprint** focused on the national organisation and coordination and on defining the lists of tasks to be performed in response to a real threat scenario.
- To harmonise the national (SMPAG-level) efforts into a SMPAG coordinated action this must be organised at communication level, technical level, decision level. The **second sprint** is focussing on discussing how the coordination is done among different SMPAG delegations.
- The **third sprint** will deal with communication and coordination issues within SMPAG.



POLITECNICO
MILANO 1863



Agenzia
Spaziale
Italiana



UPDATE SPRINT 1

Task 1 List the required tasks for a coordinated response to the threat.

- A non-complete list of tasks is reported here below as example. It is asked to each delegation to complete this list.
 - Refinement of risk of impact, Improved orbit determination, Trade-off of possible mission architectures and deflection strategies, Selection of the deflection strategy and eventual investigation mission, Perform mission analysis of selected mission, Perform system design of selected mission, Approval at SMPAG-member level of the proposed mission, Others...

Task 2 List the entities involved at national (SMPAG-member) level for the completion and coordination of these tasks at national (SMPAG-member) level

- List all the different entities involved at national (SMPAG-member) level for the completion of this tasks, describe how the coordination of these tasks is performed at national level.
- Explain which tasks can be performed at national level as there is internal capabilities to perform them and for which tasks there is no internal capabilities.

Task 3 Explain the internal (SMPAG-member) procedure for performing and advancing the tasks identified at Task 1 at national (SMPAG-member) level

Outcome of first sprint

- Report ready, very few comments received up to before Christmas break and implemented in the final version
- Final version will be uploaded to the SMPAG website
- Several delegations responded to the exercise
- For many delegations **a structured procedure for answer to a NEO threat is not in place yet**
- The exercise served/is serving as means of
 - Identifying the requested steps at national level
 - Started the process of survey at national level
 - Started or will start steps for definition of working group
 - Re-iteration is needed in most cases



POLITECNICO
MILANO 1863



Agenzia
Spaziale
Italiana

COMPASS



erc

UPDATE SPRINT 2

Task 4 Identify the tasks distribution among SMPAG members for a coordinated NEO response

- The tasks identified in Task 1 need to be coordinated and performed in a collaborative effort at SMPAG level. To this aim this Task will identify the tasks distribution among multiple SMPAG members for a SMPAG NEO response and will discuss how the coordination at the level of SMPAG members is achieved.

Task 5 Identify data exchange mechanics and formats

- For a fruitful collaboration the data exchange mechanics need to be defined together with the data formats. This task will be completed through a discussion at the SMPAG level.

Outcome of second sprint so far



Agenzia
Spaziale
Italiana

COMPASS



Task 4

- Monthly telecon up to now with involved delegation
- Concurrent work on report of Sprint 2
- Draft of **Task 4 “Identify the tasks distribution among SMPAG members for a coordinated NEO response”** ready, common SMPAG response.

To do

- (ASI delegation): tidy up report
- (ASI delegation): create flow diagram of recurring tasks and checkpoints
- (all delegations): revise and approve

Timeframe: Feb/March 2024

Outcome of second sprint so far



Agenzia
Spaziale
Italiana



Task 5

Regarding Task 5 “Identify data exchange mechanics and formats”

- ESA created sharepoint for data sharing

To do

- (all delegations): approve use of sharepoint so we start working there
- Proposal discussed in the last telecon and agreed (so far) by **ASI, ESA, NASA**
 - Rather than working on Task 4 in a “discussive way” we propose to understand what are the formats and the data exchange mechanism by working on a practical exercise
 - We propose to **prepare SMPAG to participate to the next PDC exercise**
 - This will give **credibility** to SMPAG as a technical committee able to give a technical response
 - Drop NEO selection made for the exercise, use the target selection by **NASA** for next PDC
- Now: Discussion and check with other delegations



POLITECNICO
MILANO 1863



Agenzia
Spaziale
Italiana

COMPASS



erc

NEXT STEPS

SMPAG coordination and communication (Sprint 3/3)



Agenzia
Spaziale
Italiana



Task 6 Define the milestone for inter-SMPAG-member coordination

- Define the milestones during the mission planning and preparation for communication and discussion within SMPAG in a real threat case
 - Define the required milestones for communication and data exchange during the response
 - Define the time schedule and milestones for coordination with other delegations
 - Define the communication channels within SMPAG
 - Define how the coordination with IAWN should be implemented
 - Recall how a decision is taken in SMPAG and propose approaches for ensuring an easy achievement of consensus within SMPAG. For example, the steering group at SMPAG coordination might be performed by the SMPAG chair.

Task 7 Define the communication lines within a real threat event

This Task will review and consolidate the communication procedure of an impact hazard at SMPAG level, in collaboration with IAWN and communicating such options to member states at COPUOS STSC.

SMPAG coordination and communication (Sprint 3/3)



Agenzia
Spaziale
Italiana



Task 8 Procedures in case of failures of the deflection action

- This task will define the procedure in case of failure of the first deflection mission achieved through the previous task. This Task will define a back-up procedure if the deflection mission fails including:
 - Asteroid/fragment re-entry coordination
 - National security coordination
 - International security coordination



POLITECNICO
MILANO 1863



Agenzia Spaziale Italiana



European Research Council
Established by the European Commission



Part of the research presented has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (grant agreement No 679086 – COMPASS)

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

First SMPAG NEO threat exercise

camilla.colombo@polimi.it

marco.castronuovo@asi.it



@COMPASS_ERC

www.compass.polimi.it

