



The “Near-Earth Space Trekker” multi-asteroid mission concept (for the ESA “Fast” launch opportunity)

Lead Proposer: DaVIDE Perna (INAF-OAR)



XV Congresso Nazionale di Scienze Planetarie
Firenze, 7 febbraio 2019

The “Fast” mission call in ESA’s Science Programme

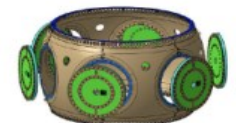
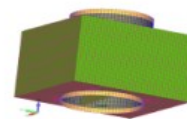
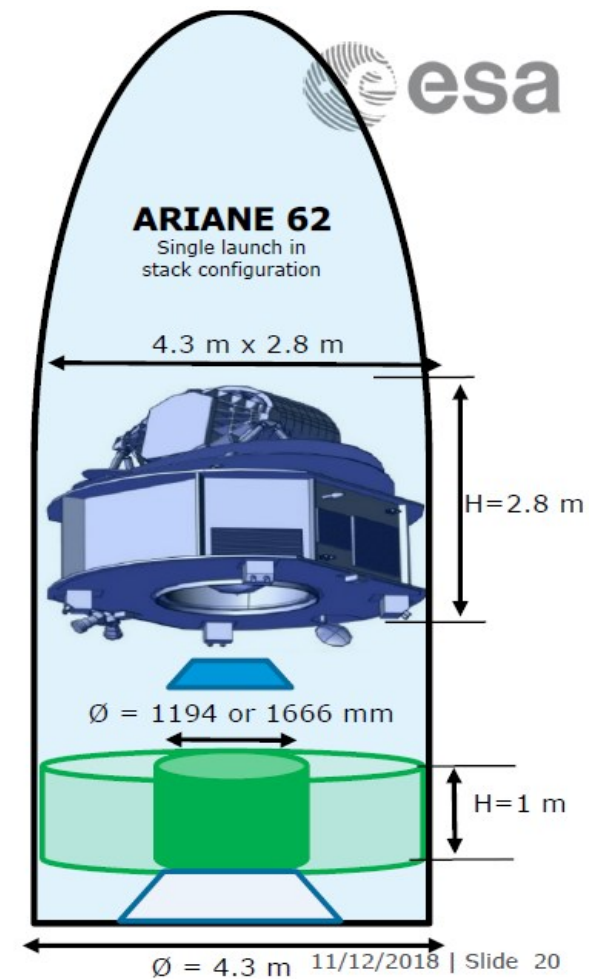
Activity	Date
Release of the Call for F mission	16 July 2018
Phase-1 proposal submission deadline	25 October 2018 – 12:00 (noon) CEST
Phase-1 proposal assessment	November 2018
Workshop for Phase-2 proposers	11 December 2018 (TBC)
Phase-2 proposal submission deadline	20 March 2019 – 12:00 (noon) CET
Letters of Endorsement deadline	10 April 2019 – 12:00 (noon) CEST
Proposal evaluation and scientific ranking	April – July 2019
Phase 0 study	July – December 2019
Selection of candidate mission	February 2020
Phase A/B industrial kick-off	September 2020
Mission adoption	November 2022
Mission CDR	June 2024
Spacecraft launch readiness	December 2027

- Launch to Sun-Earth L2 Lagrange point as a co-passenger to the ARIEL M mission
- Cap of 150 M€ to the ESA Cost at Completion (CaC)
- 6 out of 23 Phase-1 proposals recommended for Phase-2 after the technical and scientific screening by ESA

Workshop@ESTEC (11 Dic 2018)



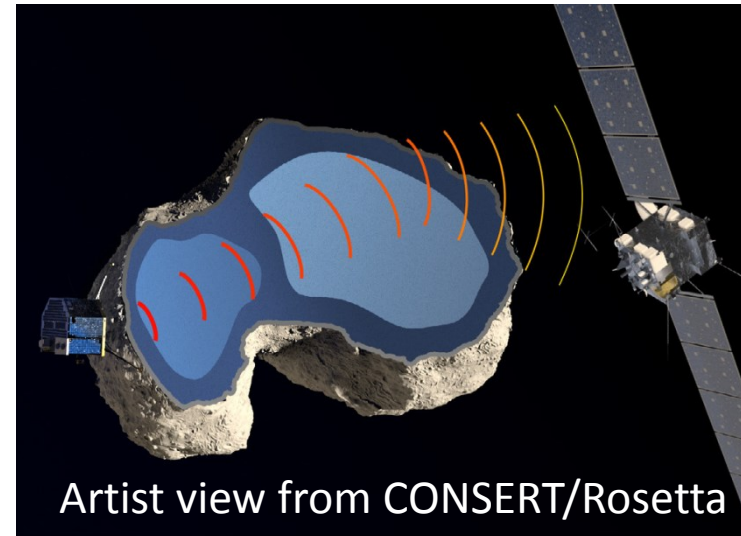
- Funding contribution by ESA (beyond the 150 M€ cap) can be envisaged for the study of nationally-provided mission elements before the Mission Adoption (Phases A/B, ≤ 2022)
- Revised mass limit due to new A62 declared performance: 1000 kg \rightarrow 850-900 kg
- Size/shape/accomodation constraints



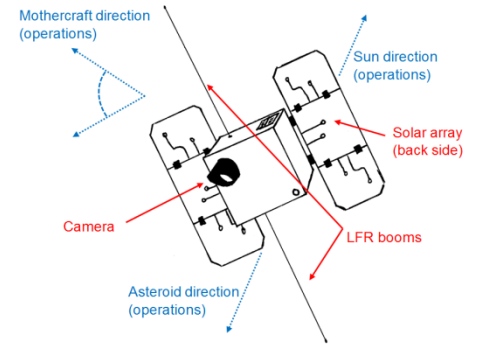
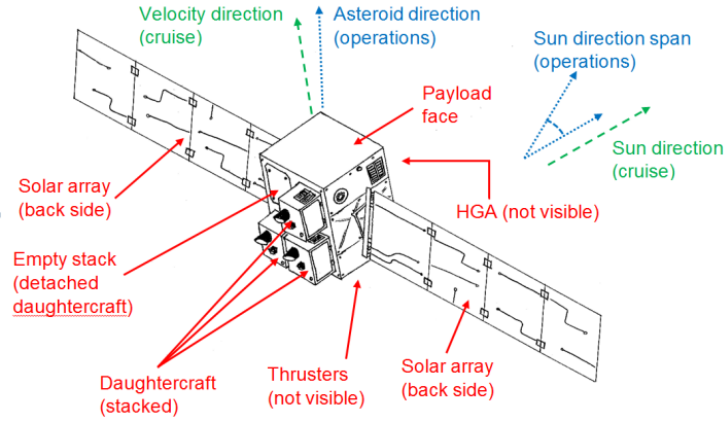
Recommended configuration for further study:
✓ Primary Structure based on a central tube and panels

NEST in a nutshell

- Rendez-vous with multiple NEAs (operations at each target: a few months)
 - Main target: Apophis (350-m “potentially hazardous asteroid”)
 - ✓ Mothercraft: HF/LF radar, camera, imaging spectrometer
 - ✓ Daughtercraft: LF radar, (micro)camera, (micro)spectrometer
 - Additional smaller targets (~ 50-100 m): 1 (baseline) or 2 (extended) [flexibility wrt launch date, propulsion specifics, mission architecture, etc.]
- Scientific goals
 - To explore the NEA population diversity
 - smallest asteroid(s) ever visited
 - First radar measurements ever to reveal the internal structure of asteroids (monolithic vs. “rubble pile”)
- Payload
 - Italian-French-Swiss consortium
 - Strong heritage, high TRL



NEST in a nutshell



Mothercraft

- Architecture & operations
- Camera
- Imaging spectrometer
- Radar HF/LF



Daughtercraft

- Architecture & operations
- (Micro)Camera
- (Micro)Spectrometer
- Radar LF



NEST in a nutshell

Core-team (12 Italian members + Lead Proposer)

Name	Main affiliation, Country
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Maria Antonietta BARUCCI	LESIA – Observatoire de Paris, France
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Website

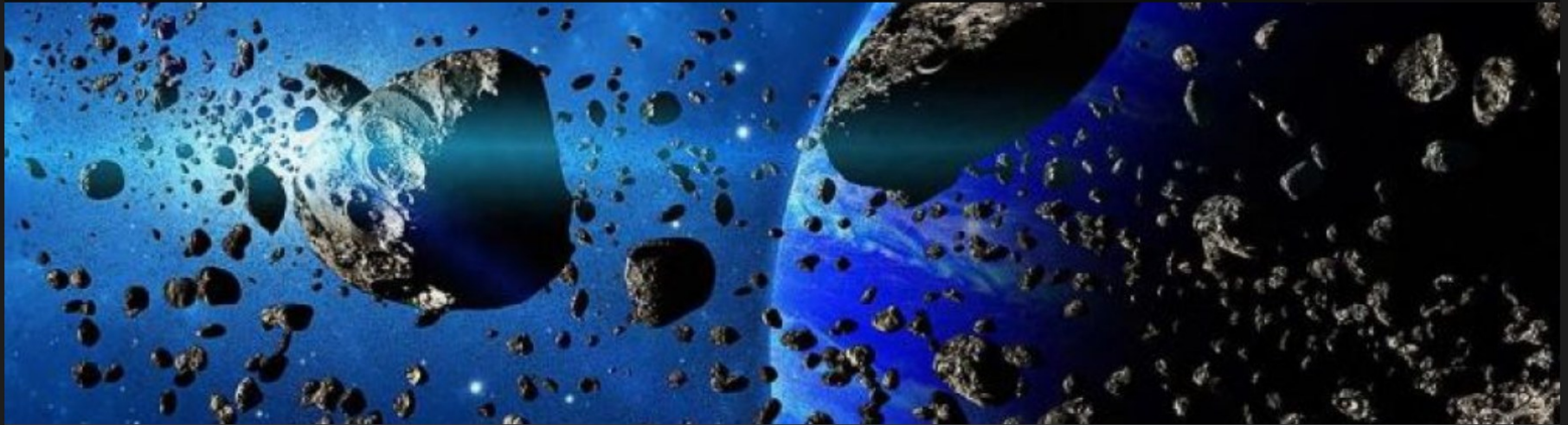
<http://www.oa-roma.inaf.it/nest/>

We need a “long & strong” list of supporters!

NEST

A Fast mission to Near Earth Asteroids

Cerca



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NEST mission community

NEST Science Goals



Horizon 2020
European Union funding
for Research & Innovation

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