

# LICIACube

the Light Italian Cubesat for Imaging of Asteroids

Elisabetta Dotto (INAF-OAR)  
on behalf of the LICIACube Team

PDC– April 2021



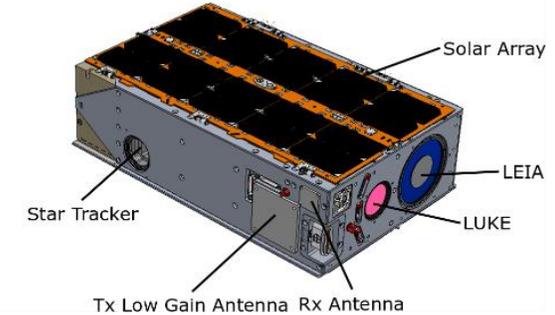
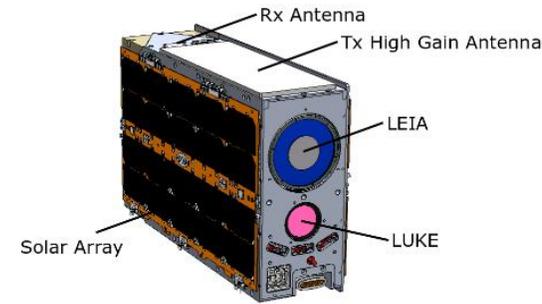
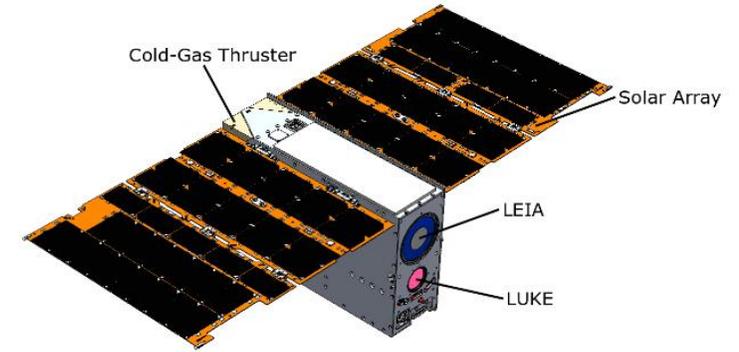
# The LICIACube team:

- INAF:** E. Dotto (*Science Team Lead*)  
V. Della Corte (*Instrument Team Lead*)  
E. Mazzotta Epifani (*WP Observations Lead*), S. Ieva, D. Perna  
J.R. Brucato (*WP Laboratory experiments Lead*), A. Meneghin, G. Poggiali  
S. Ivanovski (*WP Ejecta Lead*)  
A. Lucchetti (*WP Impact Simulation Lead*), G. Cremonese, E. Simioni  
M. Pajola (*WP Proximity Lead*)
- IFAC-CNR:** A. Rossi (*WP Dynamics Lead*)
- Politecnico Milano:** M. Lavagna (*WP Mission Analysis Lead*), A. Capannolo, G. Zanotti
- Univ. Bologna:** M. Zannoni (*WP Orbit determination Lead*), P. Tortora, D. Modenini, I. Gai
- Univ. Parthenope:** P. Palumbo, I. Bertini,
- Argotec:** V. Di Tana (*Argotec Program Manager*), S. Simonetti (*System Engineer*),  
B. Cotugno, F. Miglioretti
- ASI:** S. Pirrotta (*Program Manager*), M. Amoroso, G. Impresario,
- ASI SSCDC:** A. Zinzi (*SOC Lead*)

# LICIACube



**Orbit:** Heliocentric (~10M km from the Earth)  
**Mass:** 14 kg  
**Volume:** 6U+  
 366 mm x 239 mm x 116.2 mm (stowed)  
 911.5 mm x 366 mm x 239 mm (deployed)

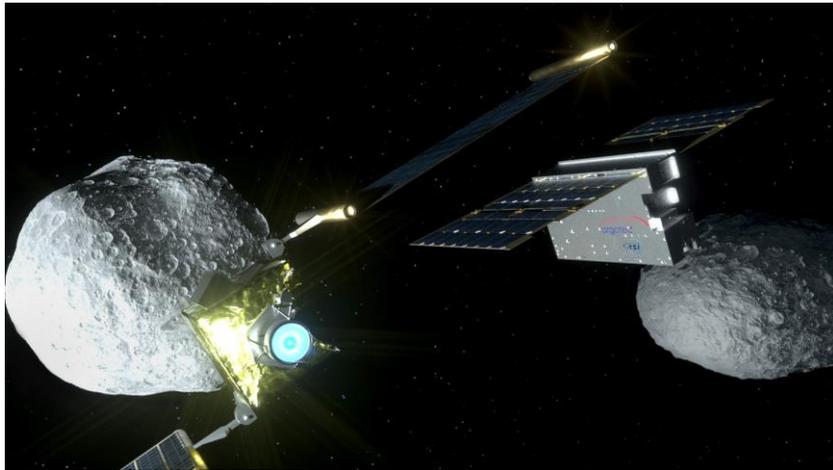


	Focal length (mm)	FoV (°)	IFoV (μrad/px)	Spat. scale at 55.2km (m/px)
<b>LEIA</b>	220	± 2.06	25	1.38
<b>LUKE</b>	70.55	±5	78	4.31

**LEIA:** a catadioptric camera  
 spatial scale at C/A (~55km) 1.38 m/px

**LUKE:** a camera with a RGB Bayer pattern filter

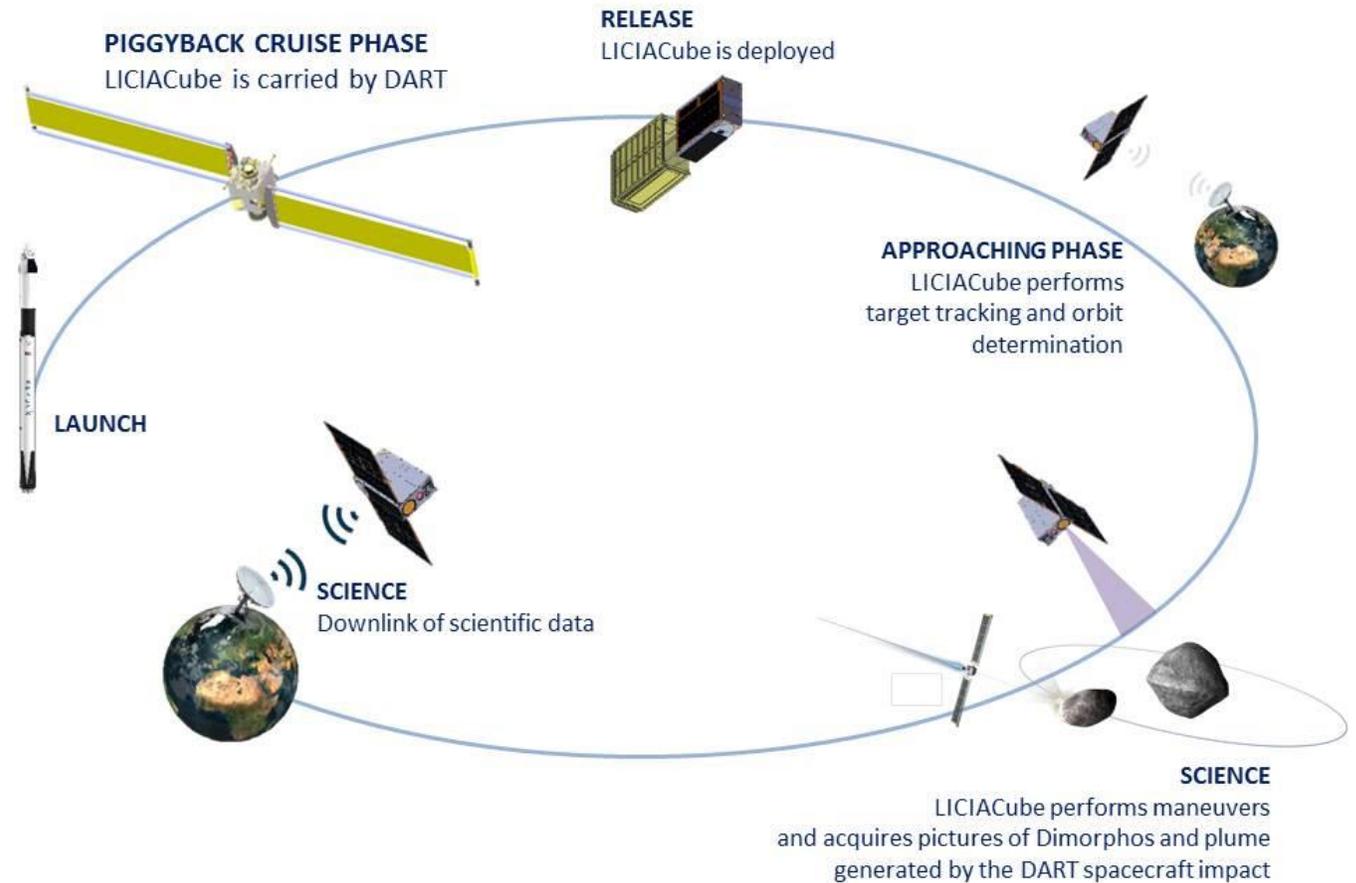
# LICIACube



LICIACube is carried by DART until close to Didymos and then released to perform a fly-by of Dimorphos after DART impact.

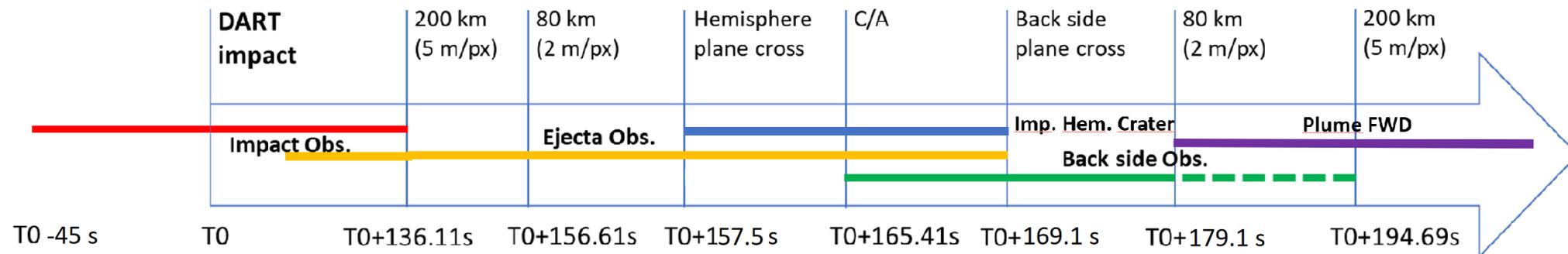
LICIACube downlinks images directly to Earth after the target fly-by.

E. Dotto and the LICIACube team



# LICIACube acquisition strategy

Phase	Start	End	LEIA	LUKE
1 – DART Impact	-45 s to T0	T0+136.11 s	yes	Not operative
2 - Ejecta Observation	-25 s to T0	T0 + 169.1 s	yes	yes
3 - High resolution (surface properties/crater) observation	T0 + 157.5 s	T0 + 169.1 s	yes	yes
4 – Non-impact hemisphere observation	T0 + 165.41s	T0 + 179.1 s	yes	yes
5 – Plume evolution in forward scattering	T0 + 179.1 s	T0 + 600 s	yes	yes



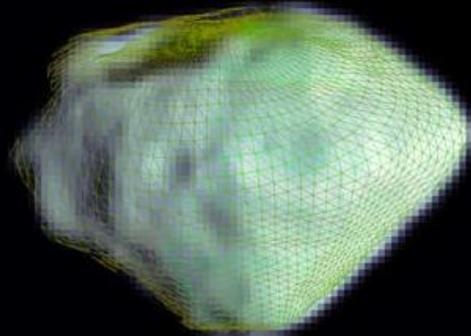
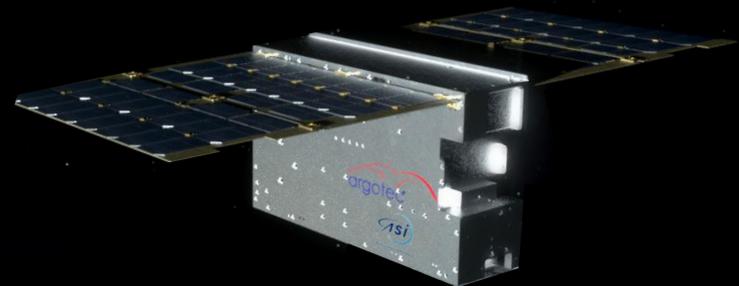
# Scientific Objectives



Plume



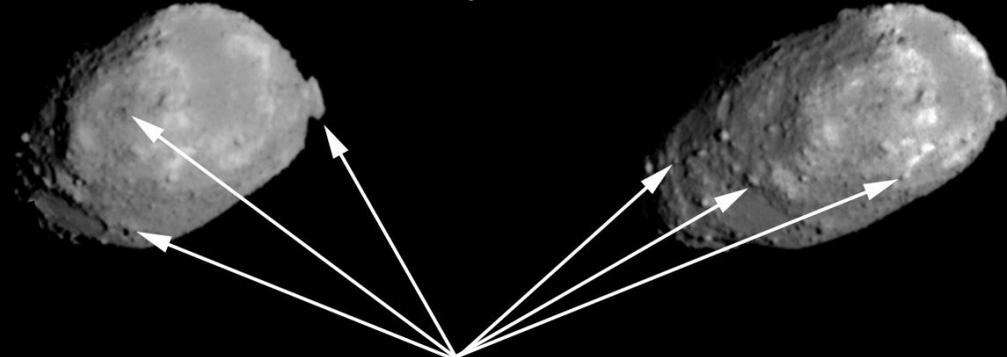
Crater



Shape and structure

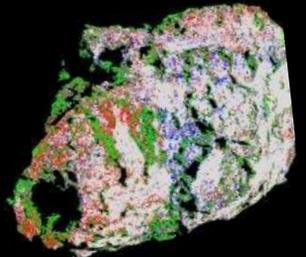
Geological and morphological analysis

Non-impact side



Boulders

Colours and composition



# Ground Segment



Agenzia Spaziale Italiana



The mission Ground Segment architecture includes DSN antennas and the two main elements located in Italy:

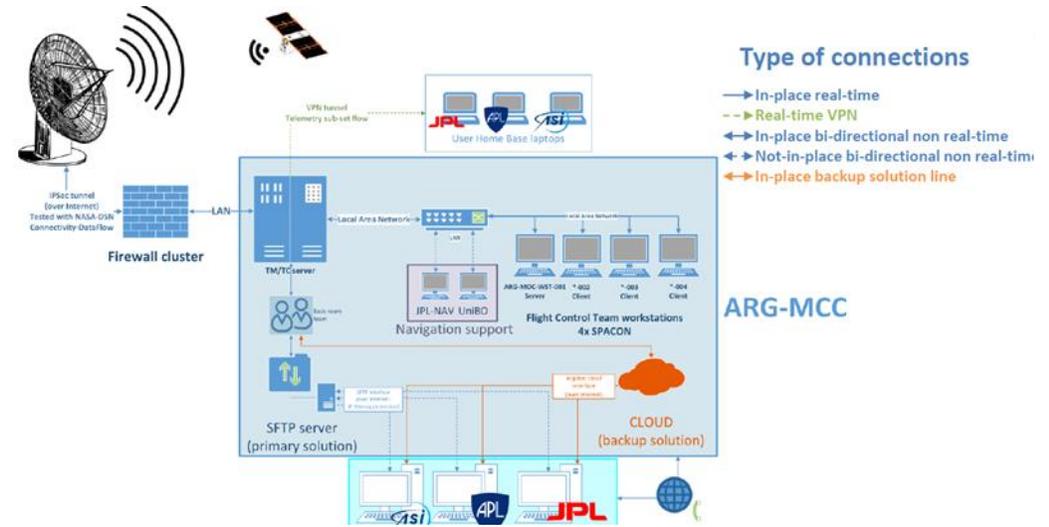
- Mission Control Center (MCC): @ Argotec (Turin)
- Science Control Center (SOC): @ ASI SSDC (Rome)

<https://www.ssdc.asi.it/liciacube/>

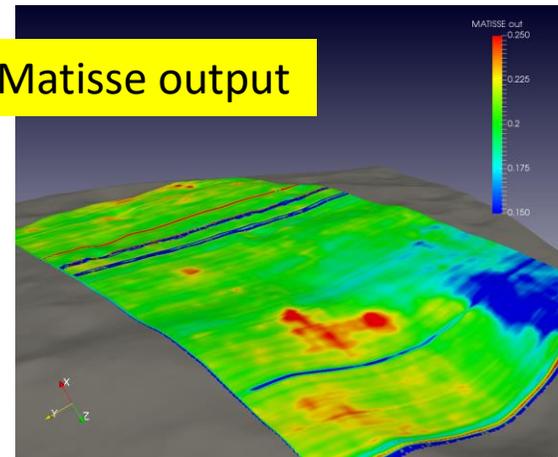
The raw data, coming from MCC, will be calibrated by SOC, using the calibration procedure provided by INAF.

A PDS4 archive will be designed, populated and released to the public after the end of the mission.

Data will also be accessible (first of all to the team and in a second time to public) by means of the SSDC MATISSE webtool (<https://tools.ssdc.asi.it/Matisse>), with advanced 2D and 3D visualization capabilities.

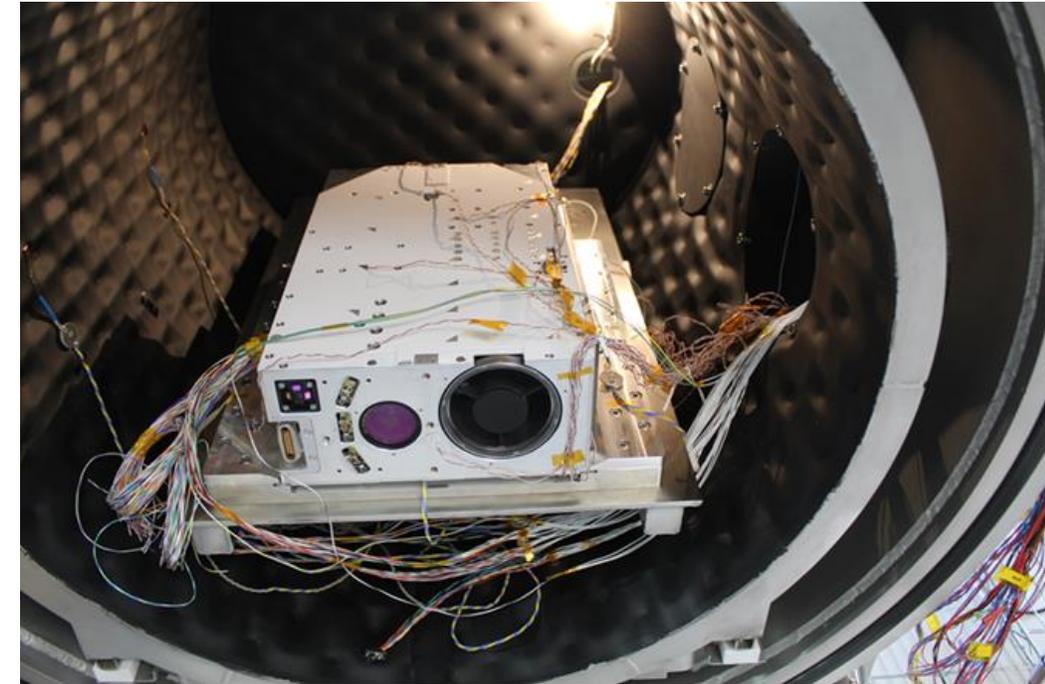


Matisse output



# Status of the Project

- Qualification test campaign at Cubesat level in progress:
  - Full functional test successfully completed;
  - TVAC test successfully completed;
- Integration into the dispenser, expected on 12th May
- Qualification and Acceptance test campaign at System level (cubesat + dispenser + EBC)
  - Vibrations test
  - Deployment test
  - Thermal balance test
- Readiness of the System, expected on mid June
- Reviews and logistics
- Delivery to APL in Baltimore, expected on 23rd July



**LICIACube spacecraft in TVAC chamber, after test**



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