

LICIACube ground segment activities at SSDC: image processing, calibration and archiving following PDS4 standards



Angelo Zinzi
V. Della Corte, R. Espiritu, O. Barnouin, E. Dotto, M. Amoroso and the LICIACube Team*

angelo.zinzi@ssdc.asi.it



Introduction

LICIACube is an ASI 6U cubesat launched as a piggyback to the NASA DART mission on Nov. 24 2021. On Sep. 11 2022 it was deployed and started its approach to Dimorphos in order to acquire images of the DART impact (Dotto et al., submitted) with its two cameras, LEIA and LUKE (Fig. 1).

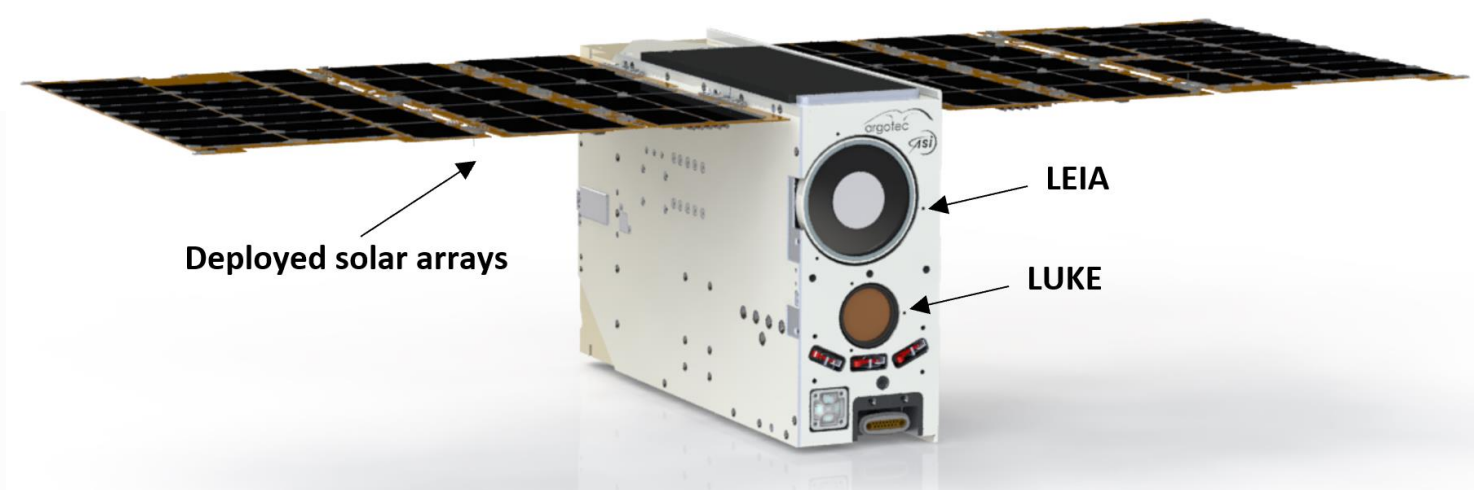


Fig. 1: The LICIACube spacecraft

LICIACube data

LEIA and LUKE acquired more than 400 images, sent back to Earth in the following month, using the DSN. The raw-from-telemetry images were built at MCC in Argotec, sharing them with the ASI-SSDC SOC, where they were converted to FITS and calibrated (Fig. 2).

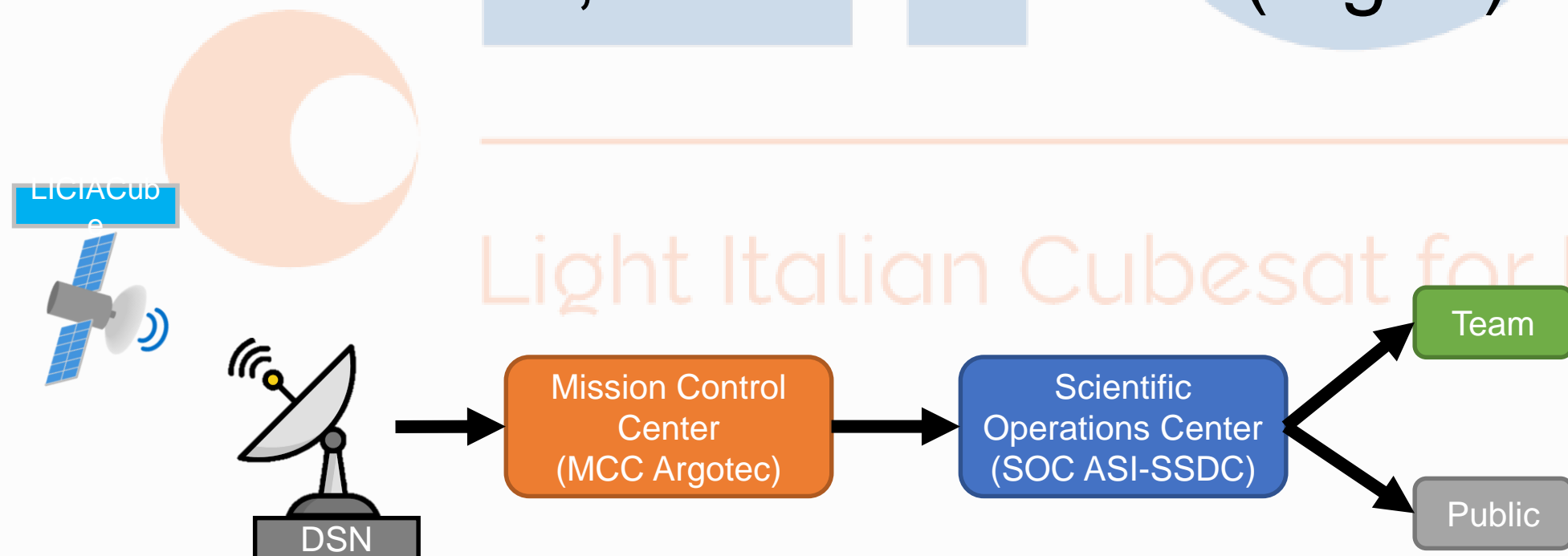


Fig. 2: The LICIACube ground segment

The LICIACube archive design

In order to assure a long-term preservation of these unique data, SSDC designed the archive to be compliant with PDS4 standards. The LICIACube dataset is a PDS4 bundle.

A series of metadata have been computed and added in form of FITS keywords to the distributed images, so that they can be better put into context (Zinzi et al., 2022).

MATISSE for LICIACube

The images thus archived are also going to be added to the SSDC MATISSE webtool (Zinzi et al, 2016 – <https://tools.ssdc.asi.it/Matisse>), so that a more accurate analysis, due to advanced projection and visualization methods, can be allowed.

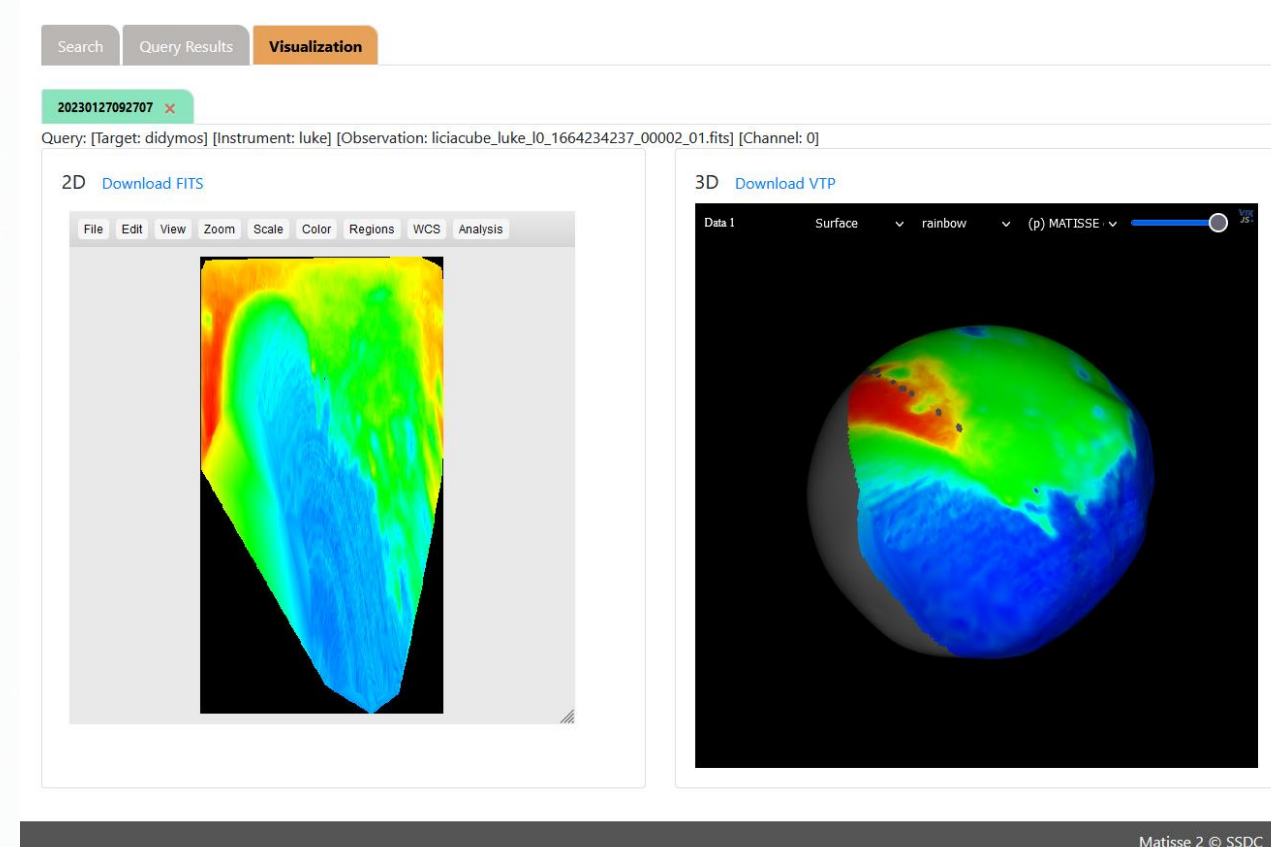


Fig. 3: A LUKE image displayed in MATISSE: on the left the 2D projection, on the right the 3D one

The LICIACube dataset is planned to be publicly released in autumn 2023.

References:

- E. Dotto et al., Nature, submitted
- A. Zinzi et al., Astronomy and Computing, Volume 15, p. 16-28, 2016
- A. Zinzi et al., The Planetary Science Journal, Volume 3, Issue 5, id.126, 13 pp, 2022



*The LICIACube Team is can be found here https://www.ssdc.asi.it/liciacube/lcc_team.php