

IAF SYMPOSIUM ON PLANETARY DEFENSE AND NEAR-EARTH OBJECTS (E10)
Informing Planetary Defense (2)

Author: Mr. Gabriele Impresario
Agenzia Spaziale Italiana (ASI), Italy, gabriele.impresario@asi.it

Dr. Angelo Zinzi
ASI - Italian Space Agency, Italy, angelo.zinzi@asi.it
Dr. Marilena Amoroso
Italian Space Agency (ASI), Italy, marilena.amoroso@asi.it
Dr. Simone Pirrotta
ASI - Italian Space Agency, Italy, simone.pirrotta@asi.it
Dr. Ivano Bertini
University of Naples "Parthenope", Italy, ivano.bertini@uniparthenope.it
Dr. John Robert Brucato
INAF - Astrophysical Observatory of Arcetri, Italy, jbrucato@arcetri.astro.it
Dr. Andrea Capannolo
Politecnico di Milano, Italy, andrea.capannolo@polimi.it
Mr. Michele Ceresoli
Politecnico di Milano, Italy, michele.ceresoli@mail.polimi.it
Mr. Biagio Cotugno
Argotec, Italy, biagio.cotugno@argotecgroup.com
Prof. Gabriele Cremonese
INAF - Osservatorio astronomico di Padova, Italy, gabriele.cremonese@oapd.inaf.it
Dr. Massimo Dall'Ora
INAF - Osservatorio Astronomico di Capodimonte, Italy, massimo.dallora@inaf.it
Mr. Vincenzo Della Corte
INAF-IAPS, Italy, vincenzo.dellacorte@inaf.it
Mr. Prasanna Deshapriya
INAF, Italy, prasanna.deshapriya@inaf.it
Dr. Elisabetta Dotto
INAF - OAR, Italy, elisabetta.dotto@inaf.it
Mr. Emilio Fazzoletto
Argotec, Italy, emilio.fazzoletto@argotecgroup.com
Mr. Igor Gai
Alma Mater Studiorum - University of Bologna, Italy, igor.gai@unibo.it
Mr. Pedro Henrique Hasselmann
INAF - Osservatorio Astronomico di Capodimonte, Italy, pedro.hasselmann@inaf.it
Dr. Ieva Simone
INAF, Italy, simone.ieva@inaf.it
Dr. Stavro Lambrov Ivanovski,
INAF, Italy, stavro.ivanovski@inaf.it
Prof. Michèle Lavagna
Politecnico di Milano, Italy, michelle.lavagna@polimi.it
Dr. Alice Lucchetti

INAF - Osservatorio astronomico di Padova, Italy, alice.lucchetti@inaf.it
Dr. Elena Mazzotta Epifani
INAF, Italy, elena.mazzottaepifani@inaf.it
Dr. Andrea Meneghin
Italy, andrea.meneghin@inaf.it
Mr. Federico Miglioretti
Argotec, Italy, federico.miglioretti@argotecgroup.com
Dr. Dario Modenini
Alma Mater Studiorum - University of Bologna, Italy, dario.modenini@unibo.it
Mr. Maurizio Pajola
CISAS – “G. Colombo” Center of Studies and Activities for Space, University of Padova, Italy,
maurizio.pajola@gmail.com
Prof.Dr. Pasquale Palumbo
INAF-IAPS, Italy, pasquale.palumbo@inaf.it
Mr. Silvio Patruno
Argotec, Italy, silvio.patruno@argotec.it
Dr. Davide Perna
INAF - OAR, Italy, davide.perna@inaf.it
Dr. Giovanni Poggiali
INAF, Italy, giovanni.poggiali@inaf.it
Dr. Alessandro Rossi
IFAC-CNR, Italy, a.rossi@ifac.cnr.it
Mr. Gianmarco Reverberi
Argotec, Italy, gianmarco.reverberi@argotecgroup.com
Dr. Emanuele Simioni
Italy, simioni@dei.unipd.it
Prof. Paolo Tortora
Alma Mater Studiorum - University of Bologna, Italy, paolo.tortora@unibo.it
Dr. Filippo Tusberti
INAF - PD, Italy, filippo.tusberti@inaf.it
Dr. Marco Zannoni
Alma Mater Studiorum - University of Bologna, Italy, m.zannoni@unibo.it
Dr. Giovanni Zanotti
Politecnico di Milano, Italy, giovanni.zanotti@polimi.it

THE ITALIAN MICROSATELLITE MISSION LICIAcube: AN ENABLER FOR INNOVATIVE STRATEGIES IN INTERPLANETARY EXPLORATION AND PLANETARY DEFENSE

Abstract

In the last decade, an increasing number of cubesat-class spacecraft have been involved in the execution of missions, operating at distances from our home planet ranging between Low-Earth Orbit to Mars.

In particular, the Light Italian Cubesat for Imaging of Asteroids (LICIAcube) mission of Agenzia Spaziale Italiana (ASI) has contributed to the Double Asteroid Redirection Test (DART) mission of National Aeronautics and Space Administration (NASA) by witnessing, on September 26th, 2022, the successful impact of DART spacecraft with the asteroid 65803-Didymos I (Dimorphos), and revealing the immediate aftermaths of the event while performing a quick flyby, successfully participating in the first Planetary Defense real-scale test ever conducted by humanity.

The LICIAcube mission, leveraging on national competences and together with the international collaboration with the DART mission, has been able to improve the operational, technical, managerial and scientific know-how at national level, together with creating new records in interplanetary exploration.

The concept of modular space segments, for the achievement of ever complex mission goals, has recently found favourable conditions thanks to the increasing capabilities of smaller platforms, that are now capable of bringing non-negligible, and even crucial, added values.

An assessment of present state of the art will be conducted, considering the consequences on mission life cycle and the architecture of companion space systems' segments, with a focus on exploration.

In particular, the present work aims also at highlighting and describing the added value of the LICI-ACube mission's contribution, in validating and verifying the outcome of the Planetary Defense method of kinetic impact with the presence of a proximity observer spacecraft.