

IAF SPACE SYSTEMS SYMPOSIUM (D1)
Space Systems Architectures (2)

Author: Mr. Ezio Ciancetta

Thales Alenia Space, Italy, ezio.ciancetta@thalesaleniaspace.com

Mr. Paolo Musi

Thales Alenia Space Italia, Italy, Paolo.Musi@thalesaleniaspace.com

Mr. Marco Sias

Thales Alenia Space Italia, Italy, marco.sias@thalesaleniaspace.com

Mr. Alberto Anselmi

Thales Alenia Space Italia, Italy, alberto.anselmi@thalesaleniaspace.com

Dr. Annamaria Piras

Thales Alenia Space Italia, Italy, annamaria.piras@thalesaleniaspace.com

Mr. Giuseppe D. Racca

European Space Agency (ESA), The Netherlands, giuseppe.racca@esa.int

Mr. Luca Stagnaro

European Space Agency (ESA), The Netherlands, luca.stagnaro@esa.int

Mr. Jean-Christophe Salvignol

ESA - European Space Agency, The Netherlands, Jean-Christophe.Salvignol@esa.int

THE EUCLID SPACECRAFT

Abstract

Euclid is a space-based optical/near-infrared survey mission of the European Space Agency (ESA) designed to investigate the nature of dark energy, dark matter and gravity by observing their signatures on the geometry of the Universe and on the formation of large structures over cosmological timescales. Euclid will use two main techniques in the detection of the signature of dark matter and energy: Weak gravitational Lensing, which requires the measurement of the shape and photometric redshifts of distant galaxies, and Galaxy Clustering, based on the measurement of the 3-dimensional distribution of galaxies through their spectroscopic redshifts. The mission is scheduled for a launch date in 2021 and is designed for 6 years of nominal survey operations. The Euclid Spacecraft is composed of a Service Module (SVM) and a Payload Module (PLM). The Service Module comprises all the conventional spacecraft subsystems, the instruments warm electronics units, the sunshield and the solar arrays. In particular the Service Module provides the extremely challenging pointing accuracy required by the scientific objectives. The Payload Module consists of a 1.2 m three-mirror Korsch type telescope and of two instruments, the Visible Imager (VIS) and the Near-Infrared Spectro-Photometer (NISP), both covering a large common field-of-view enabling to survey 36 billion galaxies. Following mission approval in 2012, Euclid spacecraft has started the implementation phase in 2013. The System and Mission level Preliminary Design Reviews were successfully completed in 2015. The mission phase C/D is now in progress, the Avionic Model activities on both SVM and PLM have started. The System Critical Design Review (CDR) is running and the Mission CDR will be held in mid-2018. Starting from the overall mission requirements, this paper describes the spacecraft architectural design and expected performance and provides a view on the current project status.