

PLANETARY PROBES ENTRY AND DESCENT SCIENCE

Deliver robotic platforms and, in the next future, human missions on a planetary body with an atmosphere is a significant technological challenge. Onboard data acquired during Entry Descent and Landing (EDL) mission phases are typically used to verify the engineering system performances. Nevertheless, such data carry out much information of great scientific value. This webinar introduces the post-flight analysis of EDL mission data with a particular focus on the reconstruction of atmospheric profiles building upon the experience with past missions such as Huygens and ExoMars-2016 and presenting real-world case studies.

Topics:

- Introduction to entry, descent and landing technologies with related onboard instrumentation. Overview of past and future planetary exploration missions.
- Basic aerodynamics of aeroshells and parachute systems, guidance, navigation and control issues.
- Entry and descent phase modelling and simulation. Case study: ExoMars-2022 entry and descent simulation.
- Methods and algorithms for the reconstruction of trajectory and atmospheric profiles from onboard data. Bayesian techniques for data assimilation. Case study: ExoMars-2016 Schiaparelli data analysis.

Learning objectives:

- Understand EDL challenges and current technologies.
- Understand aeroshell and parachute aerodynamic, dynamical modelling and entry and descent phases simulation issues.
- Implement methods and algorithms to reconstruct both the vehicle trajectory and the atmospheric structure from inertial data.
- Application of Bayesian techniques for data assimilation and multi-sensor fusion.

Target audience: doctoral students, non-academic professionals, and undergraduate students.

Dates and time: 8 and 9 November 2021, 10:00-12:00 CEST

Speaker

Alessio Aboudan is a software engineer with over 18 years of experience. He was/is involved in several ASI/ESA led space programs such as Cassini-Huygens, BepiColombo, Rosetta, ExoMars, Juice, Agile, maturing broad expertise in the development of scientific payloads and data exploitation activities:

- Modelling, simulation and control of complex dynamical systems such as multibody systems and robotic platforms, atmospheric entry/descent vehicles.
- Data analysis: optimization and statistical estimation methods, machine learning algorithms, vision systems, remote sensing and geospatial data analysis.
- Development and testing of embedded and fault-tolerant software. Requirements definition, test cases, test procedures automation.
- Flight hardware integration, qualification and test activities. Support to flight operations.

Thanks to the continuous interaction with both engineers and scientists, he matured a robust multidisciplinary approach in tackling complex, underconstrained problems and the capacity to work in heterogeneous teams.

He is currently part of the technical staff at CISAS "G.Colombo" of University of Padova and works as freelance for private companies in the automotive and aerospace sectors.

Registration and Webinar Platform

The registration is mandatory via the online form at the web [link](#).

Deadline: 1 November 2021

Fees: there are no registration fees for AIDAA members. Instructions to become a member can be found here: <https://www.aidaa.it/become-a-member/>

Webinar platform: Webex, a link will be sent via email a few days before the event.

