

SYMPOSIUM ON FUTURE SPACE ASTRONOMY AND SOLAR-SYSTEM SCIENCE MISSIONS (A7)
Science Goals and Drivers for Future Exoplanet, Space Astronomy, Physics, and Outer Solar System
Science Missions (2)

Author: Mr. Paul Eccleston
STFC, United Kingdom

Prof. Giovanna Tinetti
University College London (UCL), United Kingdom

Dr. Paul Hartogh
MPS, Germany

Dr. Jeremy Leconte
University of Bordeaux, France

Dr. Giusi Micela
INAF, Italy

Dr. Marc Ollivier
IAS, France

Dr. Göran Pilbratt
European Space Agency (ESA), The Netherlands

Mr. Ludovic Puig
ESA, The Netherlands

Dr. Diego Turrini
INAF-IAPS, Italy

Dr. Bart Vandenbussche
K.U. Leuven, Belgium

Dr. Paulina Wolkenberg
Space Research Centre, Polish Academy of Sciences (CBK-PAN), Poland

Dr. Pierre Drossart
Observatoire de Paris, France

THE ARIEL MISSION - ATMOSPHERIC REMOTE-SENSING INFRARED EXOPLANET
LARGE-SURVEY

Abstract

The Atmospheric Remote-Sensing Infrared Exoplanet Large-survey (ARIEL) is one of the three candidate missions selected by the European Space Agency (ESA) for its next medium-class science mission (M4) due for launch in 2026. It is just coming to the conclusion of the assessment phase (phase A) study and beginning the process that will lead to mission selection. The goal of the ARIEL mission is to address the fundamental questions on how planetary systems form and evolve by means of investigating the atmospheres of many hundreds of planets orbiting distant stars.

During its four-year baseline mission ARIEL will observe approximately 1000 exoplanets in the visible and the infrared with its meter-class telescope in L2 orbit. ARIEL targets will include Jupiter- and Neptune-size down to super-Earth and Earth-size around different types of stars. The main focus of the mission will be on hot and warm planets orbiting very close to their star, as they represent a natural laboratory in which to study the chemistry, formation and evolution of exoplanets. The analysis of ARIEL

spectra and photometric data will allow extraction of the chemical fingerprints of gases and condensates in the planets' atmospheres for the whole observational sample, as well as to define the elemental composition of hundreds of these planets. It will also enable the study of thermal and scattering properties of the atmosphere and its variability as the planet orbits around the star.

The ARIEL mission concept and payload design has been developed by a consortium of more than 50 institutes from 12 European countries, along with the European Space Agency and two industry primes who have conducted phase A studies of the mission and spacecraft.

This presentation will give an overview of the mission science case, the baseline spacecraft and payload design that has been developed to deliver these exciting discoveries and talk about the future plans for mission implementation if the mission is selected.