Ariel: Enabling planetary science across light-years

Giovanna Tinetti[1], Paul Eccleston[2], Theresa Lueftinger[3], Jean-Christophe Salvignol[3], Salma Fahmy[3], Caterina Alves de Oliveira[4], and the Ariel team[*]
[1]University College London, Physics and Astronomy, London, United Kingdom of Great Britain – England, Scotland, Wales (g.tinetti@ucl.ac.uk)
[2]RAL Space, Harwell Campus, Didcot, UK
[3]European Space Agency, ESTEC, Noordwijk, NL
[4]European Space Agency, ESAC, Spain
[*]A full list of authors appears at the end of the abstract

Ariel, the Atmospheric Remote-sensing Infrared Exoplanet Large-survey, was adopted as the fourth medium-class mission in ESA's Cosmic Vision programme to be launched in 2029. During its 4-year mission, Ariel will study what exoplanets are made of, how they formed and how they evolve, by surveying a diverse sample of about 1000 extrasolar planets, simultaneously in visible and infrared wavelengths. It is the first mission dedicated to measuring the chemical composition and thermal structures of hundreds of transiting exoplanets, enabling planetary science far beyond the boundaries of the Solar System. The payload consists of an off-axis Cassegrain telescope (primary mirror 1100 mm x 730 mm ellipse) and two separate instruments (FGS and AIRS) covering simultaneously 0.5-7.8 micron spectral range. The satellite is best placed into an L2 orbit to maximise the thermal stability and the field of regard. The payload module is passively cooled via a series of V-Groove radiators; the detectors for the AIRS are the only items that require active cooling via an active Ne JT cooler. The Ariel payload is developed by a consortium of more than 50 institutes from 16 ESA countries, which include the UK, France, Italy, Belgium, Poland, Spain, Austria, Denmark, Ireland, Portugal, Czech Republic, Hungary, the Netherlands, Sweden, Norway, Estonia, and a NASA contribution.

This presentation provides an overall summary of the science and instrument design for Ariel and presents the many activities that the Ariel team have planned to engage the science community at large and the public prior to launch. These include the Ariel Dry-Run program and citizen-science programs such as ExoClock and the Ariel Data Challenges.

Ariel team: Anna Aret, Tartu Observatory, Estonia; Jean-Philippe Beaulieu, Institut d'Astrophysique de Paris, France; Matt Griffin, Cardiff University UK; Pierre-Olivier Lagage, CEA, France; Giuseppe Malaguti, INAF-OAS Bologna, Italy; Giusi Micela, INAF – Osservatorio Astronomico di Palermo, Italy; Mirek Rataj, Space Research Centre, Polish Academy of Science, Poland; Ignasi Ribas, IEEC, Spain, Enric Palle, IAC, Spain; Bart Vandenbussche, University of Leuven, Belgium; Manuel Guedel, University of Vienna, Austria; Masahiro Ikoma, NAOJ, Japan; Pedro Machado, IA - Institute of Astrophysics and Space Sciences, Portugal; Yamila Miguel, SRON Netherlands Institute for Space Research, the Netherlands; Lars Buchhave, DTU, Denmark; Tom Ray, Dublin Institute for Advanced Studies, Ireland; Mark Swain, JPL, US; Jonathan Tan, University of Chalmers, Sweden, Stephanie

Werner, University of Oslo, Norway; Martin Ferus, Heyrovsky Institute of Physical Chemistry, Czech Republic; Robert Szabo, Konkoly Observatory, Hungary; Joanna Barstow, IC, UK; Luca Borsato, U. of Padova, Italy; Sarah Casewell, U. of Leicester, UK; Quentin Changeat, UCL, UK; Benjamin Charnay, LESIA, France; James Cho, Flat Iron, US; Katy Chubb, St. Andrews, UK; Svatopluk Civiš, Heyrovsky Institute, Czech Republic; Vincent Coudé du Foresto, LESIA, France; Athena Coustenis, LESIA, France; Nicholas Cowan, McGill U., Canada; Camilla Danielski, IAA, Spain; Olivier Demangeon, IA- Portugal; Billy N. Edwards, CEA, France; Luca Fossati, IWF Graz, Austria; Davide Gandolfi, INAF, Italy; Gabriella Gilli, IA- Portugal; Csaba Kiss, Konkoly Obs., Hungary, Anastasia Konkori, UCL-CSED, UK; Jérémy Leconte, U. of Bordeaux; Zita Martins, IST, Portugal; Juan Carlos Morales, IEEC, Spain; Pierre- João Mendonça, DTU, Denmark; Lorenzo Mugnai, La Sapienza, Rome, Italy; Antonio García Muñoz, CEA, France; Ravit Helled, U. of Zurich, Switzerland; Pedro Machado, Obs. Lisboa, Portugal; Michiel Min, SRON, the Netherlands; Isabella Pagano, INAF, Italy; Olja Panic, Leeds, UK; Enzo Pascale, La Sapienza, Rome, Italy; Giampaolo Piotto, University of Padova, Italy; Ludovic Puig, ESA; Miriam Rengel, MPS, Germany; Subhajit Sarkar, U. of Cardiff, UK; Clara Sousa-Silva, CfA, US; Diego Turrini, INAF-IAPS, Italy; Angelos Tsiaras, Obs. Arcetri, Italy; Olivia Venot, LISA, France; Krisztián Vida, Konkoly Observatory, Hungary, Ingo Waldmann, UCL, UK; Gyula Szabo, U. of Eötvös Loránd, Hungary; Gordon K. Yip, UCL, UK; Sergey Yurcheko, UCL, UK; et al.