

Case Study

# ExoMars Mission: Searching for Life on the Red Planet



**RESEARCHER**

Dr Matt Gunn

**THE OVERVIEW**

The Department of Physics at Aberystwyth University (AU) is involved in the ESA ExoMars rover mission, where Dr Matt Gunn is responsible for the radiometric and colorimetric calibration, and image processing for the primary remote-sensing science camera system during mission operations. An emulator for the camera system was developed, which has provided the data for industry partners to develop and validate operational procedures and data processing software systems. Social, cultural and creative impacts have also emerged from the research, which will ultimately provide a foundation for answering the question of whether there is life beyond Earth.



**THE RESEARCH**

The Department of Physics (in collaboration with the Department of Computer Science) at Aberystwyth University have contributed to the objectives of the mission through involvement with three of the key remote sensing instruments; PanCam, ISEM and CLUPI. These instruments will be used to identify the best locations to use the limited resources of the life detection instruments on board the rover. The success of the mission is dependent on the accuracy of their results.

**THE IMPACT**

**IMPACT ON THE EXOMARS MISSION AND THE SEARCH FOR LIFE ON MARS**

The ExoMars rover will be the first to search directly for signs of life, and will rely on PanCam (a multiscale camera system) and ISEM (an infrared spectrometer for determining bulk mineralogy composition), both mounted on the rover mast. AU staff have played a key role in their development, calibration, and testing.

**IMPACT ON COMMERCE AND INDUSTRY**

We have worked closely with ESA and industry, applying our expertise to minimise costs associated with instrument testing and calibration, and maximise the accuracy of results. Our work on the ExoMars rover, both when performing individual instrument calibration as well as Pan-Cam/ISEM cross calibration, has enabled industrial contractors to maintain their tight schedules.

**IMPACT ON SOCIETY**

Our role in the development of the imaging instruments has enabled us to contribute to national outreach activities, involving more than 310,000 people. Using our research on the Martian environment, we developed exhibits to improve public engagement, which have been extensively used by the UK Association for Science Discovery Centres.

**Aberystwyth University is recognised as a centre of excellence in radiometry and calibration, instrument development, computer science and robotics.**