Space age engineers to verify control software for future robotic interplanetary missions

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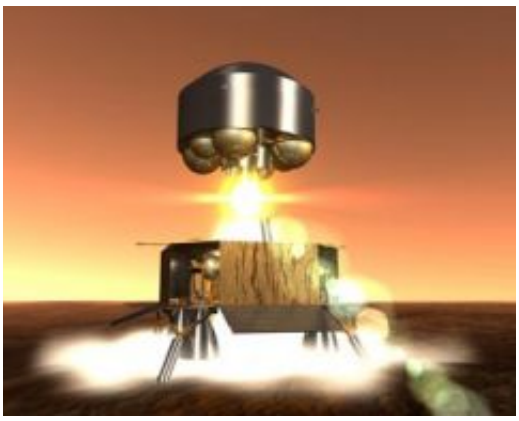

Artist's view of a future Mars Sample Return ascent module lifting off from Mars' surface with the Martian soil samples. Picture courtesy of ESA

An international team of engineers is to develop mission-critical control software for future European robotic space missions, it has been announced.

Dr. Declan Bates, a senior lecturer in the University of Leicester Department of Engineering, is part of an international consortium that has won €250K from the European Space Agency to develop new verification and validation techniques for next-generation satellite systems.

Dr. Bates will lead a team of researchers from the Control and Instrumentation Research Group on a two year project which aims to radically improve the reliability of the mission-critical control software required for the successful rendezvous of groups of satellites. The other members of the consortium are the Spanish advanced technology company GMV, the Canadian company NGC Aerospace, and the University of Oxford.

Dr. Bates said: "Leicester's involvement in this major research project is a direct result of our international reputation for research on the analysis of safety-critical control software.

"Future ESA missions, like the autonomous robotic satellites which will collect and return samples from the surface of Mars, require control systems involving complex requirements, system architectures, software algorithms and hardware implementations. A typical example is the design of a collision avoidance mode requiring a minimum separation distance between 'chaser' and 'target' satellites.

"Key elements for the development of such autonomous rendezvous control systems are the availability of reliable analysis tools for the verification and validation of complex system behaviour. It is essential to show that the control system is sufficiently robust to ensure the desired safety levels under a large number of adverse and unforeseen conditions.

"In this new project, we will develop and test control system analysis techniques to improve the reliability and efficiency of this verification and validation process."

Dr Bates added:

"This latest project is the third major research contract we have recently been awarded by ESA, and confirms that the Leicester Control Group is

now at the forefront of European research on Space Control Systems."

Source: University of Leicester