

# **RMAP OVER SPACEWIRE ON THE EXOMARS ROVER FOR DIRECT MEMORY ACCESS BY INSTRUMENTS TO MASS MEMORY**

**Session: SpaceWire missions and applications**

## **Short Paper**

Bryan Dean, Rosalind Warren, Ben Boyes

*EADS Astrium, Gunnels Wood Road, Stevenage, SG12AS, UK*

*E-mail: [bryan.dean@astrium.eads.net](mailto:bryan.dean@astrium.eads.net), [rosalind.warren@astrium.eads.net](mailto:rosalind.warren@astrium.eads.net),  
[ben.boyes@astrium.eads.net](mailto:ben.boyes@astrium.eads.net)*

### **ABSTRACT**

The ExoMars Rover has a number of high bandwidth instruments including cameras and microscopes which connect to the On Board Computer using SpaceWire technology. We intend to use the Remote Memory Access Protocol (RMAP) to allow the instruments to write large amounts of data to the Mass Memory within the computer without application software involvement. This will free up much needed processing time for the autonomous navigation algorithms.

Since the file system management tasks will be performed by the application software on the processor, the Mass Memory controller will not have knowledge of the file or data structure in the logical address space. As a result all write accesses to the Mass Memory must be controlled by the application software. We are developing a mechanism using RMAP to allow the software to initiate a transfer of data from a specified memory address in an instrument to a specified memory address in the Mass Memory. Once the data transfer has been initiated, the software can perform other tasks whilst waiting for acknowledgement of a successful transfer.

In order to achieve the high level of processing required for the Rover to navigate and drive autonomously on the surface of Mars, the initial processing of images used for navigation will be performed by dedicated hardware in the On Board Computer. The same mechanism for data transfer from camera to Mass Memory will be used to send image data directly to this hardware. In this paper we outline the details of this mechanism.