Double Walled Isolator (DWI) System for a Mars Sample Receiving Facility (MSRF) - Outline of Activities and Early Results of European Space Agency (ESA) Technology Development

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Inside a future Mars Sample Receiving Facility (MSRF) there are several critical systems[1] that are required to perform all the identified operations[2] in the required environment to the required level of safety. One of these critical systems is the Double Walled Isolator (DWI) system which is required to simultaneously maintain containment (i.e. nothing gets out) and maintain ultra-cleanliness (i.e. nothing gets in) for the returned sample material. The DWI system will consist of approximately 40 individual DWIs, each dedicated to a particular science investigation or operation and transport of equipment & sample material between DWIs achieved by the use of Double Walled Rapid Transfer Port (DWRTP) boxes.

Within the framework of the European Space Agency (ESA) “Mars Robotic Exploration Preparation (MREP) Technology Development programme a Double Walled Isolator (DWI) ‘Breadboard’ is being designed to determine the suitability of modifying existing isolator technology whilst maintaining containment and ultra-cleanliness under representative operational conditions.

References: [1] A detailed design, operation and assessment of technology development required for a Mars Sample Return (MSR) Sample Receiving Facility (SRF), M. Guest et al. 61st IAC, Prague, 2010, [2] Report on the workshop outputs from the Working Group on Scientific Investigations to be conducted in the Mars Sample Receiving Facility, E913-010\Working group report, Draft

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