University of Leicester; The Sample Linear Inlet Investigation Device, SLIID

Project Summary

Initially proposed for use in planetary exploration, the Sample Linear Inlet Investigation Device, SLIID is an innovative sealing technology designed to ensure sample integrity for high science value specimens. However, developmental research has indicated that there may be terrestrial applications. The basic design concept is not dissimilar to a syringe and makes use of a linear actuated semi-dynamic dry sealing interface between the circumferential sealing tips and the sample chamber wall. See Fig 1.

Planetary protection protocols exist to prevent both forward and backward contamination of planets like Mars; similar to aseptic technique and contamination control in surgery.

SLIID enables sample collection and containment in hostile and extreme environmental conditions. Specifically, it presents the following processes within the confines of planetary protection:

• *Clean and sterile sealed sample chamber (semi-dynamic dry seal)*

• Chamber aperture is actively opened to enable ingress of sample

• The chamber is passively closed

• Integrity of the sample is maintained

Crucially for space, SLIID is a small volume, low power, simple design.

SLIID represents a key UK enabling technology towards a future Mars Sample Return mission, which is considered a high priority by the UK Space Agency.