STEREOMICROSCOPE INSPECTION OF POLISHED ALUMINUM COLLECTOR 50684.0. M. C. Rodriguez[1], M. J. Calaway[2], J. H. Allton[3]; [1] Geocontrol Systems- ESCG at NASA/Johnson Space Center, Houston, TX 77058; melissa.rodriguez-1@nasa.gov, [2] Jacobs- ESCG at NASA/Johnson Space Center, Houston, TX 77058, [3] NASA/Johnson Space Center, Houston, TX 77058.

Introduction: The Genesis polished aluminum "kidney" collector was damaged during the hard landing of the capsule on September 8, 2004 in the Utah desert. The kidney was introduced into the Genesis (ISO class 4) cleanroom laboratory on November 4, 2004 and stored under nitrogen cover gas. The collector is currently fastened to a highly polished stainless steel plate (Fig.1) for secure handling. Curatorial work at JSC has made successful subdivision and subsequent allocation of samples from the kidney.

Post-flight Characterization of Collector: The pre-flight surface area of the T6061 aluminum alloy collector pre-flight was ~ 245 cm^2 [1]. In 2004, mosaic imaging was performed on a portion of the polished aluminum slated for early allocation. Subsequently, portions 1, 2, 4, and 5 were removed using a small handsaw (Fig.1). The current effort is to document the remaining surface of the collector. This portion of the collector (50684.0 in Fig. 1) was entirely surveyed for impact craters [2]. No cleaning techniques have been applied to the collector.

Fig. 1. Polished aluminum collector after subdivision in 2005. Portions 1, 2, 4, and 5 were previously imaged. Imaging of portion 50684.0 is in progress.

Methodology: Challenges in making a mosaic image of the polished aluminum are the great depth of field needed to image a crumpled sheet and the high reflectivity of the substrate. An overview mosaic representation has been constructed using Canvas X with Scientific Imaging software (Fig. 2). Images were acquired using a Leica MZ9.5 stereomicroscope 1.0X lens at 0.63X magnification under oblique lighting.

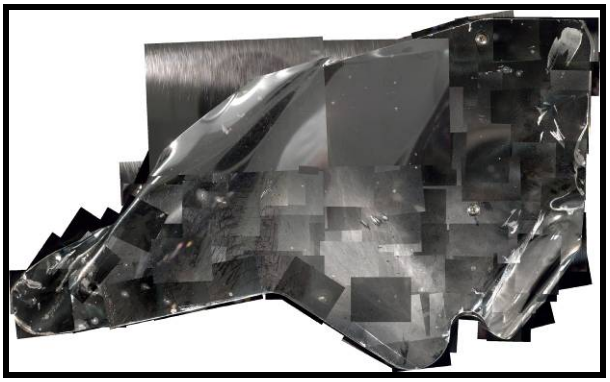

Fig. 2. Overview image of remaining polished aluminum kidney, 50684.0.

Stereomicroscope Observations: Post-flight characterization shows that the collector area has remained intact and did not fracture during impact. However, the Al collector was distorted and bent from the original dimensions. Mud and salt evaporite contamination from the Utah lakebed landing site is observed on the outer edges of the collector (Fig. 3) in smears and dried droplet formations. An extremely fine layer of particulate contamination is also present on the interior, flatter portions of the collector, recording evidence of physical movements of fragments during the hard landing (Fig. 4). Examples of hypervelocity impact craters, found on the right-hand portion of the image, are shown at higher magnifications in Fig. 5. All of the crater shapes appear to be uniformly round diameters at the collector surface and have unevenly splayed protruding edges. The interior "pit" bases also appear to be consistently rounded. Various gouges and scrapes from the hard landing have also been imaged; these are markedly different from impact cratering features and also appear near collector edges (Fig. 6).

Future Work: Additional scaled imaging at higher magnification will be done to document individual features.

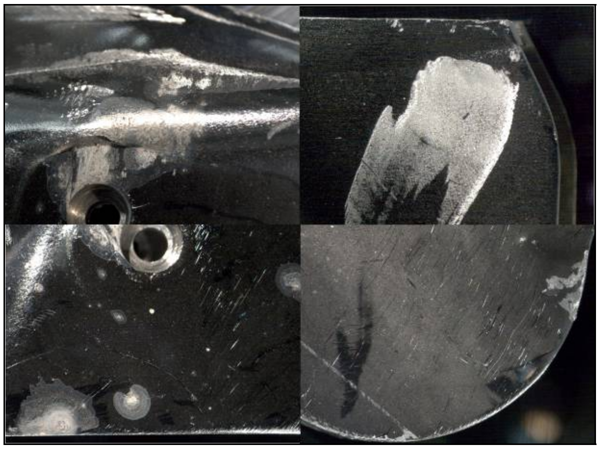

Fig. 3. Four examples of Utahogenic contamination near collector edges at 0.63X.

Fig. 4. Patterns in extremely fine material coating the polished surface shows evidence of physical movement of fragments during hard landing.

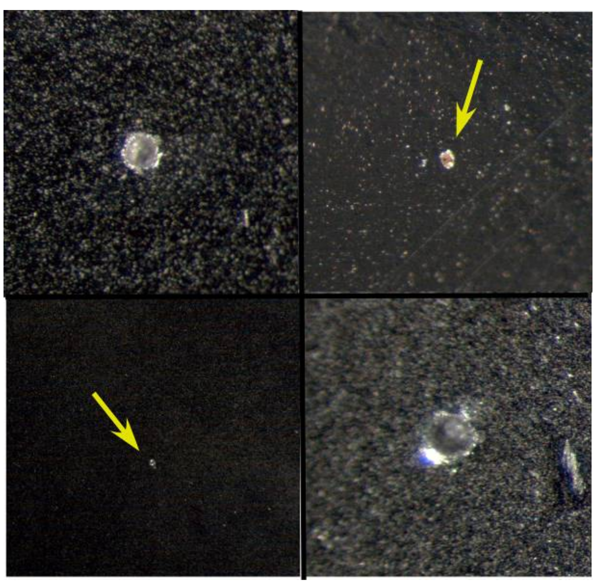

Fig. 5. Examples of microcraters on polished aluminum surface. Image on lower left has not been positively identified.

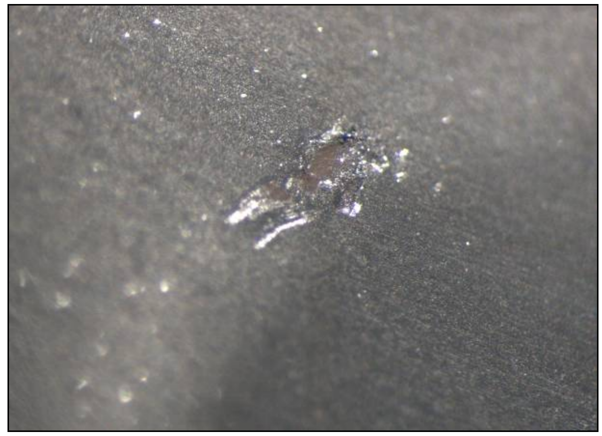

Fig. 6. Irregularly shaped gouge on aluminum kidney surface.

References: [1] Allton, J.H., et al. (2005) LPSC XXXVI, Abstract # 1806. [2] Love S.G. et al. (2006) *Icarus, 184,* 302-307.