

# C2060W “Calverton”

## Stardust Cratering Subgroup Foil report. 28 June 2006

S.F. Green<sup>1</sup>, J.C. Bridges<sup>1</sup>, I.A. Franchi<sup>1</sup>, A.T. Kearsley<sup>2</sup>, M.J. Burchell<sup>3</sup>

<sup>1</sup>PSSRI, The Open University, UK; <sup>2</sup>Natural History Museum UK; <sup>3</sup>CAPS, University of Kent at Canterbury, UK.

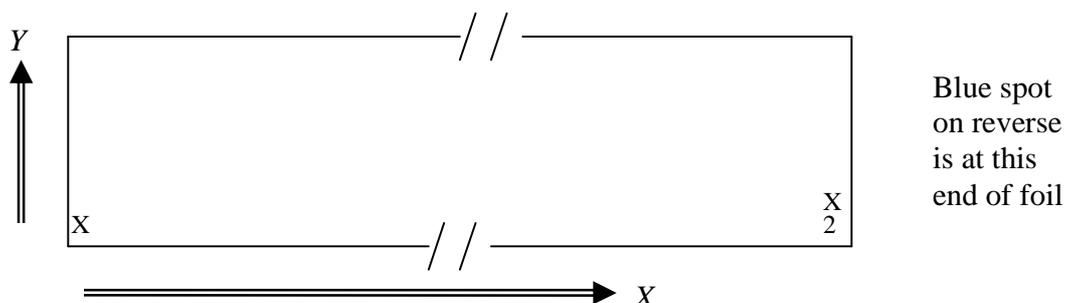
### (1) General Information

**General appearance:** Short foil, 12 x 1.5 mm

- This foil has relatively minor damage although there is a noticeable horizontal grooving fabric.
- Iron-rich patches are ubiquitous across the foil. In addition Fe-rich grains a few microns in diameter are present within pits. They appear to be part of the foils which were exposed by the milling process.

**Sample mounting:** Held by two Sn-coated restraining wires on custom Al holder.

**Foil Coordinates:** Fiducial marks, size 5 $\mu$ m, milled in foil with ion beam near corners of long side:



All measured coordinates transformed to Coordinate system (X,Y) with origin at fiducial mark 'X' and X axis towards fiducial mark 'X2' Units of mm.

#### Crater surveys:

Quanta 200D Dual Beam FIB-SEM.  $D_c$  measurement accuracy checked with etched quartz graticule.

- Manual survey image mosaic of entire foil (LOWRES): 15kV, 0.5 nA, x135 magnification, x1024 pixel resolution.  
Area = 18 mm<sup>2</sup>. Estimated complete to  $D_c = 2 \mu\text{m}$ .
- Automated surveys of smaller areas (2 mm<sup>2</sup> and 3 mm<sup>2</sup>). 20 kV, 0.6 nA, x1000 magnification, secondary electrons, 2048 x 1792 pixel resolution, Kalman frame (3) averaging. Working distance 7 mm. Resolution limited by flatness of foil over sub-area.  
SA1: Nominal 3 mm<sup>2</sup>. Actual area = 3.25 mm<sup>2</sup>. Estimated complete to  $D_c = 0.8 \mu\text{m}$ .  
Corners (7.46, 1.52) (10.55, 1.60) (10.58, 0.55) (7.49, 0.46)  
SA2: Nominal 2 mm<sup>2</sup>. Actual area 2.17 mm<sup>2</sup>. Estimated complete to  $D_c = 0.8 \mu\text{m}$ .  
Corners (4.51, 1.40) (6.54, 1.46) (6.57, 0.40) (4.51, 0.35).

#### EDX measurements:

15 KV, 75s acquisition times.

# C2060W “Calverton”

## (2) Crater Location

LOWRES manual survey of entire foil.

Target completeness limit  $D_c=5\mu\text{m}$ . Estimated complete to  $D_c=2\mu\text{m}$ .

Coordinates reproducible to  $\sim 0.1\text{mm}$  due to flexure of foil.

Randomly selected areas SA1 and SA2 to obtain completeness to  $D_c\sim 1\mu\text{m}$ .

Craters that also appear in LOWRES survey are cross-referenced.

9 craters found.

LOWRES survey

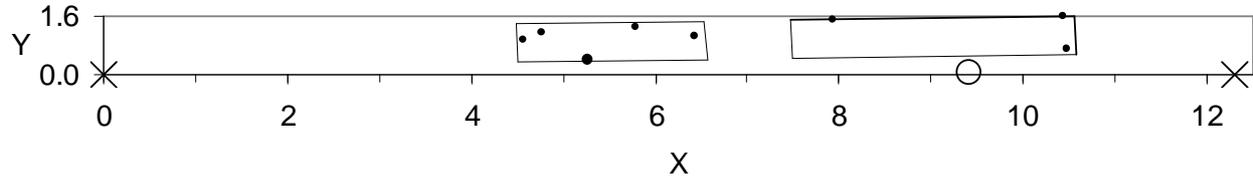
Crater	X (mm)	Y (mm)	$D_c$ ( $\mu\text{m}$ )
1	9.42	0.06	9.0

SA1

Crater	X (mm)	Y (mm)	$D_c$ ( $\mu\text{m}$ )
101	7.93	1.5	0.7
104	10.47	0.68	0.6
108	10.44	1.6	0.6

SA2

Crater	X (mm)	Y (mm)	$D_c$ ( $\mu\text{m}$ )
102	4.76	1.13	0.9
103	5.79	1.32	0.6
105	4.57	0.96	0.8
106	5.27	0.42	1.0
107	6.44	1.04	0.5



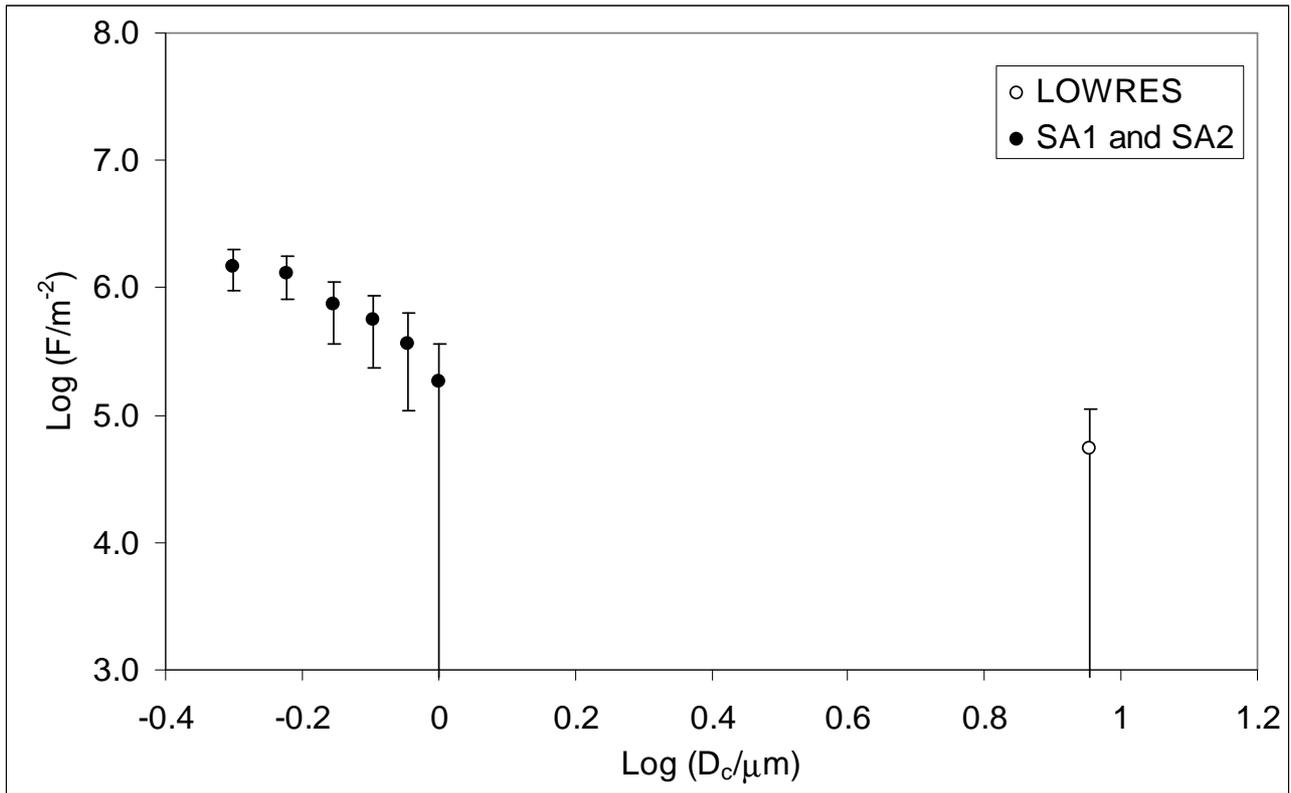
# C2060W “Calverton”

## (3) Size distribution

Crater sizes are listed in crater location tables.

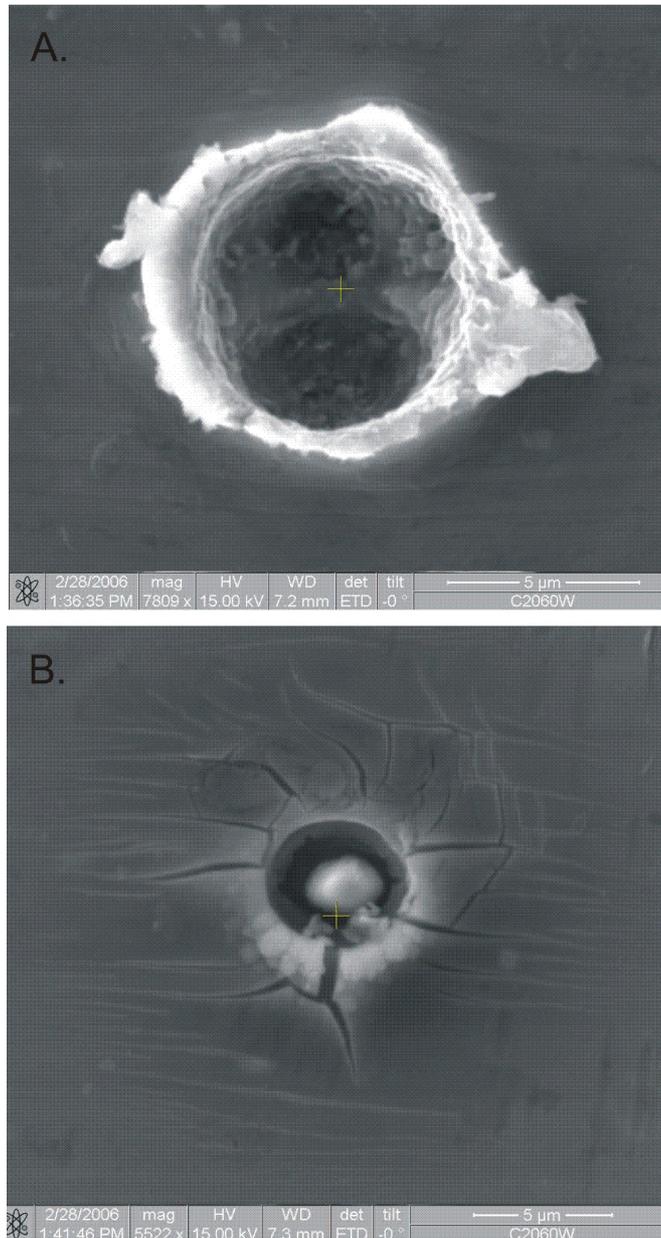
Size distributions for SA1 and SA2 plotted together.

Error bars reflect counting statistics only.



# C2060W “Calverton”

## (4) Images



A. Crater 1 showing ridge bisecting the crater floor. B. Fe-rich grain within foil exposed by milling of the foil. Fe-rich grains are spread across the foils. Secondary electron images.

# C2060W “Calverton”

## (5) Composition

NB. A summary is given here. Quantitative analysis will be reported to the Min & Pet Sub-Group.

<b>Crater</b>	<b>Elements detected</b>	<b>Interpretation</b>
1	Mg, Fe, S, Si	Mix of Mg-Fe silicate and Fe-S