VIKING 2 LANDING SITE IN MGS/MOC IMAGES. P. J. Stooke[1], [1]Department of Geography, University of Western Ontario, London, Ontario, Canada N6A 5C2 (pjstooke@uwo.ca).

Introduction: Viking Lander 2 (VL2) landed on Mars on 3 September 1976 [1]. Its location (47.67º N, 225.59º W from radio tracking) has not been identified unambiguously in orbital images. The Viking 1 and Pathfinder sites were located in orbital images by matching horizon topography in lander panoramas with features seen in orbital images [2, 3, 4]. The difficulty with VL2 arises from the low relief of the site and the low resolution of Viking Orbiter images of the region. Stooke [5] tried to locate VL2 just prior to the availability of Mars Global Surveyor MOC images of the site. Three possible locations were identified. Here, an attempt to match VL2 horizon features with MOC images of the area is reported. One of the three locations reported previously allows numerous surface features to be matched between Lander and MOC images. It also corresponds closely with locations proposed by Oberst *et al*. [6] and Parker and Kirk [7].

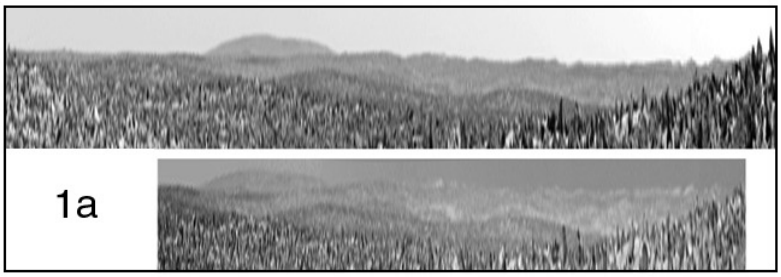
Background: Stooke [5] identified two hills on the VL2 horizon, a prominent one at azimuth 65º and a small hill at azimuth 8º. The first is identified with a hill or pedestal crater Goldstone (Fig. 1a; note the tenfold vertical exaggeration!). The second is informally named 'northern hill' (Fig. 1b). VL2 thus sits at a known azimuth from Goldstone and its position can be fixed by the correct identification of the 'northern hill'. Other potentially diagnostic features include complex bright spots and dark hills between VL2 and Goldstone. Stooke [5] identified three possible candidates for 'northern hill' in Viking Orbiter images, spread over 8 km, preferring the eastern one. Oberst *et al*. [6] refined the local control network, giving a location 3 km south of Stooke's westernmost candidate. Parker and Kirk [7, see also 6] looking at horizon features, found a site coinciding with Stooke's middle candidate.

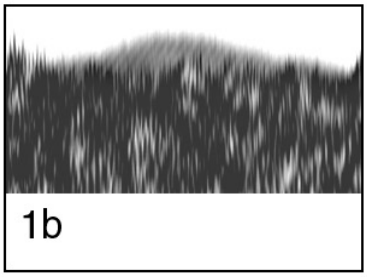
MOLA data: Gridded MOLA data (Fig. 2), courtesy the MGS/MOLA team, reveal Goldstone and a second hill to its northwest. The second hill must be 'northern hill'. This hill is barely visible in Viking images, but part of it was the feature Stooke (5) used to select his middle candidate. Therefore this point, also selected by Parker and Kirk, must be the VL2 landing site (Fig. 3).

MGS/MOC images: The new candidate site is an area about 1 km in diameter (uncertainty caused by the difficulty in identifying hilltop locations for exact azimuths). It falls within MOC images E0201291 and E0202726. In E0201291(Fig. 4a) the landing area could be anywhere within the dark plains at left. A small circle in Fig. 4a indicates an area from which several lines of sight may correlate with features seen in the intermediate distance in Fig. 1a. Dark rock-strewn hills in the foreground of Fig. 1a (note the vertical exaggeration) must correspond to subtle hills seen in the plains (black sight lines in Fig. 4a). Several small bright spots seen near the horizon and elsewhere in the complex topography of Fig. 1a appear to correlate with large blocks or other positive landforms on ridge crests in the vicinity (white sight lines in Fig. 4a). The sight lines converge on a point which must be the VL2 landing point, locating it within perhaps 50 m (circle in Fig. 4a). MOC image E0202726 is the highest resolution image of this region, 1.5 m/pixel (Fig. 4b). In the area indicated by the sight lines, a single bright pixel (line 5191, sample 1337) is a possible candidate for VL2 itself, though this is far from certain. It is the brightest pixel in the vicinity, and a dark pixel adjacent to it on the northeast side is correctly positioned to be a shadow cast by the sun at an elevation of 45º at the expected azimuth. A faint streak curves across the plains only about 10 m north of the bright pixel. It is reminiscent of a discontinuous series of dust drifts seen in lander panoramas [1], some of them occupying a small trough near the lander but also extending further to the northeast.

References: [1] Mutch T. A. et al. (1977) *JGR, 82,* 4452–4467. [2] Morris E. C. and Jones K. L. (1980) *Icarus*, 44, 217-222. [3] Parker T. J. et al. (1999) *LPS XXX,* Abstract #2040. [4] Golombek M. P. et al. (1999) *JGR, 104,* 8523-8553. {5} Stooke, P. J (1997), *Earth, Moon, Planets, 76*, 47-65. [6] Oberst et al. (2000), *LPS XXXI,* Abstract #1612. [7] Parker T. J. and Kirk R. L. (1999) 5th Int. Conf. Mars, LPI Contrib. 972, Abstract #6124.

Figure captions: Fig. 1a: VL2 panorama sections showing the eastern horizon with ten times vertical exaggeration, afternoon (top) and noon (bottom). **Fig. 1b:** VL2 image (super-resolution composite) showing 'northern hill' with tenfold vertical exaggeration. **Fig. 2:** MOLA relief representation showing Goldstone, the northern hill and the VL2 site. For scale, the VL2 site is 12 km from the summit of Goldstone. **Fig. 3:** part of MOC image E0201291 showing the landing area (dark plains at left) and brighter rough area with many depressions ringed by blocks or positive relief features. Image width 2 km. black and white lines suggest correlations between features seen in Figure 1a (dark foreground hills, bright blocks or small hills on horizon) and MOC-imaged features. These lines suggest a landing within the circle labeled VL2. **Fig. 4a:** part of MOC image E0202726 showing the location (box) of Figure 4b. **Fig. 4b:** small detail of MOC image E0202726 showing a single bright pixel suggested to be VL2, a single dark pixel which may be its shadow to the upper right, and a bright streak possibly associated with drifts of dust seen in VL2 panoramas. Some of those drifts lie within a narrow trough system but others extend beyond it.


1a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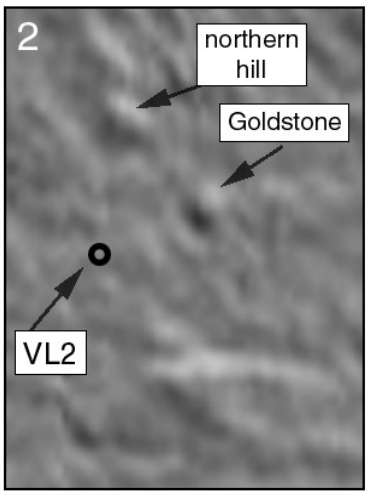
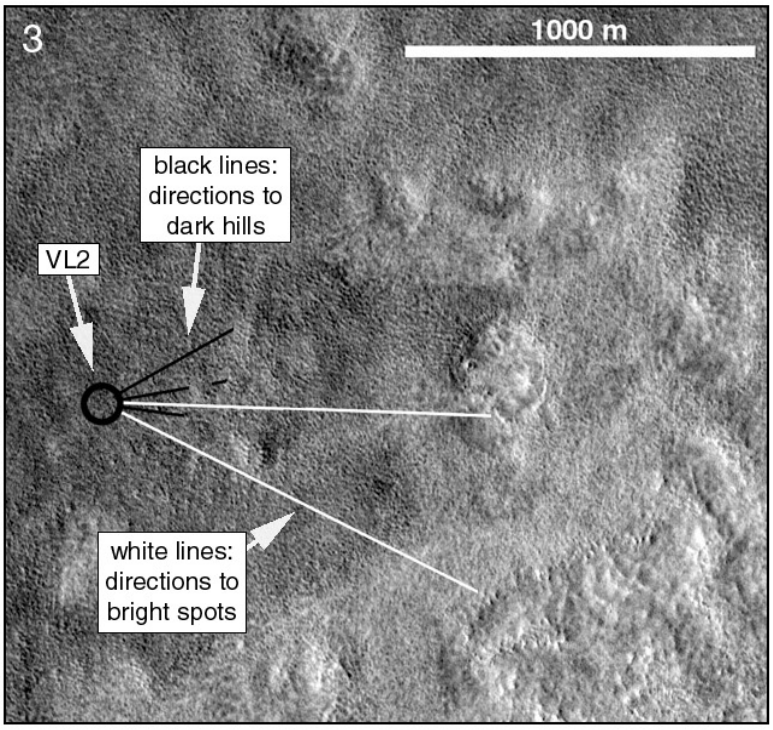
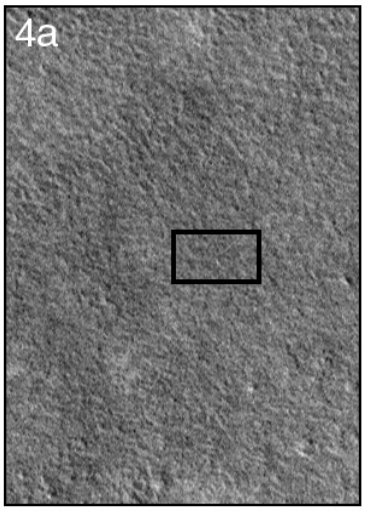
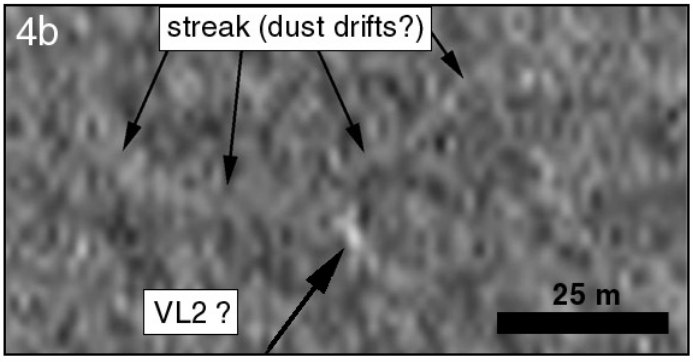

2
northern hill
Goldstone
VL2


3
1000 m
black lines: directions to dark hills
VL2
white lines: directions to bright spots


4a


4b
streak (dust drifts?)
VL2 ?
25 m