CANDIDATE-LANDING SITES AND BACKUPS FOR THE MARS SURVEYOR PROGRAM IN THE SCHIAPARELLI. CRATER REGION Nathalie A. Cabrol, Edmond. A. Grin, and Kevin Hand. NASA Ames Research Center, Space Science Division, MS 245-3, Moffett Field, CA 94035-1000. Email:ncabrol@mail.arc.nasa.

Rationale: Our Survey area comprises the Sinus Sabeus NW quadrangle that includes most of the Schiaparelli crater and part of the Arabia SW region (3N to 15S Lat.) and (0 to 337.5W long.) and covers all regions that show a potential hydrogeological link with the Schiaparelli impact structure. This area is hereafter defined as the Schiaparelli Crater Region.

The Schiaparelli crater region is one of the most documented MOC targets. Up to now, MGS MOC camera took two dozens images at an average of 5m/pxl resolution that not only provide an exceptional insight on the local geology and morphology, but give also key-elements to assess landing safety criteria. In addition, the MOLA topographic profile No. 23 passes through part of the crater basin (Smith et al., 1998) allowing the adjustment of the elevation as previously known from the Viking mission (USGS I-2125, 1991). Beyond the Mars Polar Lander mission that will land next December, the future missions (2001 APEX, 2003, and 2005) are led by a series of science objectives and engineering constraints that must be considered in order to select landing sites that will fulfill the Surveyor Program's objectives. The search for a sound and safe candidate-site (without ending up with the usual "safe but boaring" or "fascinating but too risky" site) is usually limited by the data available to the investigator, by the data accuracy (*e.g*. poor image resolution, poor altimetry), and the by lack of crucial information for science and safety that can be derived from them. The Schiaparelli region provides an exception to this recurrent pattern.

We listed the preliminary constraints for landing site selection identified for the Surveyor '01 mission, in terms of safety requirements and data needed (after Golombek *et al.*, 1999) and compared them against the existing information and/or data already available for the Schiaparelli region. The engineering constraints of '03 and '05 are not designated yet but, since they are also related to atmospheric density and Lander designs, we will assume that these points will be comparable to '01. The main difference will reside in the rover design, the Rocky-7 class rover being bigger than Marie Curie ('01) will be able to overcome bigger obstacles.

We listed then the main objectives of the Surveyor Program and compared them with the potential offered by the Schiaparelli Crater Region to document them.

Within the survey area, the Schiaparelli impact crater is 2.5S/343.3W (USGS I-1376, MC-20 NW, 1981) and occupies a significant surface area. The crater has been proposed as a potential candidate-site in the past years (Rice, 1994, Barlow 1998, Zimbelman 1998, Edgett et al.,1998, Cabrol 1998). The purpose of this study is to show that, not only the Schiaparelli Crater would be a high-priority target, but that the region where it is located offer several very-high potential back-up sites, all within science and engineering constraints, that make this region probably the most promising candidate area so far.

Area 1: Schiaparelli Crater South and Southeast: The crater is about 470 km in diameter and characterized South and East by a series of small gullies and channels (the Brazos Valles). Most of them erode the crater rim and converge toward the basin floor. Other drainage systems located on the south rim are heading away from the crater and join a series of valley networks which supplied a topographic low south of Schiaparelli and North of Evros Vallis. The crater is mentioned in the geologic map of the Sinus Sabeus quadrangle of Mars by Moore (1980), where the it is described as being superimposed on Noachian terrain. Using portions of the MOC image No. 2303, Hartmann et al.,(1999) tried to constrain the age of a unit located north in the crater basin and compared the results to the surrounding 4Gyr-old Arabia Terra. Hartmann et al., (1999) concluded that Schiaparelli is younger than the Arabia Terra formation, and probably 4-3Gyr old. The rim includes rough, hilly, fractured materials that are interpreted as ancient highland rocks and impact breccias (Greeley and Guest, 1987). Moore (1980) and Greeley and Guest (1987) describes the material in the main valley of the Brazos system as being of possible aeolian, fluvial, or volcanic in origin. Rice (1994) proposed that sediments superimposed on the basin floor in the south and southeast parts of the crater are fluvial in origin and possibly dating from Noachian and Hesperian. Barlow (1998) also mentions the plausible role of water in the small gullies that enter Schiaparelli.

• *Science Interests:* Noachian, Hesperian and Amazonian Materials; Evidence for fluvial activity: convergence of fluvial valleys, alluvial and/or deltaic formation in the crater; possible ancient hydrothermal systems; indicators of evaporites as suggested by the presence of high albedo material in the crater. Several potential landing sites with trafficability TBD.

Area 2: Brazos Lakes The new MOC images support the possible role of water for the generation of valleys (Malin and Carr 1999). During Orbit 023, image No. 2306 showed a portion of the Brazos Valles centered at 5.5S/347.7W. The image reveals two important informations: (a) a field of exceptionally bright dunes that covers the bottom of the valley. Bright dunes were first observed in this region by the Viking Orbiter 1 in 1978 with 15m/pxl resolution images. They were located in valleys that debouched northwest in a basin for which Rice (1994) proposed a lacustrine origin. The field of dunes observed by MOC is located in one of the Brazos Valles south of Schiaparelli and might have been active recently (Thomas