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Mars Lander Based 1000m Class Drill

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The article describes system level design of a lander based drilling rig capable of probing Mars subsurface down to depth of several hundred meters. The paper describes

- Major subsystems of the drilling rig and their Earth-based analogs - A list of assumptions, science requirements and environmental constraints for the overall system and the major subsystems at each drilling depth of 100m, 300m and 1km. - A list of design drivers for each major subsystem based on science and Martian environmental requirements and spacecraft constraints. - Existing deep drilling technologies and their applicability to drilling on Mars - Several conceptual drilling systems based on low power, low mass drilling, navigation, debris transfer, overburden control, well casing, well completion, and hazard avoidance technologies used industry-wide as well as several UTD Inc. proprietary techniques.