

ADAPTING TERRESTRIAL TECHNOLOGY TO THE DESIGN OF A NIGHT-SURVIVABLE 10 METER PLUS LUNAR POLAR PROSPECTING DRILL. G. R. Baiden¹ and B. R. Blair², ¹CEO, Penguin Automated Systems Inc., Sudbury, Ontario, Canada, <gbaiden@penguinasi.com>, ²Penguin Automated Systems US Inc., Denver, Colorado, <planetminer@gmail.com>.

Introduction: This paper will explore the possibility of combining the Lunar and terrestrial drilling needs together for lunar polar exploration. While drilling in varying gravity environments is only theoretical at this point, the creation of a 10 metre or deeper Lunar polar drill that can survive through the night would represent a remarkable breakthrough if accomplished, enabling the collection of priceless scientific data that could validate current models for polar resources. Current lunar drill designs are limited to 1 meter or less. Novel drilling technology in mining and oil & gas exploration could fill the void and increase sampling depth. Penguin ASI is a patent holder of a new type of drill that grips the rock and thrusts based on ground pressure rather than gravity, enhancing its operational capabilities for lunar and asteroidal applications.

Cryogenic Drill Design: The focus of this presentation will be on the engineering steps needed to design, certify and de-risk drilling technology for lunar cryogenic applications. Moreover, the operational requirements to setup the drill, drill the hole and then move to the next drill site while managing the consumables for multi-day operation will be explored.

Spinoff Technology: Rock drilling is a key societal technology both terrestrially and extra-terrestrially. Advances in terrestrial drilling technology have been slowing to date as consumable designs for bits, steel and machines have not had an impetus to improve due to the nature of their in production rather than research. Therefore, significant commercial potential is also anticipated for technical breakthroughs.