

Interactive comment on “A low-cost autonomous rover for polar science” by Andrew O. Hoffman et al.

Schmidt (Referee)

walter.schmidt@fmi.fi

Received and published: 2 February 2019

General comments

The paper “A low-cost autonomous rover for polar science” by Andrew O. Hoffman, Hans Christian Steen-Larsen, Knut Christianson, and Christine Hvidberg describes the design, implementation and test of a light-weight and inexpensive autonomous rover for polar research. According to the authors it can be easily adapted for a wide range of scientific objectives and makes areas accessible which are difficult or expensive to explore using human field operatives. Due to the simple design it might be deployed without highly specialized know-how only available to the original development team like most previous rover missions. The article is well written and contains sufficient

C1

details to allow the reader an evaluation as to the concept’s usefulness for own application areas. Though the design focuses on a rover deployment on polar ice sheets, different applications in harsh environments seem to be feasible where direct human access might be difficult or dangerous.

Specific comments

Page 4, table 1: For what temperatures and/or snow densities are the given modulus values valid? Snow coherence and surface friction are heavily dependent on these environment conditions. As these conditions determine via the equation on line 20 under which conditions the design can be safely used, a rough estimate of the pressure under considered extreme conditions would be helpful.

Page 8, line 7-8: passive insulation to keep the battery above freezing? Is active, battery-powered heating needed to ensure this temperature at very low outside temperatures and intermittent low-power usage? See remark in the introduction of the article hinting at operation also under polar winter conditions.

Controller and electronics temperatures? What are the lowest temperatures the components of the control electronic can operate in? Does the electronics compartment need heaters to start and/or operate under very low external temperatures? Low temperature components are often built to military specifications and are expensive or restricted for political reasons to certain applications and owner countries.

Interactive comment on Geosci. Instrum. Method. Data Syst. Discuss.,
https://doi.org/10.5194/gi-2018-52, 2019.

C2