**Rubric Points**

Is the review of the state of the art, patents and currently available products appropriately thorough? *(full 10 points: review looked at a good range of applicable areas)*

Is there appropriate discussion/summarization of patents/ papers/ product literature?

*(full 10 points: summary provided with relevant information clearly identified with clear references to sources)*

The current BCMOS trail rider information to parallel the below is in appendix XX. Little literature exists to substantiate the engineering design and objective comparables of these current options. The Sage Journal article noted in the links below and manufacturer websites provided the following information.

Chair institute currently sells both the GRIT “Freedom Chair” and ORC “Off-Road Wheelchair” both of which draw parallels to the current Trail Rider. The GRIT is sold in limited configurations whereas the ORC is customizable, and the prices reflect this. The GRIT uses a patented lever drive system on a conventional two-wheeled wheelchair design with a 3rd front wheel for stabilization. There is also the option to propel by pushing along the wheels similar to a conventional wheelchair or be pushed. All components are quick-release mountain bike parts that can be disassembled to fit in any vehicle. The major advantage of this design is its modularity and low cost ($3000USD). The ORC parallels the design of the GRIT and uses the same patents but far exceeds it in price to provide a higher resolution of fit and superior personalization.

A more similar unit to the current version 4.0 Trail Rider is the Joelette. It has comparable one-wheeled geometry, braking mechanism, and ergonomics. The portability, and carry system for the rear sherpa is ergonomically superior, and the unit when folded has far superior portability. The Joelette does not include a rider interaction system and has no registered patents in its single wheel configuration. There is a double wheel kit with registered patents that involve a gas suspension and a trailing wheel for stability. Currently, only the single wheel Joelette is available and is fully equipped near $4000USD.

Each of the Joelette variations (with one wheel, and with the double-wheel kit) and the GRIT (identical for these purposes to the ORC) are superior to the current Trail Rider for their intended usage. The GRIT excels in urban class one situations and enables rider involvement, and the Joelette provides an equivalent user experience to the Trail Rider but is more portable and has superior ergonomics. Both the Joelette ($3500-$4500USD), and the GRIT ($3000USD) greatly undercut the cost of the Trail Rider ($6500USD) as well. As such, the most economical way of improving the current Trail Rider may be to incorporate aspects of these superior market comparables.

<https://www.gogrit.us/grit-freedom-chair-spartan-chair>

<https://chairinstitute.com/grit-freedom-chair/>

<http://www.joeletteandco.com/en/exclusive-manufacturer-of-the-joelette-all-terrain-chair/joelette-monoroue/#tab-1-2-technical-features>

<https://journals.sagepub.com/doi/full/10.1177/1687814017730541>