
ABSTRACT

This Request For Proposal (RFP) proposes an opportunity and its requirements for the powered wheelchair community. This design opportunity presented itself after interviewing powered wheelchair users as many voiced complaints about the difficulties of picking up objects they had dropped on the ground from their wheelchair.

The powered wheelchair community is anyone who uses an electric wheelchair. Since powered wheelchair users usually have limited mobility due to neurological or musculoskeletal disorders¹, if an item is dropped onto the ground, their elevated position and lack of mobility makes it difficult to pick up objects from the ground safely.

The vulnerability of the wheelchair community and the complexity of carrying out simple tasks presented the opportunity to create a design for the stakeholder that picks up or prevents objects from falling to the ground which would improve the stakeholder's independence and safety. The barriers that accompany this challenge are mainly due to the design of the wheelchair and the pre-existing medical conditions of the operator.

The main requirements of the design solution are that it is accessible to a variety of powered wheelchair users, effectively prevents the situation where an object cannot be retrieved by the user, retrieves a variety of objects, and ensures the safety of the user and the object being picked up.

Currently, the main solution to this problem is using reach-extension tools which actively retrieve objects using various gripping mechanisms². However, these are often ineffective as they cannot lift objects that do not have the ideal shape and size for the claw. Other existing solutions consist of object-holding devices aimed at preventing falling, passive retrieval solutions such as reel-in lanyards, and wheelchair training. These, however, also fail to meet the opportunity, as they either do not work for all objects or are not a viable option for everyone in the powered wheelchair community.

¹ Kairy, D., Rushton, P., Archambault, P., Pituch, E., Torkia, C., El Fathi, A., . . . Gourdeau, R. (2014). Exploring powered wheelchair users and their caregivers' perspectives on potential intelligent power wheelchair use: A qualitative study. *International Journal of Environmental Research and Public Health*, 11(2), 2244-2261. doi:10.3390/ijerph110202244

² Grab it reacher grabber pick up tool hand magnetic grabber tool. (2019, June 16). Retrieved February 26, 2021, from <https://www.hsmagnets.com/product/grab-it-reacher-grabber-pick-up-tool-hand-magnetic-grabber-tool/>