S. ISHIHARA, Y. KAWACHI, K. ISHIHARA, A. KANBE, R. ITSUKI. VR powered wheelchair maneuverability evaluation of an elder care facility. Gerontechnology 2018;17(Suppl): 180s; https://doi.org/10.4017/gt.2018.17.s.175.00 In Japan, 6,533 powered wheelchairs were sold in 2016 (not including 3 or 4 wheel electric scooters, Powered Chair Safety Assoc. http://www.den-ankyo.org/society/transition.html). As the population ages, the powered wheelchair is becoming more popular. There are many problems associated with powered wheelchair use. Three major causes are; (1) Maneuverability; (2) Small own room; and (3) Mechanical limitation of the powered wheelchair. Wheelchair users have difficulty in their physical abilities. Most operations are controlled with a single joystick, and switching of the joystick is basically in on/off base. Thus, linear analog control requires frequent switching. In corridors of corrective houses or elder care facilities, there are many still and moving obstacles like tray service carts and other walking elders. Own rooms in Japanese collective houses are small. These rooms often include a bed, chairs and a small sofa, a sink or a washbowl, small bookshelf, a TV set and a closet. Space remaining for a wheelchair is very limited. This study aims to simulate maneuvering in an elder's own room of a collective house and corridor using immersive VR. We have created a room and corridor 3D CG model. A room scale VR was setup with Oculus Rift. Long range scale VR of the corridor was set with Windows MR system. Seven participants (two in their 50s, 5 in 20s) have participated in a room evaluation. The place of the bed in the VR room was aligned with a real bed (in orange in the figure). Most of them recognized the difficulties of maneuvering powered wheelchair to approaching the bed and turn inside the room. We are now evaluating attention and collision avoidance maneuvers in a corridor model with different types of powered wheel chair and controllers.

Keywords: virtual reality, wheelchair, simulation
Address: Hiroshima International Univ., 555-36, Kurose-Gakuendai, Higashi-Hiroshima, Hiroshima, 724-0695 Japan;
E: i-shige@he.hirokoku-u.ac.jp

Figure 1. Left: VR scene of a room; Right: Room scale setting of Oculus Rift VR system