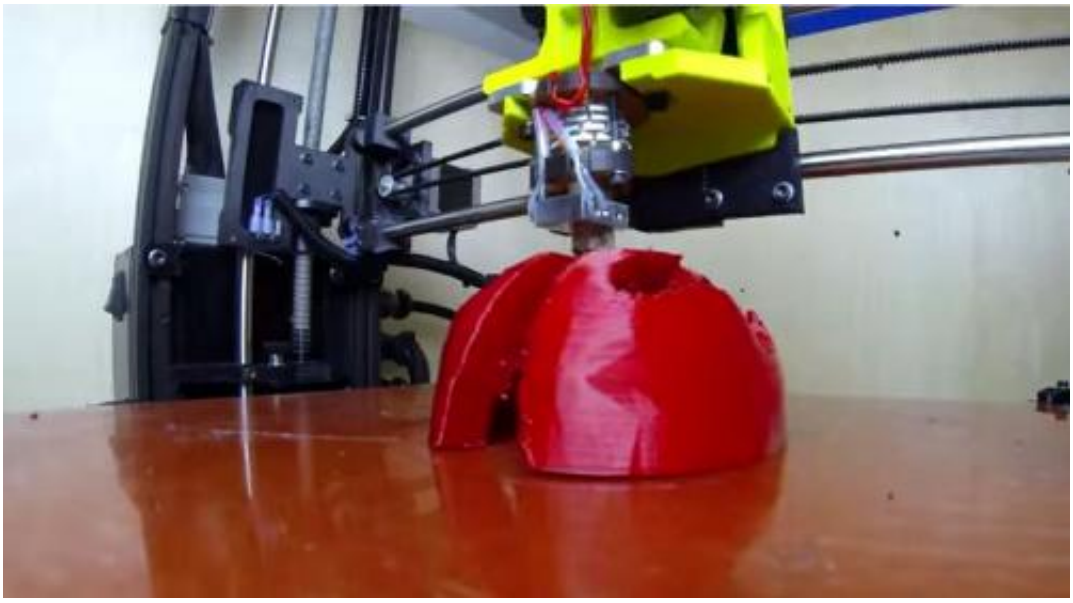
CSU lab team custom-build helmet liner for Brazil event (w/ video)

May 27 2014, by Nancy Owano



Viewers around the world preparing to watch the World Cup next month in Brazil are also to witness a special event where a paralyzed person, with the help of a robotic exoskeleton, will rise from a wheelchair, walk to the center of the field and kick a soccer ball. The mind-controlled exoskeleton is the work of an inspiring global collaboration among scientists, as part of the Walk Again Project. The exoskeleton is controlled by brain activity and is relaying feedback signals to the patient. The patient's cap picks up brain signals and relays them to a

computer in the backpack, decoding the signals and sending them to the legs. More details recently emerged from some of the collaborators, namely research efforts at Colorado State University, where the CSU team developed a protective, custom-made helmet liner for the patient to wear as part of the World Cup walk-again effort.

CSU's Vice President for Research Alan Rudolph asked David Prawel who oversees the university's Idea-2-Product 3D printing lab to create a custom lining for the helmet that the user will wear as part of the device. Lab director Prawel talked about the lab's work in a video recently released. Basically, a man or woman will use his or her brain to tell a robotic prosthesis to move the legs. Prawel noted the different focus areas of global teams to put this system in place. One team built the exoskeleton, basically an outside rigid frame which the patient will wear.

Other teams worked on the neuroscience aspects, while others were focused on circuitry and feedback mechanisms. The Colorado group worked on the helmet portion, and were asked to ensure the helmet performs two jobs, of protecting the patient's head against falls, and of making sure "we protect the electrodes," a complicated design of an immense number of data points involved in the scan of the patient's head,, he said, and the scan of the inside of the helmet. 3D printing technology offered the major benefit of speed at which constant tweaking could occur.

"The prosthesis user is outfitted with a cap dotted with electrodes that must be situated just so on the person's head so their brain can optimally communicate with the electrodes, which relay commands to the exoskeleton," said a report on their progress in The Coloradoan. "A custom-made lining ensures the electrodes line up exactly right under a hollowed-out Bern helmet." The report said the final product is a pliable head-sized thermoplastic urethane liner.

Citation: CSU lab team custom-build helmet liner for Brazil event (w/ video) (2014, May 27) retrieved 6 May 2024 from
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