There is no bath or shower in the ISS and rockets to Mars. No gravity makes it difficult to drain splash completely, so that water drifts in room and clings on the wall, which is very dangerous for astronauts/cosmonauts and machineries in the rocket. On the other hand, soaking in a bath/taking a shower is really good thing for relaxing and, of course, keeping sanitary. Although, wet towel and dry shampoo are used in the ISS, we imagine that it is far from perfect.

Our team “de-stress” solves “Rock-It Space Fashion and Design” to care physical and mental health for astronauts and cosmonauts. We propose a wearable bath, which is a total bath system. The most significant problem on taking a shower in the ISS is that the crew must clean up (i.e., wipe up) the splash. It must be very hard work, and so, no one wanted to take a shower. We consider that bath is suitable in the space because shower generate splash. However, a bath tub would not work in the environment of no gravity. So, we came up with a slim bath suits that covers the crew’s body and hot water is inside the suits. We put emphasis on “after finishing the bath”. We devised a way to achieve the situation that the body after putting off the suits has little splash. This means that no splash spread out, so that no clean up is needed. We believe that the refreshment for the crews will improve their performance and leads to success in their missions.

The wearable bath consists of bath suits, vital sensors, a fan and hands-free controller. (Please see the following URL: https://github.com/yukinagai/de-stress/blob/master/README.md ) The bath suits will be silicon or something waterproof and soft materials for full body below neck. It is equipped with pouring/draining/ventilation tubes for hot and warm water and drying the body roughly. The vital information is monitored using sensors to notify when to finish soaking. The fan is for cooling face/head. He/she can control the bath related things (e.g., the temperature of the water) by shaking the head, which is detected by a depth camera. The controller also collects the sensed data to monitor his/her vital status.

How to use:

1. Put the bath suits on (and may need to wear vital sensors)

2. Pour hot/warm water through the tubes.

3. Enjoy the bath!

3-a. If you feel hot, the fan will cool down your head

3-b. If you want change the temperature of the bath, hot or cold water flows into the suits from one tube and flows out of it from another one.

4. The system will notify you of finishing bath

5. Water in the suits is drained from the tube.

6. Warm wind blows from the ventilation tubes to dry the body roughly.

7. Put the suits off

7-a. The towels with the suits wipe the splash on the body. (Just the behavior of putting off is enough to do so)

7-b. No splash in room/on the wall

In this hackathon, we prototyped a tiny version of the concept, which is just for soaking the leg and the hand. It’s really good thing even this tiny version. We believe that the concept improves the physical and mental health of the crew members. Although the prototype system is completely handmade and works manually, it works fine. We want to know how it works in the space (i.e., no gravity) and find new and special issues there.