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EVERYWEAR, A HUMAN RESEARCH AND HEALTH MOBILE ASSISTANT FOR EXPLORATION

Abstract

EveryWear is a system dedicated to Human research and medical data collection for astronauts onboard the International Space Station ISS. The user interface is a mobile application deployed on station iPads. The EveryWear project is supported by the French Space Agency (CNES) and the European Space Agency (ESA) and is operated almost continuously since ISS mission 49 (2016) with very positive feedback from European astronauts enjoying the enhanced usability offered by mobile application ergonomics.

EveryWear medical functionalities, structured in different modules, include nutritional tracking and assessment, secure private messaging as well as medication intake recording. Per the nutritional assessment

module, the astronaut collects the personal food intake either by scanning food item barcodes via the iPad camera or by picking an item from the list of food items available on board. The amount of nutrient intake (e.g. calories, protein, etc.) is summed up and compared to the personal nutritional target defined by the flight surgeon and nutrition specialist. Trends over several days or weeks can be displayed. An advanced search function can direct the astronaut to food items with specified criteria of nutritional facts. The food item database can easily be updated any time by simple file uplink to accommodate for modified or added items. The private messaging module allows exchange of end-to-end encrypted text messages (incl. attachments) between crew and flight surgeon. Also, medication intake can be logged easily using this medical messaging stream.

EveryWear functionalities dedicated to science support include interfacing to remote devices, dynamic questionnaires, and private messaging with operational teams. During the PROXIMA mission of the French astronaut Thomas Pesquet, a smart-shirt, a biometric patch and a self-applied tonometer have so far been used in conjunction with EveryWear. Nowadays, EveryWear is connecting to a glucometer (CSA experiment "Vascular Aging"). Scientific questionnaires can easily be incorporated into the app by using a simple file uplink. The private messaging functionality allows for exchange of personal medical information related to an experiment protocol.

Multiple support teams and multiple crewmembers can use EveryWear autonomously and simultaneously. The system ensures end-to-end encryption between crew and designated recipient for each type of data and for each crewmember.