Editorial

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Putting together this special issue about human computer interactions related to spaceflight has been exciting and rewarding. We have collected research and design work testimonies in several areas related to HCI with a special focus on multidisciplinary contributions and explorative approaches. Each of the articles in this issue represents a key component toward our advancement of human spaceflight.

This issue opens with an insightful article describing usability guidelines as well as tools to analyze, model and test human-machine collaborations in space. These topics are helpful for improving crew performance, particularly when accomplishing procedures for nominal and off-nominal events.

An insightful study on personal digital assistants (PDAs) for onboard applications is a nascent and potentially fruitful area of technology for spaceflight. The article on this topic discusses the involvement of space crew representatives and evaluation exercises at the European Astronaut Centre training facilities for the suitability of introducing PDAs onboard.

Another key portion of this issue is dedicated to the challenges and opportunities of designing large-scale pervasive systems, particularly deep space colonies that may

become established once spaceflight becomes more commonplace. This article identifies issues for future research and provides a shift in perspective that challenges the way pervasive systems on Earth are considered.

In addition, this issue contains an extended section that focuses on space habitat design for extreme conditions, with perspectives from space anthropology, environmental design, space art, and space psychology. By combining contributions from natural design philosophy and human-centred design, the authors of this section describe a range of solutions and innovative ideas on how to increase habitability in space.

HCI related to health in space is another key subject in this issue. The associated article showcases new applications of brain-computer interfaces in which astronauts could potentially perform direct mental teleoperation of external semi-automatic manipulators.

This issue concludes with the topic of living in low-gravity environments, and how the design of interior environments in outer space involves the interaction of technology and humanity to impact astronaut experiences and well-being. The article includes contributions from an experienced astronaut and a zero-g environmental designer.

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