

## Standing on an asteroid: using virtual reality for outreach and education

\*Elizabeth Tasker<sup>1</sup>, Alexander Kaurov<sup>2,3</sup>

1. Institute of Space and Astronautical Science (ISAS), JAXA, 2. Institute for Advanced Study, 3. OmniScope

Virtual reality presentations offer an immersive and interactive environment to share scientific material. From standing on the surface of a planetary body or deep underwater on the ocean floor, to holding three dimensional models of instruments or spacecraft, virtual reality can provide an experience impossible to replicate in classrooms or conference halls.

With museums and planetariums currently unable to welcome large gatherings, the use of virtual worlds can bring their immersive presentations online to reach audiences around the globe, and enable the opportunity to interact with scientists live in virtual meeting spaces. This interaction ability is also applicable to online conferences, which often struggle to replicate the collaboration potential of in-person meetings despite the growing need for remote alternatives due to environmental impact or financial restrictions.

As a proof-of-concept, we developed an experience that covers the Hayabusa2 asteroid exploration mission led by JAXA. This virtual tour contains custom designed scenes that recreate both real and fictitious places, including the asteroid surface and the mythological palace of Ryugu-jo from the tale of Urashima Taro. With the use of the Mozilla Hubs platform, multiple people can share the same virtual space with the lecturer and interact with the environment (exploring the scenes and handling models of the spacecraft) as well as one another. The cross-platform capability of Hubs allows people to connect from almost any system, from a virtual reality headset through to a computer web browser or smart phone. We are currently testing and learning ways to present effectively in the virtual worlds and design new environments for effective learning and sharing of ideas.

Keywords: virtual reality, outreach, education, planetary science

