

Outreach Activities with the use of KARUTA on UZUME Project (Unprecedented Zipangu Underworld of the Moon Exploration)

ARAI, Mayumi^{1*}; FUJIWARA, Yasushi²; NICOSPYDER, -³; YAMADA, Tatsuya⁵; HARUYAMA, Junichi⁴; KAWANO, Isao⁴

¹Miraikan, ²Mukainooka Technical High School, ³Illustrator, ⁴JAXA, ⁵Knospear

In 2009, the science team of Japanese Lunar explore SELENE (SELenological and Engineering Explore) called KAGUYA, discovered three big holes on the Moon; never before discovered. The diameter of these holes range from 50 to 100 m in scale.

These are assumed to be spreading laterally at the bottom of these holes.

These holes are considered to be left over lava tubes similar to those seen around Mt. Fuji, Seju island and Hawaii.

Currently planned exploration of lunar and planetary subsurface caverns, UZUME project (Unprecedented Zipangu Underworld of the Moon Exploration) is to explore planetary holes and subsurface caverns on Moon and Mars.

In particular, we are thinking to bring exploration for life signs, as well as geological survey, geomorphic investigation and environmental survey as might be necessary for a future lunar base.

We are working towards using Japanese advanced robotic technology to move quickly ahead of other countries.

Then we, UZUME's team considered that outreach is an important method to accomplish the exploration. In order to encourage support from the general public and to make them understand significance of exploration.

It is important to offer a simple exploration and to get them interested enough for the general public to actively participate.

Looking for opportunities and chances to motivate the public to support this research project, the team determined that a majority of the public would not pay much attention at the beginning because people are busy, there's no effect on their affairs or their daily life, and many people would find science interesting

We thought it is necessary to include elements of excitement intentionally, for example, interesting parts of exploration, exciting things, and motivation for wanting to help.

So, we developed a set of playing cards (Japanese Karuta games) on UZUME as a tool to introduce our exploration projects. We considered that playing cards could be one of the most effective tool for the children and adults who have no knowledge about space developments as well as UZUME projects.

We consider Japanese karuta games as an ultimate science communication tool which has short and compressed topics about features of research. And it also has a functional role in base science illustration using simple pictures or photos/figures suitable for the reading cards (cards with words).

The prototype UZUME karuta was completed in October 2014. Then we exhibited it and used it for play during children's science festival in Kanagawa prefecture in 2014 and 2015. According to the questionnaire results, users' satisfaction was high and many people showed interest for underworld exploration of the Moon.

We felt that our goal was largely achieved.

Including the future promotion and dissemination of karuta, we would like to continue to develop a new outreach program together with the use of UZUME Karuta.

In the future, our plan will be to popularize not only karuta, but also developing new outreach program.

Keywords: Lunar and Planetary Subsurface Caverns, UZUME, Citizen Participation, Science Communication, Outreach, KARUTA