

## Searching SCI craters: Results of a Hayabusa2 landing site selection dry-run

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The Hayabusa2 mission plans to create an artificial crater by **Small Carry-on Impactor (SCI)** onboard the Hayabusa2 spacecraft (SC) to access the interior of the C-type asteroid Ryugu. **Deployable CAMera system 3 (DCAM3)** onboard the SC will be separated from the SC during the SCI operation and observe in-situ crater formation. **Optical Navigation Camera (ONC)** onboard the SC will take scanning images of the cratered area from 1.5 km altitude 2-weeks before and after the SCI operation, which enable us to find the SCI crater. **Landing Site Selection** for the third touch down nearby the **SCI** crater (LSS-SCI) will be performed within 3 days after the post SCI-crater searching operation. We carried out the LSS-SCI dry-run test by using the asteroid Ryugu analog shape model "Ryugoid". ONC images were synthesized from the shape model by simulating observation conditions planned for the pre- and post-SCI-crater searching operation. In the shape model for the post SCI-crater searching operation, a total of 18 or 19 SCI-craters and 2 or 3 MASCOTs (**Mobile Asteroid surface SCOuT**, a lander developed by DLR and CNES) were created on the Ryugoid surface to simulate various conditions of SCI impacts and MASCOT landings. By comparing pre- and post-impact images, it was confirmed in the first review meeting that our searching team discovered 13 craters and 2 MASCOTs. We found it difficult to identify craters less than 10 pixels in the low altitude images. We noticed the necessity of quickly recognizing artifact noises derived from image processing such as radiometric, distortion, and photometric corrections including flat-field calibration. In the dry-run test, procedures on data processing, data supply for the searching team, and band selection were also established. The presence of undiscovered craters suggests that some craters are formed in the shadow of large boulders or out of the observation area, or hard to be identified due to lack of pre-impact images. We will introduce progress and struggle of the searching team.

Keywords: Hayabusa2, Small Carry-on Impactor (SCI) , impact crater