PLANS OF HAYABUSA2's ONC IMAGE ARCHIVING AND PUBLIC RELEASE . R. Honda[1], Y. Yokota[1,2], M. Yamada[3], Y. Yamamoto[2], S. Murakami[2], K. Crombie[4], E. Tatsumi[5,6,7], T. Kouyama[8], T. Morota[7,9], M. Matsuoka[2], S. Sugita[7] S. Kameda[10], H. Suzuki[11], N. Sakatani[2], Y. Cho[5], M. Hayakawa[2], C. Honda[13], K. Yoshioka[5], H. Sawada[2], N. Hirata[12], N. Hirata[13,] A. Miura[2], H. Ohtake[2], H. Sato[2], H. Kikuchi[2]
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Introduction: JAXA's asteroid explorer Hayabusa2 has been continuing the observation of asteroid Ryugu since its arrival to Ryugu on 28th June, 2018. Optical navigation camera suite (ONC) [1] onboard Hayabusa2 is composed of two wide-angle camera ONC-W1, ONC-W2 and the telescopic multiband camera ONC-T capable of taking 7 narrow-band images ranging from 0.40 to 0.95 μm (ul, b, v, na, w, x, p) using a filter wheel. Hayabusa2 succeeded in two touchdown to Ryugu for sampling in February and July, 2019 and also succeeded in artificial cratering experiments using a Small Carry-on Impactor (SCI). Variety of images including global mapping, high resolution images of limited areas during descending operation, sequential images during touchdown and change due to SCI cratering have been obtained during 14 month observation. We are now preparing the dataset for release to public. In this presentation, we introduce a overview of the ONC image dataset, plan of image archiving for multi-purpose analysis including geomorphology, photometry and spectroscopy such as [1][2]. The schedule of public release is also introduced.

The overview of ONC image dataset: Table 1 summarizes the contents of the major ONC image data subset in chronological order. Total of about 8700 images are acquired at the end of August, 2019. As shown in Fig. 1, during 14 month observation after the arrival to Ryugu, solar phase angle has changed from 19 deg. to 0 deg. at solar conjunction in December, 2018. After that the solar phase angle has increased up to 39 deg. As a result, several set of global mapping at home position (altitude 20 km) are acquired at different phase angles. These data can be utilized to photometric studies or geomorphological study at the different illumination condition.

As global mapping, ONC-T's v band images are taken at the 3 deg. rotational angle for shape model construction. Total of five data set (20180630, 20180710, 20190115, 20190121, 20190725) are acquired in this mode. On the other hand, ONC-T's multi band images are taken at every 30 deg. rotational angle interval are obtained as four dataset at Box-A (Home position, 20180703, 20180710, 20190131, 20190521) and six data set of BOX-B (tour observation in longitudinal direction, 20180831, 20190108, 20190124, 20190814, 20190819, 20190824).

Table 1. Representative ONC image subset

Date	Contents	Altitude (km)
20190710, 0712	**Box-A global** mapping	20
20180719-0729	**Box-C1**: tour to low altitude, E-W stereo **(global)**	5-7
20180801	Mid. altitude **global** observation	5
20180825-0907	**Box-B1**: tour to polar region **(global)**	20
20180911	Touchdown 1 rehearsal 1	3
20190920-0921	Minerva II 1	-
20191002-1003	Mascot Separation	Descent
20191002	**Global** mapping during Mascot operation	3
20191014-1015	Touchdown 1 rehearsal 1A	Descent
20191024-1025	Touchdown 1 rehearsal 3	>0.02
20181030-1101	**Box-C2**: tour to low altitude **(global)**	5
20190108, 0124	**Box-B2, B3**: tour to opposition area **(global)**	20
20190131	**Box-A: globa**l mapping	20
20190221-0222	Touchdown 1	>0
20190227-0301	**Box-C3**: tour to low altitude **(global)**	5
20190308, 0309	Descent to SCI target area	Descent
20190321, 424	**CRA1**: scan observation of SCI target area	1.7
20190404-0405	SCI separation	-
20190424	**CRA2**: scan observation of SCI target area	1.7
20190515-0516	PPTD(pin-point touchdown)-TM1: rehearsal (abort)	> 0.05
20190521	**Box-A global** mapping	20
20190529-0530	PPTD-TM1A: rehearsal	>0.02
20190612-0613	PPTD-TM1B: rehearsal	>0.02
20190710-20711	PPTD	>0
20190724-0727	**Box-C4:** tour to low altitude and poles **(global)**	5
20190814, 0819, 0824	**Box-B5, B6:** tour to phase angle 13, 30, 46 deg **(global)**	20

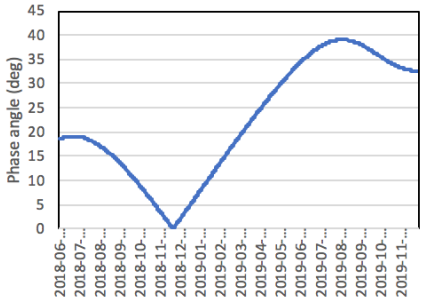

Fig. 1 Solar phase angle during Hayabusa2 proximity phase.

The product and schedule of public release: Table 2 shows the definition of product that we are planning to create as a data archive. The data is going to be prepared in PDS4 format. To improve the availability of the image data set, we are also preparing the pixel to pixel backplane data of the images including such as longitude, latitude, geometrical viewing conditions such as ones created for first Hayabusa's camera (AMICA) [5]. Together with this backplane data, multi-dimensional dataset including backplane and spectrum information and time will be composed. By extracting relevant cross section from this data set, studies utilizing machine learning techniques such as clustering[4][5] or flexible analysis on photometry[6] will become easier. In addition, correlation analysis of the multiple attributes will be enabled by a such database.

Table 2 Product level definition

Level	Specification
L2a	Raw / Onboard Calibrated Image
L2b	Calibrated Image
L2c	Distortion Corrected Irradiance Data
L2d(L2dr)	I/F Image (and its co-registered image among the bands)
L2e(L2er)	Reflectance Image (and its co-registered image among the bands)
L3{d, e}	Projected on the latitude-longitude map
L2dbp	Backplane(lat., lon., i, e, g, range)

Table 3 shows the current public release schedule. The data is planned to be released to public stepwisely. Since we are still under the review process of PDS4 , we are planning to release data in provisional format firstly from September-October, 2019, and update them afterwards. A complete data set of proximity phase in authentic PDS4 format will be released in Dec. 2020.

Table 3 Schedule of public release

Date	Content
Sept. – Oct. 2019	L2a-d, First Box-A global mapping(20180710, 20180712)
Dec., 2019	L2a-d of mid. altitude global mapping (20180801)
June., 2020	L2a-d of acquired by first touchdown rehearsal (20180911)
Dec. , 2020	L2a-d and the backplane data acquired in the proximity phase.

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