

MBUS Quick Start Guide

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The MBUS bundle is the set of lander housekeeping records for each MASCOT Lander observation set. The housekeeping readings only pertain to the lander bus and should not be confused with any instrument specific housekeeping reported in other MASCOT bundles.

The MBUS bundle contains two collections: document and data_hk

The document collection contains three documents:

- MSC-RB-MC-OPS-RP-0001_MASCOT_Landing_1.3.pdf is the operations document that describes the preparation for separation, separation, landing, and asteroid operations of the MASCOT Lander. This document describes the operational life of the MASCOT lander and the command sequences used to control the lander throughout its three day lifetime.
- MSC-RB-MC-PDS-0001_MASCOT_System_Data_for_PDS_1.4.pdf is the description of the MASCOT Lander housekeeping data that has been delivered to the PDS. Table 1 of this document contains the list of lander activities for which sets of housekeeping data have been provided. This list is consistent with the sub-directory names in the data_hk collection.
- mbus_quick_start.pdf is the document you are reading.

The data_hk collection contains 15 directories that correspond to the 15 flight activities that were deemed scientifically important by the MASCOT Operations Team. Each of the directories contains sets of housekeeping data and PDS4 label pairs. The housekeeping data sets are divided by Lander subsystems or instrument. Housekeeping parameters and descriptions can be found in Table 3 of MSC-RB-MC-PDS-0001_MASCOT_System_Data_for_PDS. Generally, temperature parameters are in degrees C, voltages in V, and amps in milliamps. Table 3 is the definitive source for housekeeping units.

The following list is a description of the parameters included in each type of housekeeping data file. Filenames begin with the following terms and end with the MASCOT activity described by Table 3 of MSC-RB-MC-PDS-0001_MASCOT_System_Data_for_PDS.

- All_Currents – Collection of all BUS electrical current measurements
- All_Temperatures – Collection of all BUS temperature measurements
- All_Voltages – Collection of all BUS voltage measurements
- CAM_Image – Collection of parameters requested by the Camera (CAM) Team
- COM – Collection of parameters requested by the Communication via radio link (COM) Team.
- Cordero – Collection of parameters requested by the Onboard Computer Subsystem Authority
- GNC-1 – First collection of bus diagnostic parameters requested by the Guidance Navigation and Control Subsystem Authority.
- GncMgr_Diag_Data – Second collection of bus diagnostic parameters requested by the Guidance Navigation and Control Subsystem Authority.
- HY2 – These measurements were made by HY2 Sensors, which are related to MASCOT. Most of them were made outside MASCOT, e.g. the electrical current for MASCOT. However, two temperature sensors were actually inside MASCOT, but were electrically connected to Hayabusa2 systems and were evaluated by Hayabusa2.
- MARA_Status – Collection of status parameters requested by the MARA Principle Investigator
- MARA_Temp_Units – Collection of temperatures requested by the MARA Principle Investigator
- MARA_Units_Temp – Collection of parameters about other MASCOT Units, which are relevant for MARA as requested by the MARA Principle Investigator
- PEC_OPS_Sensors – Photo Electric Cell Sensors and Optical Proximity Sensors RM000005 – Telemetry parameters of the Communication Manager Diagnostics Data Packet (RM000005)
- SM000032_33 – Parameters of the packets SM000032 and SM000033 as requested by the Onboard Computer Subsystem Authority
- System_housekeeping-1 – First set of vital housekeeping parameters for all participants
- System_housekeeping-2 – Second set of vital housekeeping parameters for all participants (may not be present for all activities)

Relevant references:

Ho et al. (2017) provides an overview of MASCOT and its instruments. DOI: <https://doi.org/10.1007/s11214-016-0251-6>, Space Science Reviews, Volume 208, Issue 1-4, pp. 339-374, 2017.

Sholten et al. (2019) has an analysis of the MASCOT trajectory during descent and bouncing, along with a table of position and velocity with time. *Astronomy & Astrophysics*, 634, L3 (2019)
DOI: 10.1051/0004-6361/201936757, "The descent and bouncing path of the Hayabusa2 lander MASCOT at asteroid (162173) Ryugu".