

Dataset for: Microgravity Penetrometry Flight Campaign in Support of MMX Sampler Science Exploitation

SND-ID: 2025-38. **Version:** 1. **DOI:** <https://doi.org/10.5878/yvsp-1a71>

Download data

ReactionForce_ExtensionDepth_Data.zip (7.84 MB)

Videos.zip (718.16 MB)

Associated documentation

Matrix for Data.xlsx (12.18 KB)

ReadMe.txt (2.51 KB)

SampleOfData_Flight1_Parabola2/ReactionForce_ExtensionDepth_Data/Flight1_Parabola2_1.xlsx (11.86 KB)

SampleOfData_Flight1_Parabola2/ReactionForce_ExtensionDepth_Data/Flight1_Parabola2_2.xlsx (11.85 KB)

SampleOfData_Flight1_Parabola2/ReactionForce_ExtensionDepth_Data/Flight1_Parabola2_3.xlsx (11.86 KB)

SampleOfData_Flight1_Parabola2/ReactionForce_ExtensionDepth_Data/Flight1_Parabola2_4.xlsx (11.92 KB)

SampleOfData_Flight1_Parabola2/ReactionForce_ExtensionDepth_Data/Flight1_Parabola2_6.xlsx (11.79 KB)

SampleOfData_Flight1_Parabola2/ReactionForce_ExtensionDepth_Data/Flight1_Parabola2_7.xlsx (11.79 KB)

SampleOfData_Flight1_Parabola2/ReactionForce_ExtensionDepth_Data/Flight1_Parabola2_8.xlsx (11.86 KB)

SampleOfData_Flight1_Parabola2/ReactionForce_ExtensionDepth_Data/Flight1_Parabola2_9.xlsx (11.79 KB)

SampleOfData_Flight1_Parabola2/Videos/Flight1_Parabola2.mp4 (16.5 MB)

Download all files

2025-38-1.zip (~742.61 MB)

Citation

Smyth-Moore, A., & Hagermann, A. (2025) Dataset for: Microgravity Penetrometry Flight Campaign in Support of MMX Sampler Science Exploitation (Version 1) [Data set]. Luleå University of Technology. Available at: <https://doi.org/10.5878/yvsp-1a71>

Creator/Principal investigator(s)

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Research principal

Description

This dataset includes penetration data collected from a parabolic flight experiment described in Smyth-Moore et al. 2025: "Microgravity Penetrometry Flight Campaign in Support of MMX Sampler Science Exploitation". Data includes Reaction Force and penetration depth measurements for penetrometer penetrations, separated for each individual penetrometer, plus video footage obtained of each penetration for each parabola. A key is provided to understand which specific set of data is related to the penetration that has a specific penetration velocity, tip shape and sample material.

Data contains personal data

No

Language

[English](#)

Time period(s) investigated

2022-11-22 – 2022-11-22

2022-11-23 – 2022-11-23

2022-11-24 – 2022-11-24

Data format / data structure

[Numeric](#)

[Video](#)

Data collection 1

- Mode of collection: Experiment
- Description of the mode of collection: This data was collected by a penetrometry experiment on a parabolic experiment. The tools used to measure the data was video cameras for video footage, force sensors to measure reaction force and linear actuators to measure extension distance.
- Time period(s) for data collection: 2020-12-13 – 2025-03-20
- Data collector: Luleå University of Technology
- Instrument: Force Sensor - A force-sensing resistor is a material whose resistance changes when a force, pressure or mechanical stress is applied.
- Instrument: Linear Actuator - A linear actuator is an actuator that creates linear motion (i.e., in a straight line), in contrast to the circular motion of a conventional electric motor. A linear actuator can record the extension depth of the actuator.
- Instrument: Video Camera - A video camera is an optical instrument that captures videos.
- Sample: University of Tokyo Simulant- Simple Version (UTPS-S)
A regolith simulant developed by the University of Tokyo to simulate the surface mechanical properties of Phobos.
- Sample: Silica Glass Beads
Silica Glass beads of sizes 600 micron to 5 mm in diameter.
- Temporal resolution: 90 second

Responsible department/unit

Space Technology, Department of Computer Science, Electrical and Space Engineering

Funding

- Funding agency: Swedish National Space Agency (SNSA)
- Funding agency's reference number: 2022-00308
- Funding information: This project received support by Swedish National Space Agency (SNSA).
DNR:2022-00308

Research area

[Physical sciences](#) (Standard för svensk indelning av forskningsämnen 2011)

[Meteorology and atmospheric sciences](#) (Standard för svensk indelning av forskningsämnen 2011)

Keywords

[Asteroids](#), [Cohesion](#), [Microgravity](#), [Parabolic flight](#), [Penetrometers](#), [Phobos](#), [Regolith](#)

Publications

Smyth-Moore et al., Microgravity Penetrometry Flight Campaign in Support of MMX Sampler Science Exploitation, Progress in Earth and Planetary Science, 2025)

Accessibility level

Access to data through SND

Data are freely accessible

Use of data

[Things to consider when using data shared through SND](#)

License

[CC BY 4.0](#)

Versions

Version 1. 2025-02-11

This resource has the following relations

References [Surface environment of Phobos and Phobos simulant UTPS.](#)

Download metadata

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[DDI 3.3](#)

[DCAT-AP-SE 2.0](#)

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[File overview \(CSV\)](#)

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