This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No *776276-PLANMAP*

Grant Agreement	776276
Acronym	PLANMAP
Project full title	Planetary mapping
Deliverable	**D 7.6**
Deliverable Name	**Public data/code delivery**
Nature of deliverable	ORDP
Dissemination level	PU
Scheduled delivery date`	31h March 2020 → 15th May 2020
Status	FINAL
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Executive summary

Planmap-produced code, notebooks, scripts and snippets are provided and kept updated within the Planmap GitHub organisation in several repositories. Code related to the Planmap web app (data fusion portal, file-based access, web mapping components), as well as storymaps are also provided on dedicated repositories with self-explaining naming. Data are available on the Planmap data portal and related web services, as well as prepared for the ESA Guest Storage Facility (GSF). Software releases have been be provided as needed as Zenodo/OpenAIRE DOI-citable objects. Since the creation of the Planmap data archive and GitHub organisation, data and code have been periodically and spontaneously added and made publicly available.

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List of Acronyms

Acronym	Description
DMP	Data Management Plan
ESA	European Space Agency
ESAC	European Space Astronomy Centre (ESA centre)
ESDC	ESA Science Data Centre
GDAL	Geospatial Data Abstraction Library
GIS	Geographic Information System
GSF	Guest Storage Facility (at ESA ESAC)
OGC	Open Geospatial Consortium
PM_ID	PlanMap IDentification (i.e. planmap map short name)
WCS	Web Coverage Service
WFS	Web Feature Service
WMS	Web Map Service

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Introduction

Planmap-related software code is open source and publicly available through GitHub, the main point of access is the Planmap-EU GitHub organization.

The repositories published by Planmap are organized after the software components in the project's infrastructure for the sake of simplicity and better access of the interested user, according to the different skills allowed by the project's audience.

Data availability and access

Data from Planmap (D7.2-public) are available via the project map portal. Planmap map files are available individually or as compressed packages for download.

The prime points of access for data is on:

- The Planmap data directory - https://data.planmap.eu/
- The Planmap data portal - https://maps.planmap.eu/
- The Planmap Geoserver backend - https://geoserver.planmap.eu/

Additional regular or derived data supporting WP8 are also available

Data versioning

Planmap data used to have the version number embedded in the PM_ID (See D7.4). From the present release onwards (including ESA GSF delivery) the PM_ID has been simplified (see also D7.5, Rossi et al., 2020). Versioning is now embedded on https://data.planmap.eu in subdirectories as needed, (see Table 1):

Mercury	Mars	Moon
. ├── PM-MER-C-H05 │ ├── document │ └── raster ├── PM-MER-MS-H02_3cc │ ├── document │ ├── raster │ └── vector ├── PM-MER-MS-H05_3cc │ ├── document │ ├── raster │ └── vector ├── PM-MER-MS-H05_5cc │ ├── document	. ├── PM-MAR-C-Arsinoes │ ├── document │ └── raster ├── PM-MAR-C-Crommelin │ ├── document │ └── raster ├── PM-MAR-D-Crommelin │ └── model ├── PM-MAR-D-Gale_kimberley │ ├── model │ └── other ├── PM-MAR-MS-Arsinoes │ ├── document	. ├── PM-MOO-C-SPAApollo │ ├── document │ └── raster ├── PM-MOO-MS-Copernicus │ ├── document │ ├── raster │ └── vector ├── PM-MOO-MS-SPAApollo │ ├── document │ ├── raster │ └── vector └── versions ├── PM-MOO-C-SPAApollo_01

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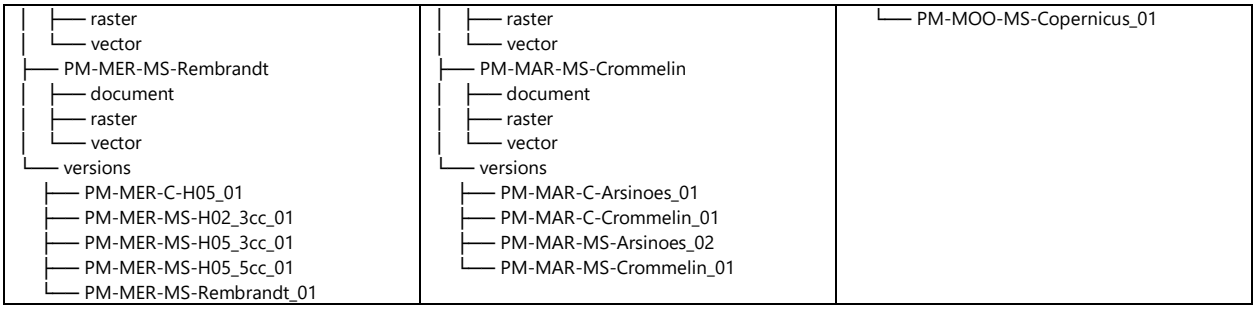

│ ├── raster │ └── vector ├── PM-MER-MS-Rembrandt │ ├── document │ ├── raster │ └── vector └── versions ├── PM-MER-C-H05_01 ├── PM-MER-MS-H02_3cc_01 ├── PM-MER-MS-H05_3cc_01 ├── PM-MER-MS-H05_5cc_01 └── PM-MER-MS-Rembrandt_01	│ ├── raster │ └── vector ├── PM-MAR-MS-Crommelin │ ├── document │ ├── raster │ └── vector └── versions ├── PM-MAR-C-Arsinoes_01 ├── PM-MAR-C-Crommelin_01 ├── PM-MAR-MS-Arsinoes_02 └── PM-MAR-MS-Crommelin_01	└── PM-MOO-MS-Copernicus_01

Table 1: Directory tree of current Planmap data archive on data.planmap.eu. PM_ID versioning is now handled via subdirectories, with a simplification of the top-level map naming and directory structure.

Data formats

Map layouts are provided in pdf format. Data are provided in commonly used or standard geospatial file formats, both for raster (GDAL-compatible geotiff, plus, as needed ENVI .hdr format, ISIS3 .cub or alike) and vector (OGC geopackage) formats. All raster formats used are GDAL-compatible.

Please see also the updated DMP (Rossi et al, 2020, D7.5).

Data updates (from last release)

The previous formal release of data included morphostratigraphic and compositional map (see D7.4, Rossi et al., 2019). The present release includes, based on previous deliverables from WP5 (D5.1, D5.2, Caravaca et al. 2019, 2020) and WP6 (D6.1, Pozzobon et al., 2020), also digital outcrop and geologic models ("D" type Planmap products). A summary of currently release Planmap maps on the data portal is summarised in Table 2.

PM_ID	Version	Map title	Target body	link
PM-MER-MS-H02_3cc	01	Victoria Quadrangle	Mercury	https://data.planmap.eu/pub/mercury/PM-MER-MS-H02_3cc/

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PM-MER-MS-H05_3cc	02	Hokusai Quadrangle (3 classes)	Mercury	https://data.planmap.eu/pub/mercury/PM-MER-MS-H05_3cc/
PM-MER-MS-H05_5cc	02	Hokusai Quadrangle (5 classes)	Mercury	https://data.planmap.eu/pub/mercury/PM-MER-MS-H05_5cc/
PM-MER-C-H05	02	Hokusai Quadrangle compositional map	Mercury	https://data.planmap.eu/pub/mercury/PM-MER-C-H05/
PM-MER-MS-Rembrandt	01	Rembrandt basin	Mercury	https://data.planmap.eu/pub/mercury/PM-MER-MS-Rembrandt/
PM-MAR-MS-Crommelin	02	Crommelin	Mars	https://data.planmap.eu/pub/mars/PM-MAR-MS-Crommelin/
PM-MAR-C-Crommelin	02	Crommelin	Mars	https://data.planmap.eu/pub/mars/PM-MAR-C-Crommelin/
PM-MAR-D-Crommelin	01	Crommelin	Mars	https://data.planmap.eu/pub/mars/PM-MAR-D-Crommelin/
PM-MAR-D-Gale_Kimberley	01	Gale_Kimberley	Mars	https://data.planmap.eu/pub/mars/PM-MAR-D-Gale_kimberley/
PM-MAR-C-Arsinoes	02	Arsinoes	Mars	https://data.planmap.eu/pub/mars/PM-MAR-C-Arsinoes/
PM-MAR-MS-Arsinoes	03	Arsinoes	Mars	https://data.planmap.eu/pub/mars/PM-MAR-MS-Arsinoes/
PM-MOO-MS-SPAApollo	01	Apollo SPA Basin	Moon	https://data.planmap.eu/pub/moon/PM-MOO-MS-SPAApollo/
PM-MOO-C-SPAApollo	02	Apollo SPA Basin	Moon	https://data.planmap.eu/pub/moon/PM-MOO-C-SPAApollo/

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PM-MOO-MS-Copernicus	02	Copernicus	Moon	https://data.planmap.eu/pub/moon/PM-MOO-MS-Copernicus/
PM-MER-C-Beethoven	01	Beethoven	Mercury	https://data.planmap.eu/pub/mercury/PM-MER-C-Beethoven/
PM-MER-C-Rembrandt	01	Rembrandt	Mercury	https://data.planmap.eu/pub/mercury/PM-MER-C-Rembrandt/

Table 2: Directory tree of current Planmap data archive on data.planmap.eu. PM_ID versioning is now handled via subdirectories, with a simplification of the top-level map naming and directory structure.

Data and metadata preparation for ESA GSF

The Planmap data archive structure is used also for ESA GSF delivery, for which each Planmap map is going to be considered as a single dataset, i.e. 1 DOI per map.

Currently a subset of Planmap map-wide metadata[1] is used for ESA GSF dataset-wide metadata. See also (See also D7.5, Rossi et al., 2020).

Code availability

The main point of access for codes is the Planmap GitHub organisation where several repositories are located.

https://github.com/planmap-eu

Semi-automated workflows and utilities

This repository contains data and codes relevant to data processing and map generation for the production of PLANMAP products.

Each subdirectory contains tools and code related to a different Planmap's activity. Please refer to the specific readme files in each repository and subdirectory.

[1] E.g. https://data.planmap.eu/pub/mars/PM-MAR-MS-Arsinoes/

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https://github.com/planmap-eu/planmap-notebooks-code

Web/data access client/server code and configuration

Code released and related to D7.2-public is briefly described below. Please refer to D7.2-public for more general details and to relevant repositories and links listed below for deeper technical aspects.

Client-side

Any updates to the web client are and are going to be pushed on the GitHub repo.

https://github.com/planmap-eu/planmap-app-client

Server-side

Any updates to the web client are and are going to be pushed on the GitHub repo.

https://github.com/planmap-eu/planmap-app-server

Storymap code

The Storymap web app is regularly updated and the latest version of the app code is always available on the GitHub repo (see also Brandt and Rossi, 2019)

https://github.com/planmap-eu/storymaps

See also D8.11 (Rossi et al., 2019).

Planmap package validator

The production of Planmap packages goes through a validation step which makes use of some scripts. They are kept in the following repository:

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https://github.com/planmap-eu/package_validator

Sharpy

Subsurface mapping using sounding radars, particularly at high latitudes on Mars, within WP6, has led to the development of tools for access, visualisation and integration in a 3D environment the NASA MRO SHARAD radargrams (Penasa, 2020). Sharpy.

https://github.com/planmap-eu/sharpy

Workshop support code and documentation

Previous workshop with Planmap involvement and tutorial, documentation is available on the GitHub organisation as separate repositories, e.g. on:

https://github.com/planmap-eu/3d-data-workshop-open-source-tools

Guides

The Planmap Guides repository contains guides and non-automated workflows for planetary mapping. Automated workflows are included in the repo notebooks & code.

The presented material will be subject of continuous improvements and updates.

https://github.com/planmap-eu/planmap-guides

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Additional materials

Any other utility or additional material not fitting the repositories described above is included below:

https://github.com/planmap-eu/awesome-tools-for-planmap

Additional repositories are envisaged and will be created though the course of the project in order to support both internal and community needs. In particular, WP8 dissemination activities such as those linked to workshops (e.g. VESPA/Planmap Mapping workshop 2019 - https://epn-vespa.github.io/mapping2019/) are going to be available, e.g. on Open Source tools for 3D geologic data handling, e.g.

https://github.com/planmap-eu/3d-data-workshop-open-source-tools

Licensing

The material available on Planmap GitHub repositories, based on D7.3-public, is provided under open source licenses (e.g. GPL-3, MIT). Documentation and tutorials are intended as CC-BY. Specific licensing information can be included in individual repositories.

References

Brandt, C. H., Rossi, A. P. (2019). Planmap - Storymaps (Version v1.2). Zenodo. https://doi.org/10.5281/zenodo.326213

Brandt, C. H., et al. (2020) Planmap data packaging: lessons learned towards FAIR planetary geologic maps, EGU2020-18839 https://doi.org/10.5194/egusphere-egu2020-18839, EGU General Assembly 2020, Presentation v1.

Brandt, C. H., Rossi, A. P. and the Planmap consortium (2019) D7.2, Planmap Data Fusion Portal, Planmap deliverable, available online at D7.2-public, https://data.planmap.eu/ - https://maps.planmap.eu/

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No *776276-PLANMAP*

Caravaca. G., and the Planmap Consortium (2019) D5.1, Merged products (GIS and maps) of orbital and in-situ data of Gale Crater, Planmap deliverable, available online at D5.1-public.

Caravaca. G., and the Planmap Consortium (2020) D5.2, 3D products (geomodels) of the merged GIS and maps of Gale crater, Planmap deliverable, available online at D5.2-public.

Penasa, L., (2020) Sharpy – Available online at https://github.com/planmap-eu/sharpy

Pozzobon, R., and the Planmap consortium (2020) D6.1, Planmap deliverable, available online at D6.1-public.

Rossi, A. P., Brandt, C. H., and the Planmap consortium (2019) D7.4, Public data/code delivery, 1st version, Planmap deliverable, available online at D7.4-public.

Rossi, A. P., Penasa, L., Pozzobon, R., and the Planmap consortium (2020) D7.5, Data Management Plan, update 2, Planmap deliverable, available online at D7.5-public.

Rossi, A. P., Brandt, C. H., and the Planmap consortium (2019) D8.11, Web-interactive project Story Maps, Planmap deliverable, available online at D8.11-public