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1. **Nature:** R = Report, P = Prototype, D = Demonstrator, O = Other

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PU	PP	RE	CO
Public	Restricted to other programme participants (including the Commission Service)	Restricted to a group specified by the consortium (including the Commission Services)	Confidential, only for members of the consortium (excluding the Commission Services)

Executive Summary / Abstract:

Despite the impact of COVID-19, the Planetary Science and broader scientific community demonstrated that they are highly motivated to undertake research at the facilities offered by Europlanet 2024 RI. One hundred and fourteen applications were made to TA call 3, including 85 to the Distributed Planetary Laboratory Facilities (DPLF).

Four TA calls have been conducted by the end of year three, one Fast Track aimed at younger scientists and three full calls. The results of the Fast Track were published in February 2022. The results of 2022 Call 3 were disseminated in the first week of 2023. The period of time allocated for completion of TA visits awarded in Call 1 & 2 and the Fast track has been extended until April 2023 and the implementation period of the third full call was set at May 2024.

To date, 51 reports of DPLF TA visits have been completed and validated, sixteen of which were virtual. Multiple other completed DPLF visits are at the data processing stage. During this reporting period, 41 TA visit reports were completed for DPLF sites including a visit to South Korea.

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1. Explanation of TA1 & Overview of Progress

a) Objectives

Objective 3: to provide access to well-characterised terrestrial field sites and a unique set of laboratory facilities capable of simulating the wide range of environments encountered on planetary bodies.

The aim of TA2 is to provide the international community with access to leading laboratory facilities, 24 in Europe and 13 in South Korea, that either provide state-of-the-art analytical capabilities or are capable of simulating conditions at the surface or interior of planetary bodies such as Mercury, Venus, Mars, Jupiter, Titan, Europa, Uranus, Neptune, comets, asteroids and the Moon. Europlanet 2024 RI has expanded the facilities available for the TA program through a strategic international collaboration with Korea Basic Science Institute (KBSI).

b) Explanation of work carried out

Task 3.1 – Management (VUA, UNIKENT, UNIBO, ESF, AU, NHM)

During the third year of the project, Task 3.1 has coordinated the provision of access to simulation and analytical laboratory facilities. For details of management implementation activities, see Task 2.1. Task 3.1 has coordinated the provision of access

to 37 facilities, several of which encompass multiple analytical or simulation facilities. A notable outcome has been applications from researchers outside the field of planetary science; e.g. archaeology.

Management of TA2, along with TA1, is overseen by the Transnational Access Subcommittee (TASC) and supported by the TA office at the VUA. The TASC has provided input to the text of the four TA calls issued so far and has supported DPLF leads in interactions with potential applicants.

The TASC, in consultation with ESF oversaw the TA calls. The TASC has provided input to the Europlanet 2024 RI Data Management Plan and in collaboration with members of VESPA is finalising a data storage protocol for data generated by TA visits. The TASC reviews post-visit evaluation forms in collaboration with the Evaluation Officer, and takes any action deemed necessary to improve the implementation of TA visits.

Task 2.2 Provision of Access to DPLF (VUA, UNIKENT, KBSI, AU, NHM, DLR, CNRS, Atomki, Comenius, ETH-Zurich, Isotoptech, MUG, OU, LTU)

Due to the impact of COVID-19, a Fast Track TA call, offering access to 18 TA2 DPLF, was opened on 1st October 2021 and closed on 3rd November 2021. Due to the impact of COVID-19, not all facilities were able to offer access. The emphasis of the call was to allow early-stage researchers (ESR) whose research funded by fixed length grants, were prioritised. Non ESR applicants were required to provide a justification why the proposal represented very high impact research.

The peer review of applications by experts independent from the Europlanet 2024 RI project was managed by the ESF. The peer review of the evaluations of the sub-panels was completed 13th January 2022 discussed and finalised by the Project Management Committee (PMC) February 2022. Of the twenty-seven applications deemed eligible (three failed), twenty were approved for funding, including 15 for DPLF sites.

The third full call, offering access to all 37 TA2 facilities, was opened on 20th September 2022 and closed on 20th October 2022. The peer review of applications by experts independent from the Europlanet 2024 RI project was managed by the ESF. The peer review and normalisation of the evaluations of the sub-panels was completed on 7th December 2022 discussed and approved by the Project Management Committee (PMC). Acceptance and rejection letters were sent in the first week of January 2023. The full outcome of the call will be published in February 2023. One hundred and fourteen applications were made to Call 3. The independent peer review panel commented on the high quality of the science and stated that 75 projects were suitable for funding. The TASC-PMC approved 70 applications for funding. This included nine from underrepresented countries. Fifty-three TA visits have been approved to DPLF sites.

The COVID-19 outbreak initially had a huge impact on the implementation of TA visits. In agreement with the facility site leaders, all the field visits scheduled for 2020 and the start of 2021 were postponed. We are pleased to report that many were undertaken in 2021 and 2022. Protocols for providing remote access to some of the TA2 facilities have been implemented and continue to be improved. We expect a greater % of visits to be virtual in future. To date 16 of 51 DPLF TA visits have been virtual.

Forty-one reports have been finalised for DPLF visit undertaken in 2021/2. Details can be seen in the hyperlinks given in the table below

Table 1: TA2 Distributed Planetary Laboratory Facilities (DPLF) offered during year 3

PFA site	TA visits 2022	Description
1. Geology and Geochemistry radiogenic and non-traditional stable Isotope Facility (GGIF), VUA, NL.	EPN-007 EPN2-039 EPN2-064	State of the art isotope geochemistry facility. Visits represent a mixture of virtual and in person.
2. High-Pressure, High-Temperature Laboratory, VUA, NL.	Two visits initiated; data processing	Experimental petrology facility that simulates the HP-HT conditions of planetary interiors. Physical visits.
3. Petrology-Mineralogy Characterisation Facility (PMCF), NHM, UK.	EPN-080 FT1-021	Combination of imaging and in situ analytical facilities.
4. Planetary Environment Facilities (PEF), AU, Denmark.	EPN-053 EPN-069 EPN2-023 EPN2-112	Large chamber with capability to mimic Martian conditions, including the presence of dust and ice.
5. Planetary Spectroscopy Laboratory (PSL), DLR, Germany	EPN2-042 EPN2-048 EPN2-069	Spectroscopic analysis of planetary materials at a wide range of wavelengths under variable (high) temperatures.
7. University of Kent Light Gas Gun Laboratory, UK	visit initiated; data processing	High velocity impact simulation.
8. Cold Surfaces spectroscopy (CSS), IPAG, France	FT1-025 FT1-033	Spectroscopic analysis of planetary materials at a wide range of wavelengths under variable (low) temperatures. Visits represent a mixture of virtual and in person.
9. Ion probe facility (IPF), CRPG, France	EPN-031 EPN-034 EPN2-067 FT1-005 FT1-006	Secondary ionisation mass spectrometry facility for in situ elemental and isotopic analysis. Visits represent a mixture of virtual and in person.
10. Stable Rare Gas and Radiogenic Isotope Facility (SGRIF), CRPG, France	EPN2-053 FT1-033	State-of-the-art isotope geochemistry facility. Visits represent a mixture of virtual and in person.
11. Atomki Ice Chamber for Astrophysics/Astrochemistry (ICA), Hungary	EPN-025 EPN-084	Ice chamber connected to a Tandetron accelerator with energies from 0.2 to 4 MeV.
13. Electron induced fluorescence laboratory (EIFL), Comenius University, Slovakia	EPN-060 FT1-015	Electron Induced Fluorescence Laboratory for the study of studying emission spectra of gas phase molecules induced by impact of electrons
14. ETH Zürich Geo- and Cosmochemistry Isotope Facility, Switzerland	EPN2-074	State-of-the-art isotope geochemistry facility.
15. ETH Zürich Geo- and Cosmochemistry Noble Gas Laboratory, Switzerland	EPN2-033	State-of-the-art noble gas isotope geochemistry facility.
16. Isotoptech Carbon-14 dating accelerator mass spectrometry laboratory, Hungary	EPN2-018 EPN2-025	Accelerator mass spectrometry laboratory for ¹⁴ C dating.
17. Isotoptech Stable/Clumped Isotopes Laboratory (ISIL), Hungary	FT1-010	Stable isotope facility, including clumped isotope. capability
19. Center for Microbial Life Detection, MUG, Austria	EPN-083 EPN2-035 EPN2-078 FT1-016	Centre for detection and analysis of microbial signatures, and microbial cultivation.
20. Mars Chamber Facility, OU, UK	EPN-015 EPN-038 EPN2-106	Large volume chamber for simulation of Martian conditions.
21. NanoSIMS 50L (NSIMS), OU, UK	EPN-008 EPN2-030	Secondary ionisation mass spectrometry facility for in situ elemental and isotopic analysis at high spatial resolution.
29. Nano Secondary ion mass spectrometer (KBSI-Korea)	EPN2-108	Secondary ionisation mass spectrometry facility for in situ elemental and isotopic analysis at high spatial resolution.

34. Atomic level electronic structure STEM (KBSI-Korea)	EPN2-108	Scanning Transmission Electron Microscope.
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c. Impact to date

COVID-19 has caused significant delays to the expected impacts for the TAs. Extensive discussions and planning have been conducted to develop remote access procedures to the TA2 facilities and 16 remote visits have now taken place. Remote access remains challenging for TA1. A total of 51 DPLF visit reports have been completed and validated but numerous other visits have been undertaken and are in the data processing stage. This aspect is taking longer than in previous RIs due to the increased virtual nature of visits.

Overall satisfaction with visits to TA 2 facilities was extremely high – of the 53 feedback forms returned, overall visit rating was 5.92 (out of 6). Moreover, interactions with hosts were also rated an average of 5.92 and laboratory environment the same (5.92). Such high levels of satisfaction were also experienced by the early-stage researchers who went on these visits. In addition, 40 visitors (including 20 early-stage researchers) reported that the visit had inspired them to consider new lines of research activity.

Visitors who have conducted TA visits to date have all committed to make presentations of their results at the European Science Congress (EPSC) and also have plans for journal articles as well as conference papers and wider outreach/dissemination based on their visits. The successful implementation of EPSC proved a perfect forum to assess the impact of the TA program. Multiple session included contributions from TA visitors (TP1,2,4,5,6,7,11,14,15,17, OPS3,5,MITM7).

The success of TA visits from the current and past Europlanet RIs is also reflected by continual output of publications ([Europlanet 2024 RI Publications – Europlanet Society \(europlanet-society.org\)](#)). The RI has also been active with multiple communications in popular media (e.g. interviews on television, radio and in national newspapers). There have also been research collaborations that originated in TA visits, including participation in an interdisciplinary bid focused on art conservation for submission in Jan 2023 (Davies). The potential for these visits to support collaborative activity is also highlighted by the fact that 48 of 53 visit reports (including 24 by early-stage researchers) reflected an intention to pursue collaborative activity with the field site facilities. This most typically included writing papers together, but also included writing bids, including a recently-submitted ERC Synergy grant. Across the TA programme, visits have started to have far wider impacts, such as on the formation of new networks, and the creation of businesses, as well as increasing engagement with industry and policymakers.

The impact of these visits on the careers of ESRs should also not be underestimated. They often allow for significant advances in collection of data for doctoral or post-doctoral projects, thus accelerating and strengthening the research, often increase understanding beyond their immediate fields and, particularly, frequently lead to new insights and even new research questions. But perhaps even more importantly, they enable the formation of networks and connections that are crucial to scientific and career advancement. For instance, one former visitor described how not only had his

visit directly led to his employment at ESA but also led him to create a network of scientists who collaborate around coding glitches, a new way of working in his field. Most if not all of these visits simply would not be possible without Europlanet 2024 RI funding.

d. Summary of plans for Year 4

The outcome of Call 3 has been communicated to the applicants. Some facilities received more successful applications than they are able to host. The focus for the start of 2023 will be ensuring implementation of assigned visits with rigorous monitoring by the TASC to identify any potential bottlenecks. A review will be undertaken in September and a decision will be taken as to if a final TA call is viable/required in the winter of 2023. Such a call would require a strict implementation plan to ensure that any newly funded visits could be implemented before the end of the project in 2024.

Work carried out in collaboration with NA1 during year three has strengthened the reciprocal agreement between Europlanet 2024 RI and the Korea Basic Science Institute (KBSI) leading to one additional instrumentation being made available for Europlanet 2024 RI applications, see website for details: <https://www.europlanet-society.org/europlanet-2024-ri/ta2-dplf/>. The addition of an SEM with cryogenic capabilities is particularly of interest to astrobiologists.

2 Update of data management plan

The TASC has provided input to the Europlanet 2024 RI Data Management Plan and in collaboration with members of VESPA is finalising a data storage protocol for data generated by TA visits.

3 Access provisions to Research Infrastructures

Links to summaries of all the TA visits reported to date can be found on the project website

<https://www.europlanet-society.org/europlanet-2024-ri-ta-visit-report-summaries/>

Specific links to the projects completed in 2022 can be found in Table 1 above.

We note that despite extensive action, the number of URS applications remains relatively low (~20%) and that they have a lower success rate (<40%). In any future RI, we will continue to follow up on the successful workshop held in 2021, where advice was given on how to prepare and submit successful TA proposals. Such activities will be written into any future RI applications.