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Executive Summary / Abstract:

This annual report provides a comprehensive overview on the activities performed within WP12 NA2 Coordination of Ground-based Observations over the 1st year of Europlanet 2024 RI. These include, among others, the establishment of the Europlanet Telescope Network, collaboration with amateur astronomers, the organisation of virtual events, and management and dissemination activities. It also gives an overview on the objectives and impact of NA2, as well as deviations from the original work plan due to the COVID-19 pandemic.

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Deliverable

1 Explanation of work & Overview of progress

Relative small telescopes, either from professional observatories or from amateur astronomers, can be used to produce first-rate science. It is in coordinating the diverse small telescope assets across Europe (and beyond) that EPN-2024-RI can be of most use in this field, ensuring that the most appropriate facility for each observation is aware of the opportunity, and that suitably trained observers are available. NA2 is addressing this topic by establishing and coordinating a network of small telescope facilities and by training amateur astronomers and integrating them into planetary sciences. The following sub-chapters will describe in detail the objectives for the first project year and give an overview on the work carried out.

1.1 Deliverables

Deliverable number	Deliverable name	Lead participant	Dissemination level	Delivery date (month)	Status
D12.1	Observation Campaign Website and Observational Alert System	AMU	PU	12	Delivered on time
D12.2	NA2 Annual Report	IWF-OEAW	PU	12	Delivered on time

1.2 Milestones

Milestone number	Milestone name	Due date (month)	Means of verification	Status
MS9	Kick-Off Meeting of NA2	3	meeting organised and held	held as virtual meeting on March 30, 2020
MS10	Establishment of the Scientific Working Group	3	Scientific Working group Established	established during kick-off meeting on March 30, 2020
MS13	NA2 Website and Observational Support Application Form	4	NA2 website and application form for the observational support online.	published online on June 01, 2020
MS14	Memorandum of Understanding	5	Set up to be signed by Europlanet 2024 and collaborating telescope facilities.	finalised and sent to facilities in June 2020
MS20	Amateur Workshop Guidelines	8	Workshop Guidelines for the regional amateur trainings established	finalised in September 2020
MS32	Year 1 Scientific Working Group (SWG) Telecons	12	4 SWG telecons held to decide on observational support applications.	Meeting to discuss review process on March 31, 2020; first review on November 27, 2020
MS33	Year 1 Amateur Training Workshops	12	At least one big amateur workshop at Pic du Midi held	held as 3 virtual workshops at EPSC 2020 due to COVID-19
MS34	Year 1 Observational Workshops	12	have been organised and held	shifted to PM19 due to COVID-19
MS35	Year 1 Observational Support	12	Up to 50 observation nights agreed to be funded by the project	first observation nights taking place in January 2021

1.3 Objectives

The overall objectives of NA2 are:

- To coordinate a network of small telescope facilities (telescope diameters around 0.5-1.2 m) to react fast and adequately to observational alerts;

- To coordinate professional and amateur long-term observational campaigns and timely constrained observations of Solar System objects, widening the participation of amateur astronomers in planetary science
- To train and educate citizen scientists (amateur astronomers) and integrate them into the planetary science community;
- To assure that observational data of small telescope facilities is made available via the VESPA VA;
- To link this activity with all other WPs and to the diverse planetary sciences community in Europe and beyond.

1.3.1 *NA2 is divided into 4 different tasks. Their specific objectives in the first project year are described below. Task 12.1 Management of the Work Package*

Task 12.1 is managed by a core team led by IWF-OEAW, supported by the deputy UoE and advised by the task leaders and its deputies. The task coordinates and manages the overall NA2 WP. The core team aims to also work closely with NA1 and to exploit the Europlanet Society's Regional Hubs to distribute information on observational campaigns and training events to the wider planetary science community and to bring in new participants.

In the first project year, the overall objectives of this task were:

- The organisation of the NA2 Kick-Off Meeting (MS9)
- Overall coordination of the WP and support of all NA2 tasks
- Distributing and disseminating the campaigns, events, and results of NA2
- Setting-up the NA2 website and observational support application form (as part of the general Europlanet website) together with Tasks 12.2 and 12.4 (MS13)
- Preparing the NA2 Annual Report (D12.2).

1.3.2 *Task 12.2 Coordination of Observations*

This task, led by UoE, and supported by AMU, IWF-OEAW, UPV/EHU, VU, and OBSPARIS, is organising the cooperation of a network of small telescopes (i.e. the so-called Europlanet Telescope Network) to facilitate and coordinate observation campaigns related to different planetary science topics. It will establish a Scientific Working Group, thereafter called 'Science Advisory Panel' (SAP), including science experts of different research topics. The SAP plays a key role in developing the network of telescope facilities and in supporting and coordinating planetary observation campaigns. The SAP is also reviewing applications for observational support. In addition, Task 12.1, led by AMU, will develop a generalised alert system for observations, which will notify and allow participating observatories to select appropriate targets across the diverse range of planetary science topics listed above. A dedicated website will be created, gathering easy-to-find information about the observation campaigns and links to the tools for observation planning (first prototype to be online in project month 12).

In the first project year, the overall objectives of this task were:

- The establishment of the Scientific Advisory Panel (MS10)
- Organisation of a network of small telescope facilities
- Development of the Observational Support Application Form together with Tasks 12.1 and 12.4 (MS4)
- The SAP review of incoming application forms for the telescope network (MS32)
- Development of the observational campaign website and observational alert system (D12.1).

1.3.3 *Task 12.3 Amateur Education & Training*

This task, led by IWF-OEAW and supported by UPV/EHU and OBSPARIS, exploits the amateur community's potential to support planetary science i) by streamlining workflows and cooperation with professional scientists, and ii) by reaching out to the diverse regional communities within Europe and beyond. The main objective of this task is the organisation of dedicated training and education workshops for amateurs. This will include workshops that will be held in the different Europlanet Regional Hubs to engage the different local communities. To assure quality, standardised workshop guidelines and tutorials will be developed in the project.

In the first project year, the overall objectives of this task were:

- The development of Amateur Workshop Guidelines (MS20)
- Organisation of an Amateur Workshop held at Pic du Midi Observatory (MS33 -> shifted to virtual meetings)
- Supporting amateur observations in planetary sciences.

1.3.4 *Task 12.4 Ground-based Observations Support*

This task, led by VU and supported by IWF-OEAW, UPV/EHU, UoE and OBSPARIS, supports coordinated planetary observation campaigns by (i) supporting scientists and trained amateurs to observe at the telescope network set up in Task 12.2, (ii) the support of professional telescope facilities to observe in dedicated observation campaigns, (iii) the support of workshops for the organisation of coordinated observation campaigns. Task 12.4 (together with Task 12.2) will set up a simple application form to the telescope network and the SAP will recommend which applications will be funded. Observational data that will be produced during supported campaigns will be made publicly available, ideally through the Virtual Observatory of VESPA. A Memorandum of Understanding (MoU) will be set up to facilitate the collaboration between EPN-2024-RI and the telescope facilities.

In the first project year, the overall objectives of this task were:

- The development of the Observational Support Application Form together with Tasks 12.1 and 12.2 (MS4)
- Preparation of a MoU to be signed by Europlanet and the telescope facilities (MS14)
- Support of researchers and amateurs to observe at the telescope network (MS12)
- Organisation of an Observational Workshop (MS34 -> shifted to Month 19)

1.4 **Explanation of the work carried per WP**

1.4.1 *Task 12.1 Management of the Work Package*

The management structure of NA2 was established at the beginning of the project with IWF-OEAW (Manuel Scherf and Günter Kargl) leading the project and UoE (Colin Snodgrass) as deputy. The core team of NA2 is further supported by all other beneficiaries within NA2, i.e., UPV/EHU (Ricardo Hueso and Itziar Garate-Lopez), AMU (Edyta Podlowska-Gaca and Grzegorz Dudziński), VU (Grazina Tautvaisiene), and OBSPARIS (Francois Colas).

NA2 Kick-Off Meeting (MS6)

A kick-off face-to-face meeting (MS9) was planned for March 30-31, 2020, in Graz, Austria, which had to be substituted by a virtual kick-off meeting on March 30. A total of 37 participants took part in the meeting out of which 11 were from under-represented countries, 12 were females and 4 were amateurs. Moreover, 19 representatives of different telescope facilities joined the meeting and presenting their observatories. The meeting agenda and all presentations of the meeting can be found at <http://bit.ly/2IQZVPN>.

NA2 website (part of MS13)

The website of NA2 (<https://bit.ly/37SCiyj>), as part of the main Europlanet website (<https://bit.ly/2Z1XA8u>), was prepared and put online on June 1, 2020, together with the NA2 Call for Observations (MS4, <https://bit.ly/2Br5LDt>). The website is continuously updated to distribute the information provided by NA2.

Support and communication within NA2

Task 12.1 also coordinated communication and collaboration between the different tasks of NA2 and with Europlanet 2024-RI. NA2 telecons combining all tasks and beneficiaries took place on a bi-monthly basis. In addition, further online meetings were regularly organised to discuss amateur workshops and guidelines, the application form, proposals to the NA2 Call for Observations and other NA2 related issues.

Project Advisory Board

WP12 nominated Prof. Helmut O. Rucker as an expert related to the activities of NA2 to the Project Advisory Board of Europlanet 2024-RI.

For dissemination activities see Section 2.

1.4.2 Task 12.2 Coordination of Observations

Establishment of the Europlanet Telescope Network (MS13)

The main objective of this task was the establishment of a network of telescopes providing their facilities for observations to the planetary science community. This network, named the Europlanet Telescope Network, was established over the first months of the project and officially kicked-off with the announcement of the NA2 Call for Observations on June 1, 2020 at <https://bit.ly/2Br5LDt>. Through this call, observers – professionals and amateurs – can apply to observe at the facilities in the network (see Task 12.4 for a full description of the application form and procedure). The Europlanet Telescope Network initially contained 15 different facilities from Europe and beyond and has now been extended to 16. The network seeks to draw in further facilities and had already received interest from additional observatories such as the Entoto Observatory in Ethiopia and the Stefanik Observatory in the Czech Republic. The current facilities in the network are:

1. **Pic du Midi Observatory**, France, 1.06 m
2. **Moletai Astronomical Observatory**, Lithuania, 1.65 m and 35/51 cm
3. **Kryoneri Observatory**, Greece, 1.2 m
4. **Skalnate Pleso Observatory**, Slovakia, 1.3 m and 61 cm
5. **Faulkes Telescope Project**, worldwide, two 2 m, nine 1 m, and ten 40 cm robotic
6. **Tartu Observatory**, Estonia, 1.5 m and 60 cm, and 30 cm robotic
7. **Danish Telescope at La Silla Observatory**, Chile, 1.54 m
8. **Beacon Observatory**, UK, 42 cm
9. **Observatorio del Teide**, Spain, 82 cm and 45 cm
10. **Calar Alto Observatory**, Spain, 1.23 m
11. **Lisnyky Observation Station**, Ukraine, 70 cm
12. **Chuguev Observatory**, Ukraine, 70 cm
13. **Terskol Peak Observatory**, Ukraine, 2 m and 60 cm
14. **Konkoly Observatory**, Hungary, 1 m and 80 cm
15. **Ussuriysk Astrophysical Observatory**, Russia, 25 cm and 50 cm
16. **Rozhen Observatory**, Bulgaria, 2 m, 60 cm and 50/70 cm

Out of these 16 facilities, 6 are in under-represented countries and 4 in Eastern European states that are not part of the EU. Further details on the different observatories, including their

equipment, costs, and nights/hours provided to Europlanet can be found on the NA2 Call for Observations website (<https://bit.ly/2Br5LDt>) and, particularly, in a comprehensive telescope summary table (<https://bit.ly/31zYpa1>) that was worked up by Task 12.4 in collaboration with the different facilities.

To counteract travel restrictions in view of COVID-19, currently 14 out of 16 of the observatories can already provide remote observations, i.e. the observer does not necessarily have to physically go to these facilities.

A press release (<bit.ly/3h85p5v>) of the network was issued by Europlanet on June 01, 2020.



Figure 1. Location of the different facilities within the Europlanet Telescope Network.

A logo for the network was created by NA2 in collaboration with WPI Management:



Figure 2. Logo of the Europlanet Telescope Network.

Establishment of the Science Advisory Panel (MS10)

The Science Advisory Panel (SAP), initially called Science Working Group (SWG), was established at the virtual kick-off meeting on March 30, 2020 (MS9). Its main objective is to coordinate and review applications and observations at the Europlanet Telescope Network. The members were chosen by NA2 according to their expertise on specific fields in planetary sciences and with respect to their links to ongoing and upcoming planetary science space missions:

- **Head:** Colin Snodgrass, UoE, UK (Co-PI of Comet Interceptor)

- **Deputy:** Francois Colas, OBSPARIS, France (Deputy, head of Pic du Midi Observatory)
- **Fireballs** (including Lunar Impact Flashes and Jovian fireballs): Detlef Koschny, ESA, The Netherlands
- **Stellar Occultation:** Bruno Sicardy, OBSPARIS, France
- **Planetary Observations** (in support of upcoming missions such as Juno, BepiColombo, JUICE): Ricardo Hueso, UPV/EHU, Spain
- **Asteroid Light Curves** (including NEOS): Anna Marciniak, AMU, Poland
- **Comets** (upcoming mission Comet Interceptor): Oleksandra Ivanova, Astronomical Institute SAS, Slovakia
- **Exoplanets** (CHEOPS and upcoming missions such as PLATO, Ariel): Monika Lendl, Univ. Geneva, Switzerland

The SAP established the application form for the NA2 Call for Observations in cooperation with Task 12.4. For this, the SAP met virtually together with representatives of Task 12.4 on March 31, 2020 to discuss and set-up the application form and peer review process (see description on the application form and the peer review process at Task 12.4).

The SAP will meet on a bi-monthly basis to discuss, review and rate incoming applications; their first panel meeting (MS32) was held on November 27 with their ratings and feedbacks forwarded to the NA2 Task 12.4 on December 11, 2020.

Development of the observational campaign website and observational alert system (D12.1)

The aim of this subtask, led by AMU, is to develop a generalised Alert System for observations, which will notify and allow participating observatories to select appropriate targets across a diverse range of planetary science topics. This will provide both regular monitoring of targets and alerts for events requiring time-critical and/or spatially distributed observations (e.g., stellar occultation by asteroids). The service is based on the existing alert system software created to coordinate amateur observations of asteroids in support of the ESA Gaia mission (Gaia-GOSA, www.gaiagosa.eu) which currently provides targets for asteroid light curve observations based on the observer's location and the available targets at the time. Targets of interest of the new service will involve atmospheres of the giant planets (like convective storms or planetary disturbances), Mars and Venus observations, and ephemeris for their observation, asteroids, comets, exoplanets, and other targets for which observations are needed.

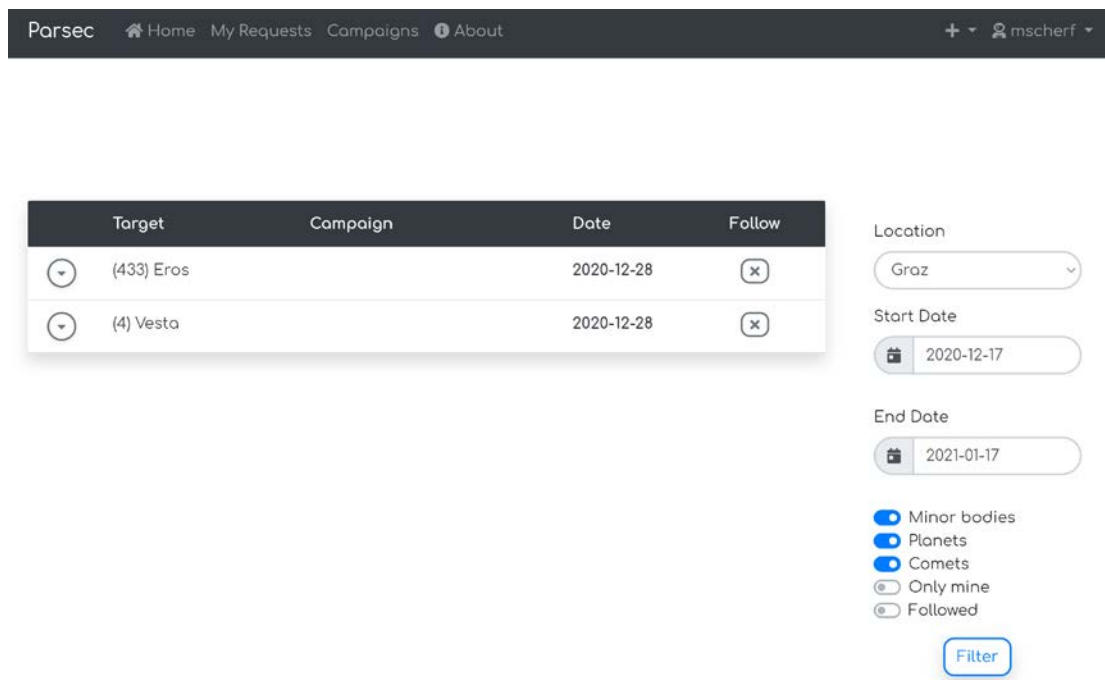


Figure 3. Startpage of the first prototype of the observational alert website.

After a rough concept plan for fulfilling the task was developed, the needs for an alert system have been established during an internal meeting. We have chosen as an optimal tool for service development: PARSEC (PIAnetaRy ScienceE Collaboration tool) which is a webapp created in Python, Flask and bootstrap frameworks. After the early development stage, the main features were programmed, thereby enabling request views on the main page, request filtering by observation date, target category, ownership, campaign view, and a notification system. The user can also establish own preferences for notifications and follow requests/campaigns. In the *Requests* menu there is the possibility of adding, editing, deleting, commenting the observational needs. Similarly, in *Campaigns* the user can start and coordinate observing campaigns of objects or events.

A prototype version was finished by the end of 2020, and can be found online at www.astro.amu.edu.pl/parsec; internal tests of the service have started. For further information on the service check the presentation at <https://bit.ly/3luMUsN> and the report on D12.1.

In the upcoming year, tests on the system will proceed and new functionalities will be added. The frontpage will be created, thereby joining other existing services for various planetary science topics. After this, the service will be made publicly available for users. Further development will then depend on the user's needs and requests.

1.4.3 Task 12.3 Amateur Education & Training

Amateur Workshop Guidelines (MS20)

For the organisation and execution of the regional amateur training workshops, which will start in project year 2, Amateur Workshop Guidelines were established that also specify the scope and the scheme of these workshops. These guidelines were finalised in September 2020. The training will take the form of topical workshops with hands-on sessions and observational training, if possible. These are planned to preferentially take place at the observatories of the Europlanet Telescope Network within different Regional Hubs of Europlanet, and will, wherever appropriate, be at least partially in the regional language to also attract local amateur astronomers. In addition, the guidelines also address potential virtual amateur training sessions

(see below) and describe the reimbursement process. The full document can be found at <http://bit.ly/37llh0X>.



NA2 – Coordination of Ground-based Observations
Task 3 – Amateur Education & Training

Guidelines on EPN2024 NA2 / Task 3 Amateur Training Workshops

I. Description of the Workshops

1. Goal of the workshops:

- Engaging and training the amateur community in the best data acquisition and processing techniques that will provide useful data for scientists.
- Reaching out to new and regional communities to best integrate a wide range of amateurs in Europe and beyond.
- Enhancing the observation and processing capabilities of the participants; increasing their potential to provide scientific useful data and drawing them into scientific projects.

Figure 4. Screenshot of part of the amateur workshop guidelines.

A virtual meeting, combining representatives of NA2 and some relevant amateurs, took place on March 16, 2020, to discuss the format of the planned amateur training workshops. The ideas gathered within this meeting strongly fed into the development of the guidelines.

Amateur Workshop at Pic du Midi Obs. (MS33) and virtual amateur workshops

Initially it was planned to organise an amateur workshop during summer 2020 at the Observatory Pic du Midi. Due to COVID-19, however, this was not possible, and we are seeking to catch this up later-on, whenever travel restrictions will again allow face-to-meetings.

However, 3 virtual splinter meetings related to amateurs and Task 12.3 were organised and held at EPSC 2020 with a total number of about 160 participants; these were

- **Juno Ground-Based Support from Amateur Astronomers**, September 21, 2020. This was an online workshop organised by UPV/EHU with scientists of the Juno mission and amateur astronomers and citizen scientists collaborating with the mission. It was a small version of previous face-to-face meetings organised during Europlanet 2020-RI in 2016 in Nice (France) and in 2018 in London (UK). About 70 participants attended at the peak, mainly amateur astronomers and about 10% female.
Link: meetingorganizer.copernicus.org/EPSC2020/session/38663;
Video available on Vimeo: vimeo.com/460930333
- **The Ariel mission for exoplanets and support from amateurs**, September 28, 2020. This was an online workshop co-organised by UPV/EHU and dedicated to the Ariel mission and the ExoClock project (www.exoclock.space), at which amateur astronomers observe exoplanet ephemeris in support of Ariel. About 50 participants attended.
Link: meetingorganizer.copernicus.org/EPSC2020/session/38673;
Video available on Youtube: youtu.be/2LVpcjjj6oE
- **The Europlanet Telescope Network**, September 30, 2020. This was another professional and amateur astronomer workshop during the meeting organised by IWF-

OEAW, which promoted the aims and goals of NA2, the Europlanet Telescope Network, and pro-am collaboration. About 30 participants attended.

Link: meetingorganizer.copernicus.org/EPSC2020/session/38665

Presentations: bit.ly/2ENreZ5

For spring 2021, a two-day topical amateur training workshop is planned to be held virtually. The goal is to combine tutorial sessions with remote observations on of the telescopes of the Europlanet Telescope Network. The first face-2-face training workshop will take place as soon as travel restrictions due to COVID-19 will have passed.

Amateur observational alerts and campaigns

NA2 additionally issued several observational alerts to the amateur community and supported different amateur observation campaigns during the first project year. These are described below:

Observational alerts: UPV/EHU is in active communication with amateur astronomers working on different topics on Solar System observations. The PVOL database developed in Europlanet 2020 RI and available at pvol2.ehu.eus now hosts regular observational alerts that guide amateur astronomers who specialise in planetary observations towards relevant topics that can contribute to scientific research. These alerts are also sent through email lists and social media (Facebook groups participated by amateur astronomers). Alerts issued in 2020 are listed with a number and their release date. The number will be used later to reference the impact of these alerts in the Impact Section.

1. March 31, 2020: Storm Activity on Saturn's North Polar Region (see Figure 5).
2. May 31, 2020: Jupiter Storm in the South Temperate Belt.
3. July 03, 2020: Amateur support to Venus research.
4. August 18, 2020: New storm in the NTropZ-NTBs Jetstream.
5. September 18, 2020: Jupiter's NTB Plume and Turbulent wake interaction.
6. October 13, 2020: BepiColombo flyby of Venus: Request for observations.

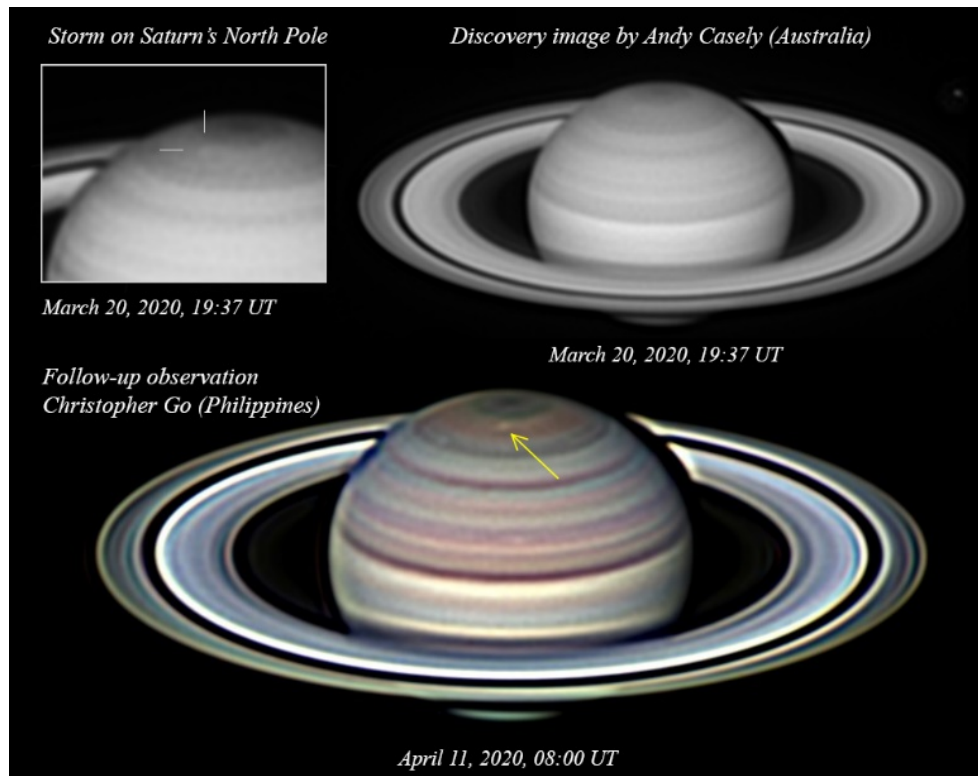


Figure 5. Example of amateur observations received in response to the observational alert on Saturn's North Polar storm.

Venus BepiColombo and Parker Solar Probe flybys: The ESA/JAXA BepiColombo mission to Mercury made a flyby of Venus on October 15, 2020. UPV/EHU organised an amateur astronomy campaign to gather Venus observations. The campaign website (pvol2.ehu.es/bc/Venus) was also used to gather amateur observations of Venus during the Solar Probe flyby of Venus on July 11, 2020. A preliminary report of the campaign was presented during the EPSC conference. Europlanet 2024-RI made the following press release related with this activity on September 21, 2020: www.europlanet-society.org/epsc2020-parker-solar-probe-akatsuki-and-earth-bound-observers-give-rare-top-to-surface-glimpse-of-venus.

Observations were sent by several amateur astronomers to the PVOL database which by now amounted to 80 in August 2020, 74 in September 2020, 74 in October 2020 (43 in +/- 5 days around the flyby) and 20 in November 2020.

UPV/EHU is working with Yeon Joo Lee (Guest Investigator in the BepiColombo mission), Javier Peralta (JAXA) and other researchers involved in both missions to evaluate the scientific potential of the observations obtained during these flybys.

Asteroid occultation events: AMU organised an observing campaign through GaiaGOSA on the occultation event of the asteroid (551) Ortrud which took place on October 6, 2020 and was visible across Europe. After gathering and processing the data with help of amateur observers, we were able to complete the rotation period for several asteroids, and the results will be used in further studies, mainly for spin and shape modelling. Besides this, further asteroid data were gathered and uploaded to GaiaGOSA by amateurs. Figure 3 gives an example of a high quality lightcurve of 45 Eugenia.

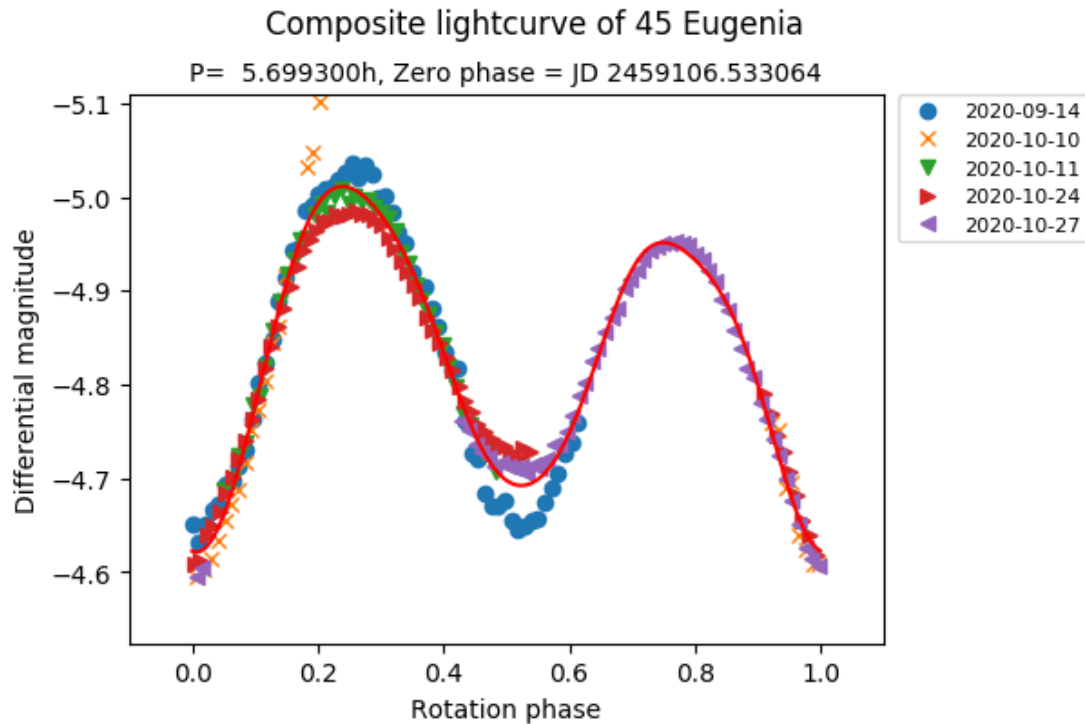


Figure 6. A high quality lightcurve of 45 Eugenia completed thanks to observations gathered by GaiaGOSA users.

1.4.4 Task 12.4 Ground-based Observations Support

NA2 Call for Observations and application form (MS13)

The aim of the Europlanet Telescope Network is to provide free access for scientists and amateurs to these facilities. For this purpose, Task 12.4 established the NA2 Call for Observations (as part of Milestone 13) through which observers can apply to observe at the facilities of the Europlanet Telescope Network (bit.ly/2Br5LDt). It went online on June 01, 2020 together with the telescope table that contains all relevant information on the different facilities in the network (<https://bit.ly/31zYpa1>). The NA2 Call for Observations is a rolling call which ends on June 23, 2023 to which applications can be submitted at any time (Figure 7).

Figure 7. Screenshot of the NA2 Call for Observations website.



Europlanet2024 Ground-based observing funding proposal form

Proposals may be submitted at any time, by e-mailing the completed form (in pdf format) to na2@europlanet-society.org. Europlanet doesn't award observing time, but can award funding to support observations (covering per diem, accommodation and travel costs of the observer, and service costs of the facility). The observing time should ideally be negotiated with the observatory prior to applying for Europlanet funding. Proposals will be assessed by an independent science advisory board, who will see only pages 2 and 3 of this form, anonymised to avoid any unconscious biases. Please do not include identifying information on pages 2 and 3. Proposals will be assessed primarily on their scientific merit and are open to all areas of planetary science, although priorities of the Europlanet project will be taken into account in awarding funding (see tinyurl.com/NA2-observation-call for details). The observed data will have to be made publicly available (ideally through the Virtual Observatory of VESPA, see [website]) after a proprietary period with a maximum of 12 months.

Figure 8. Screenshot of the introduction to the application form.

For funded applications, the observers will receive a per diem rate, and their travel and accommodation costs reimbursed. The observatories will receive their service costs. The reimbursement rules can be found at bit.ly/2XM5WBt.

The observational data gathered by the successful applicants will have to be made publicly available, ideally through the Virtual Observatory of VESPA either through already existing services or through new ones. Currently, 12 out of 16 facilities have shown interest in implementing their own EPN-TAP service to connect their databases to VESPA.

Outcome of first review round and observational support

As of December 16, 7 proposals have already been submitted to the call. The SAP met on November 27 to discuss 5 out of these proposals (two proposals came too late for the meeting and will be considered at the next SAP meeting in January 2021). On December 11, 2020, the SAP sent their ratings and feedback to the NA2 Administration who decided to fund 4 out of 5 proposals based on the review of the SAP (see Annex I for an overview on all applications). All these proposals asked for remote observations, i.e. only the service costs of the respective observatories will be reimbursed. The first observations on the Europlanet Telescope Network that will be supported by NA2 are scheduled to start in January 2021; in total these 4 proposals asked for a total of 26 observation nights.

From the 5 applications discussed in the first SAP meeting, 4 were submitted by female researchers from under-represented countries. These four applications were the ones granted by NA2.

Memorandum of Understanding (MS14)

In June 2020, Task 12.4 finalised the Memorandum of Understanding (MoU) between Europlanet 2024 and the telescope facilities involved in the network to describe the number of observation nights provided per observatory and to regulate the reimbursement of the respective service costs of the facilities. As of December 2020, 11 of 16 facilities have already signed the MoU and it is expected that the other observatories will follow within the next few months. The MoU template and the signed MoUs can be found online at bit.ly/3apqvdU.

Observational workshops (MS34 -> shifted to PM19)

In project year 1, it was initially planned to hold one ground-based observational workshop organised by Task 12.4 dedicated to fireball observations. However, due to COVID-19, this milestone had to be shifted from PM12 to PM19. It is yet unclear, whether the situation allows for a face-to-face workshop within this timeframe. However, it is now planned to hold a virtual workshop on fireballs observations, likely in spring 2021. The first preparational telecon on this workshop took place on December 22, 2020.

1.5 Impact

The Europlanet Telescope Network, which was established during the first project year, is the first network of its kind worldwide that combines a diverse set of small-scale observational facilities in Europe and beyond. Besides space missions, and the well-known big ground-based observatories, relatively small telescopes cover a niche that is, more than ever, particularly important for planetary sciences and for the characterisation of exoplanets. Studying planets, asteroids, or comets can require either long-term monitoring or precise timing and collaboration between facilities on different locations around the Earth. A network of small telescope facilities, also including the amateur community, achieve these requirements but can also react relatively fast. All these characteristics provide a unique opportunity that can be covered by the Europlanet Telescope Network.

After only one year of the project and due to COVID-19 related restrictions, the future impact of the network is currently difficult to assess. However, the number of proposals retrieved so far at this early stage of the project illustrates the demand within the planetary sciences community and we expect that this demand will rise within the next years and when access restrictions will decrease. This network will also deliver a significant number of scientific publications, since we expect most of the successful applications to culminate in peer-reviewed research articles, but also in a diverse set of publicly available observational data of different scientific topics that can then be further exploited by other research teams around the world.

Besides the impact of the Europlanet Telescope Network, the support of amateur astronomers will in addition not only integrate new regional communities into the European planetary sciences but will also result in scientifically valuable observational data. By way of example, the team of UPV/EHU expects to publish two research papers related with two of the observational alerts that were issued through PVOL in project year one, i.e. on:

- March 31: Storm Activity on Saturn's North Polar Region.
- May 31: Jupiter Storm in the South Temperate Belt.

Contents of these two manuscripts are similar to the preliminary reports submitted to the meeting of the Division for Planetary Sciences of the American Astronomical Association held in November. Furthermore, AMU already published a scientific paper in 2020 based on amateur observations submitted to GaiaGOSA, i.e., Dudzinski, G. et al., Volume uncertainty of (7) Iris shape models from disc-resolved images, *MNRAS*, 499, 3, 4545, doi:10.1093/mnras/staa3153.

The observational alerts issued through PVOL were followed by about >200 active observers. The alerts are also sent through the hstjupiter list on groups.io, which has 64 members including highly active astro-photographers. Each of these alerts has generated new observations by observers, i.e.,

1. March 31: Storm Activity on Saturn's North Polar Region. Active follow-up by Trevor Barry (Australia), Clyde Foster (South Africa) and Christopher Go (Philippines).
2. May 31: Jupiter Storm in the South Temperate Belt. Active follow-up by many observers over June-July.

3. July 03: Amateur support to Venus research. Active follow-up with tens of images by amateur astronomers: J. Camarena (Spain), M. Kardasis (Greece), L. Morrone (Italy).
4. August 18: New storm in the NTropZ-NTBs Jetstream. This was a major event in Jupiter atmospheric dynamics and attracted large interest from the amateur community. Follow-up observations were obtained by several observers with initial coordination from PVOL later, with analysis by Shinji Mizumoto from ALPO Japan (Association of Lunar and Planetary Observers), and John H. Rogers from the British Astronomical Association. Active observers following-up the activity include Clyde Foster (South Africa), Christopher Go (Phillipines), Tiziano Olivetti (Thailand), Anthony Wesley, Trevor Barry, Andy Casely, Phil Miles (Australia), Jean-Luc Dauvergne (France) to cite only a few from different countries. Hundreds of observations were uploaded into PVOL.
5. September 18: Jupiter's NTB Plume and Turbulent wake interaction. This was a continuation of the previous alert.
6. October 13: BepiColombo flyby of Venus: Request for observations. Active follow-up by amateur astronomers: J. Camarena (Spain), M. Kardasis (Greece), L. Morrone (Italy).

The three splinter meetings related to NA2 at EPSC 2020 additionally attracted over 160 participants with about 70 – 80% being amateur astronomers. The article “Telescopes United” describing the Europlanet Telescope Network and published in the journal *Astronomy & Geophysics* has by now an access number of over 400 clicks directly through the journal's website. A significant additional number of people should have been reached with other dissemination activities such as presentations at virtual conferences, the live interview on the telescope network at EPSC 2020, and three articles on NA2 in the Europlanet Newsletter which is distributed to all members of the Europlanet Society (about 500).

Besides amateur astronomers, NA2 also tried to draw in early career scientists, female researchers and researchers from under-represented states in collaboration with NA1 and the Europlanet Regional Hubs, particularly with the Central European Hub. This effort resulted in 5 out of 7 proposals, as of December 2020, submitted to the NA2 Call for Observations being led by females from under-represented countries.

1.6 Access provisions to Research Infrastructures (if applicable)

Access provision to the Research Infrastructure within NA2 will be provided through the telescope facilities in the Europlanet Telescope Network, for which their service costs for observations of successful applicants will be reimbursed. An overview on granted observations at these facilities and their costs is summarised in the table in Annex I.

2 Update of the exploitation & dissemination plan

Due to COVID-19 and the associated travel restrictions, our dissemination activities had to be slightly adapted and shifted from physical meetings and activities towards dissemination being distributed predominantly through diverse online channels to promote NA2 and the Europlanet Telescope Network. This has the advantage that more people can be reached in a more cost effective way. The following list illustrates some highlights of dissemination activities that were performed online:

- An article in the journal *Astronomy & Geophysics* describing the Europlanet Telescope Network was published online with open access, i.e. Anita Heward, Manuel Scherf, Gražina Tautvaišienė, Ricardo Hueso, Telescopes united, *Astronomy & Geophysics*, 61, 2020, Page 4.39, <https://doi.org/10.1093/astrogeo/ataa059>.

- Three virtual sessions related to NA2 were held at EPSC 2020 (see Task 12.3) with a total participation of over 160 participants.
- Three virtual presentations (all publicly available online) related to NA2 were held at EPSC 2020 and 2 virtual presentations at DPS 2020.
- The Europlanet Telescope Network was featured online in the live interviews at EPSC 2020 on September 22, 2020.
- Three press releases, one related to the Europlanet Telescope Network and two to amateur observations, were issued through the Europlanet Media Centre.
- An invited virtual presentation on NA2 and Europlanet was held at the 52nd Conference on Variable Stars of the Czech Astronomical Society (55 participants).
- UPV/EHU participated in the European Researchers Night with a short video in Spanish available at www.youtube.com/watch?v=X-ui3Lq0Qjk.

The start of the Europlanet Telescope Network and the diverse amateur observation campaigns and alerts were heavily promoted through the diverse social media channels of Europlanet 2024-RI and the Europlanet Society. News related to NA2, citizen and amateur campaigns were generally among the top content on the Europlanet social media channels. On Twitter, the announcement on the start of the telescope network reached 93 engagements and 5,384 impressions (i.e. how many times people have seen the tweet). The main tweet on the amateur campaign in support of the Parker Solar Probe and BepiColombo Venus flybys even resulted in impressive 3,158 engagements and 61,191 impressions, thereby being the top tweet of Europlanet in 2020 (see Figure 9).

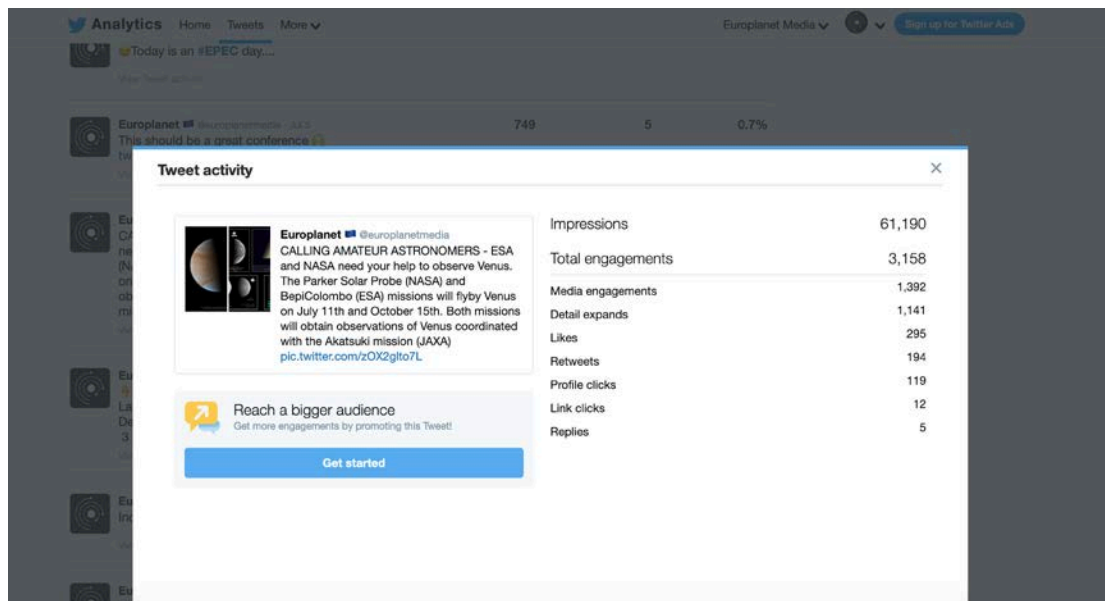


Figure 9. The main tweet on the amateur astronomer campaign in support of the Parker Solar Probe and BepiColombo Venus flybys.

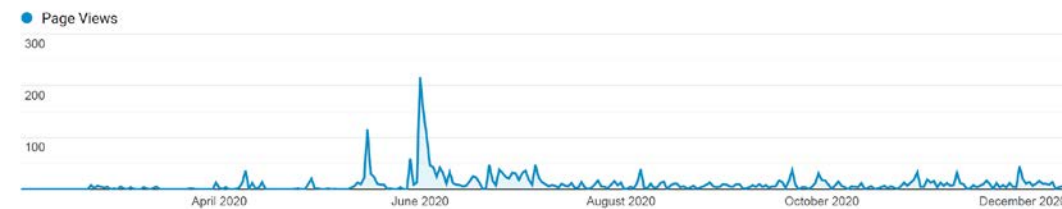
Finally, the webpages related to NA2, such as for the Europlanet Telescope Network and the Call for Observations have been visited more than 3,100 times with almost 2,200 unique page views between February 1, 2020 and December 16, 2020. As can be clearly seen in Figure 10, the official start of the NA2 Call for Observations at the Europlanet Telescope Network on June 1, 2020 attracted hundreds of interested people within the first days.

Pages

All Users
100.00% Page Views

1 Feb 2020 - 16 Dec 2020

Explorer



This data was filtered using an advanced filter.

Page	Page Views	Unique Page Views	Avg. Time on Page	Entrances	Bounce Rate	% Exit	Page Value
	3,170 (% of Total: 2.21% (143,647))	2,194 (% of Total: 2.31% (94,918))	00:02:04 (Avg for View: 00:01:13 (69.22%))	1,712 (% of Total: 2.67% (64,078))	59.93% (Avg for View: 53.79% (11.41%))	55.05% (Avg for View: 44.61% (23.40%))	US\$0.00 (% of Total: 0.00% (US\$0.00))
1. /euoplanet-2024-ri/networking-activities-na/euoplanet-2024-ri-na-call-for-observations-at-the-euoplanet-telescope-network/	1,112 (35.08%)	808 (36.83%)	00:02:45	659 (38.49%)	70.36%	66.10%	US\$0.04 (0.00%)
2. /euoplanet-2024-ri/telescope-network/	1,066 (33.63%)	714 (32.54%)	00:01:42	481 (28.10%)	53.01%	44.84%	US\$0.04 (0.00%)
3. /euoplanet-telescope-network-launched-to-support-planetary-research-and-build-global-pro-am-collaboration/	409 (12.90%)	269 (12.26%)	00:01:59	228 (13.32%)	52.63%	51.59%	US\$0.04 (0.00%)
4. /euoplanet-telescope-network-issues-1st-alert-a-new-north-polar-spot-in-saturn/	179 (5.65%)	116 (5.29%)	00:01:38	94 (5.49%)	47.87%	54.75%	US\$0.04 (0.00%)
5. /official-kick-off-for-the-euoplanet-telescope-network/	127 (4.01%)	85 (3.87%)	00:01:59	64 (3.74%)	40.62%	41.73%	US\$0.04 (0.00%)

Figure 10. Total number of page views of NA2 related webpages from February 1, 2020 to December 16, 2020. The top 5 related pages are listed.

3 Update of data management plan

NA2 contributed to the general Data Management Plan (DMP) of Europlanet 2024 RI (Deliverable D1.3); at the current stage of the project no update to the DMP is needed from NA2.

4 Deviations from Annex 1 (DoA)

4.1 Tasks

Due to COVID-19 all face-2-face activities proposed for the first year had to be cancelled or moved into virtual meetings. These are

- **NA2 Kick-Off Meeting**, which was held as a virtual meeting. No further impact resulted out of this change. Initially 10,000€ were planned for this meeting. Since no costs arose from the virtual meeting, we are planning to hold a mid-term face-to-face meeting instead.

- **Amateur Workshop at Pic du Midi.** This was substituted by three amateur related virtual meetings at EPSC 2020. The workshop at Pic du Midi itself is planned to take place as soon as the situation will allow it (planned workshop costs of 10,000€).
- **Observational Workshop on fireballs.** This milestone (MS34) was shifted from PM12 to PM19. Besides of a potential face-to-face meeting, a virtual workshop will now take place in spring 2021. The initially planned budget for this workshop (10,000€) will be partially used for this virtual meeting in case that any costs arise from the online tools used. The rest will be used to organise an additional face-2-face workshop later-on, either on fireballs or on another observational topic.

Because of COVID-19, activities related to the Europlanet Telescope Network have been delayed due to difficulties to access the sites. However, by now 14 out of 16 observatories can provide remote observations and proposals asking for such observations started to come in by October 2020. Since in these cases no travel and accommodation costs need to be reimbursed, this activity uses less budget than initially intended for the first project year. However, we expect that i) the demand on observations will significantly increase when travel to the observatories will again be possible, and that ii) we will now be able to reimburse more observation nights in total, since a higher number than initially expected will be remote observations. Initially up to 50 observation nights were expected in year 1, 26 were finally granted. We expect to grant more than 50 observation nights in the following years.

The Observatory building of AMU was closed in October and part of November 2020. There was therefore no physical access to the computer server where the observational alert service is run which caused a slight delay. However, there was no actual delay in the delivery date of this deliverable (D12.1).

4.2 Use of Resources

As mentioned in the previous section, workshop costs of 30,000€ could not be used during project year 1. All these workshops are intended to be held later in the project. Initially about 25,000€ were budgeted per year for supporting observations at the Europlanet Telescope Network of which only 4,000€ was granted in year 1 due access restrictions at the facilities. We expect the demand on the network to increase for the upcoming project years, which will give us an additional 4,250€ per year for supporting observations.

UPV/EHU changed part of its budget and shifted 4000 € of travel costs into person months to accommodate work on the PVOL server and some personnel costs associated to the tasks in NA2. This was partially caused by COVID-19 as travels initially planned for 2020 and early 2021 will not be executed.

No deviation from the initially planned person months was caused by COVID-19 or any other issue.

5 Annex 1 – Proposals submitted to the NA2 Call for Observations

The following table contains all applications submitted to the NA2 Call for Observations. Applications that were not yet reviewed are in the table but without information on the respective proposers for keeping the review process anonymous.

Nr.	submission date	title	category	Proposer	country	gender	career status	facility	rating	nights/ hours	obs. date	costs	funded
1	30.10.2020	Reducing the selection effects in asteroid spins, shapes, and thermal parameters	asteroids	A. Marciniak	Poland	female	senior researcher	Moletai Astronomical Observatory	3.5/5	7 nights	Jan. 2021	€ 490.00	yes
2	02.11.2020	Characterisation of V-type asteroids outside the dynamical Vesta family	asteroids	D. Oszkiewicz	Poland	female	senior researcher	Chuguev Observatory	4.0/5	8 nights	Jan. 2021	€ 400.00	yes
3	07.11.2020	Precise asteroid volumes from Gaia and ground-based observations I	asteroids	M. Polinska	Poland	female	post-doc	Tartu Observatory	3.6/5	6 nights	Jan. 2021	€ 300.00	yes
4	07.11.2020	Precise asteroid volumes from Gaia and ground-based observations II	asteroids	M. Polinska	Poland	female	post-doc	Observatorio del Teide	3.6/5	5 nights	Jan. 2021	€ 0.00	yes
5	10.11.2020	High-precision photometry of known exoplanets and planetary candidates	exoplanets	E. Sokov	Russia	male	senior researcher	Moletai Astronomical Observatory	3.0/5	14 nights	Feb. 2021	€ 2 380.00	no
6	24.11.2020	Variable Nebulae: Understanding the protostar environment	other					Beacon Observatory	open	39 hours	90 minutes every 2 weeks	€ 430.00	open
7	15.12.2020	Project Near Super Earth	exoplanets					LCO	open	39 hours	1st semester 2021	€ 0.00	open