



Insights into Measuring the Scientific, Social and Economic Impacts of a Research Infrastructure (RI)



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What is the Purpose of Evaluating an RI?

Evaluation of a Research Infrastructure (RI) can enable a systematic and robust assessment of:

- The effectiveness of the RI for its user community
- The impacts of the project as a whole
- Where to allocate resources for sustainability and build on success





Looking Beyond the Metrics

Continuous reporting in the European Commission Portal

Grant Management

Project Continuous Report

871149 (EPN-2024-RI) RIA

Summary for publication Deliverables Ethics, DMP, Other Reports Milestones Critical Risks Publications Disseminat... and Communic... Intellectual property rights (IPR) SME Impact Infrastruct... Open Data Gender ABS Regulation

Call: H2020-INFRAIA-2018-2020
Topic: INFRAIA-01-2018-2019 Unit: REA/C/04

Project Continuous Report

Disseminat... and Communic... Intellectual property rights (IPR) SME Impact Infrastruct... Open Data Gender ABS Regulation

Dissemination and Communication

Publications

This project does not currently have any scientific publication

Suggested publications from OpenAIRE (36 publications)

Include previously discarded publications

No.	Type	Title	Authors	Title of the Journal/Proc./Book	Date
1	Other	Summary of Venus exploration	Marinangeli, Lucia		29/01/2024
2	Other	GMAP JRA 4th year report			
3	Other	TA2 3rd year report			
4	Article in Journ	LUOJIA Explorer: An Auto-UAV for Unexposed Space Exploration	S. Sun; S. Sun; S. Sun; C. Chen; C. Chen; C.	The International Archives of the Photogrammetry, Remote Sensing and Spatial Information Science	21/10/2024
5	Other	Introduction to Base Mapping Data and Repositories	Pozzobon, Riccardo		19/01/2024

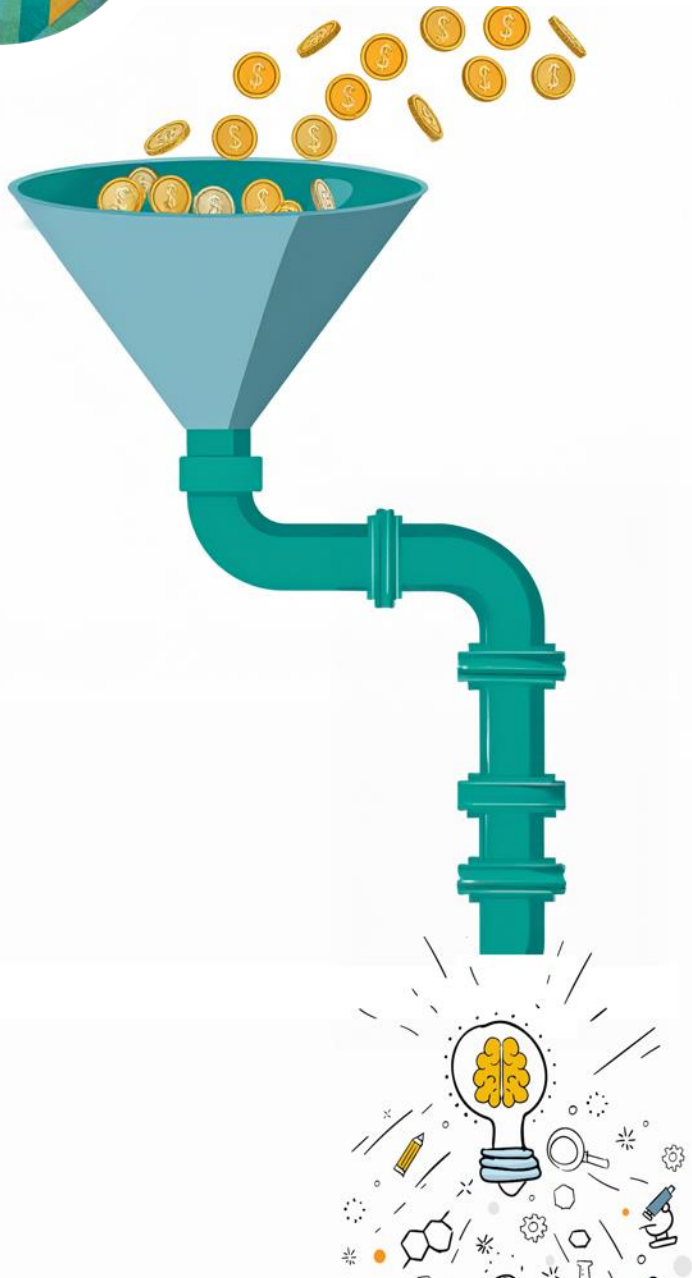
Project publications (250 publications)

Show Filters Clear Filters

No.	Type	Title	Authors	Title of the Journal/Proc./Book	Number, date or freq. of the Journal/Proc./Book
1	Article in Journ	Cross-comparison of global simulation models applied to Mercury'	S. Aizawa, L.S. Griton, S. Fatemi, W. E	Planetary and Space Science	198
2	Article in Journ	A Decade with VAMDC: Results and Ambitions	Damien Albert, Bobby K. Antony, Yaye J	Atoms	8/4
5	Article in Journ	China's Chang'e-5 landing site: Geology, stratigraphy, and provenance	Yuqi Qian, Long Xiao, Qian Wang, Jame	Earth and Planetary Science Letters	561
17	Other	Planetary Science Virtual Observatory: VESPA/Europlanet outcomes	Erard, Stéphane Ceconi, Baptiste Sidai		
24	Article in Journ	Sulfur Ice Astrochemistry: A Review of Laboratory Studies	Duncan V. Mifsud, Zuzana Kaňuchová, P	Space Science Reviews	217/1
26	Article in Journ	Telescopes united	Anita Heward, Manuel Scherf, Gražina Ā	Astronomy & Geophysics	61/4
27	Article in Journ	The Solar Event of 14 - 15 July 2012 and Its Geoeffectiveness	Agnieszka Gil, Renata Modzelewska, Szi	Solar Physics	295/10
30	Article in Journ	Volume uncertainty of (7) Iris shape models from disc-resolved images	G Dudziński, E Podlewska-Gaca, P Bartc	Monthly Notices of the Royal Astronomical Society	499/3
157	Article in Journ	Discovery of a young low-mass brown dwarf transiting a fast-rotating star	P Benni, A Y Burdanov, V V Krushinsky, J	Monthly Notices of the Royal Astronomical Society	505/4
160	Article in Journ	Facilitating reuse of planetary spatial research data - Conceptual framework	Andrea Nass, Kristine Asch, Stephan vai	Planetary and Space Science	204

the project

Total Funding Amount	402,305.45 €
Organisation of a Conference	7
Organisation of a Workshop	83
Press release	52
Non-scientific and non-peer-reviewed publication (popularised publication)	101
Exhibition	14
Flyer	5000
Training	25
Social Media	5
Website	1
Communication Campaign (e.g. Radio, TV)	3
Participation to a Conference	149
Participation to a Workshop	10
Participation to an Event other than a Conference or a Workshop	41
Video/Film	219
Brokerage Event	2
Pitch Event	0
Trade Fair	2
Participation in activities organised jointly with other EU project(s)	4
Other	19



- In a successful project, funding goes IN and great science comes OUT, but what happens inside the pipeline or black box in between?
- What are the pathways to impact and barriers to success?
- What are the impacts beyond science?

Need a systematic evaluation framework to find out

OECD Reference Framework for RI Evaluation identifies 5 impact areas:

1. Scientific
2. Technological
3. Training & Education
4. Economic
5. Social & societal



Geology & Planetary Mapping
Winter School

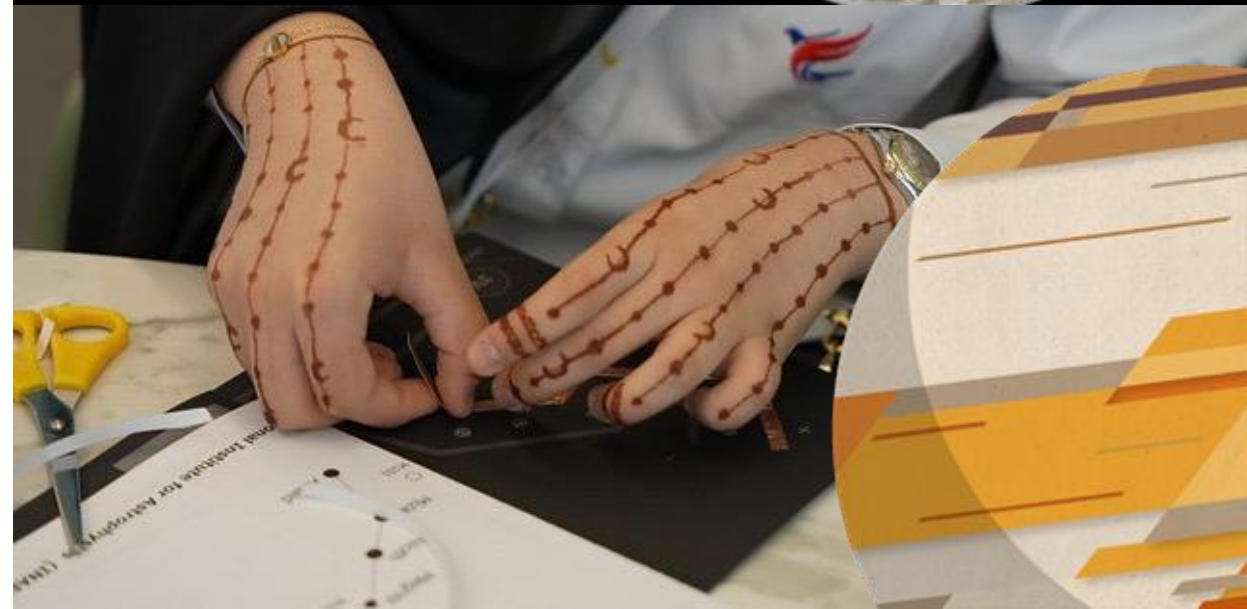


eur PLANET 2024
Research Infrastructure

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 871149.



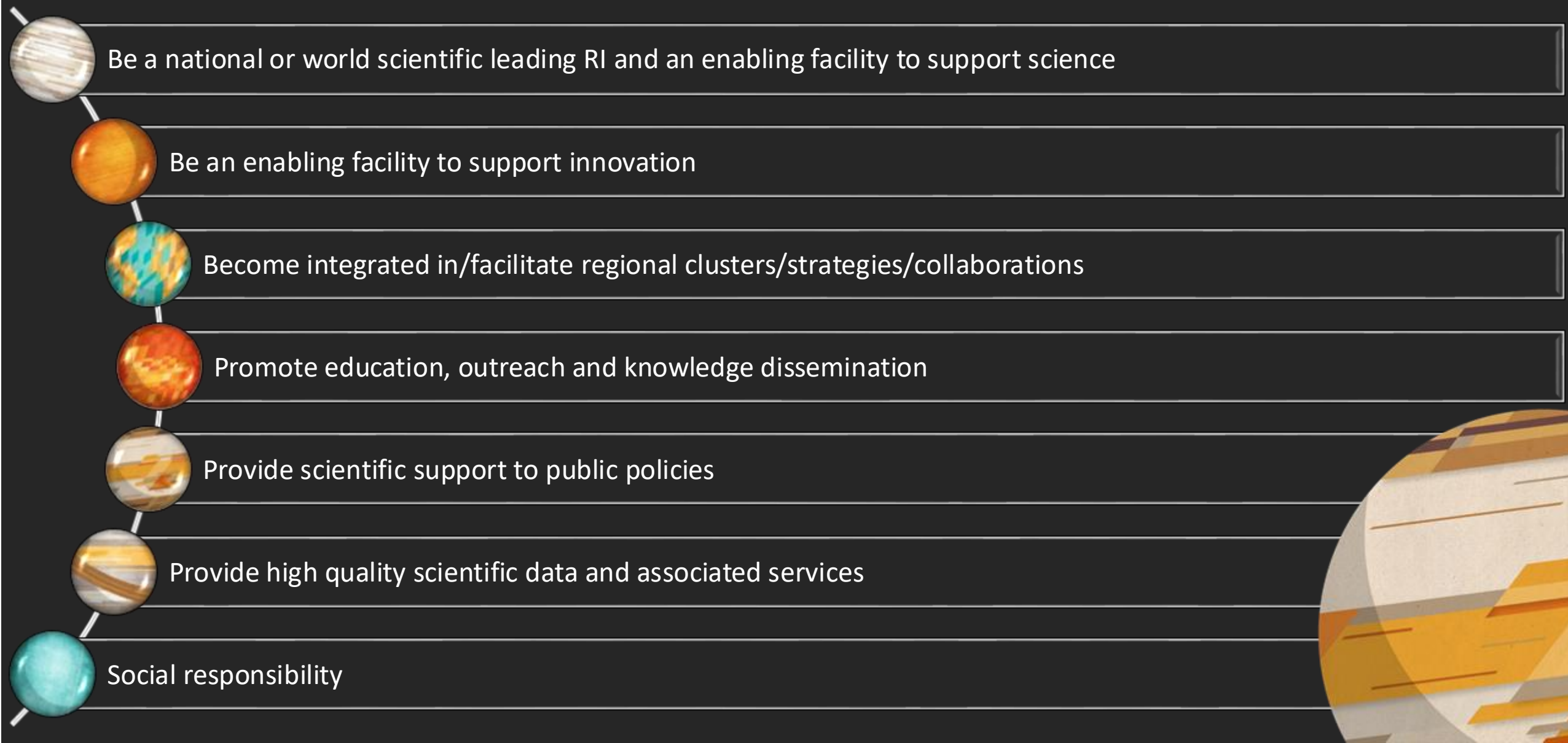
Image Credit: Basemap: NASA Voyager/Galileo, USGS. Map: USGS/Collins, et al. 2013





Strategic Objectives for an RI

* according to the OECD Reference Framework





Case Study – Advanced Research Infrastructure Project



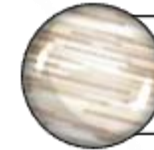
TRANSNATIONAL ACCESS
197 projects, 293 researchers
2077 days of access supported



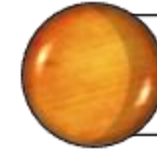
EXPERT EXCHANGES
30 exchanges, 59 researchers,
23 countries



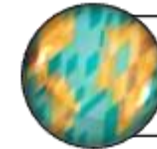
EUROPLANET TELESCOPE NETWORK
44 projects
256.5 Observation Nights



Transnational Access (TA)



Virtual Access (VA)



Networking Activities (NA)



Joint Research Activities (JRA)



VESPA
88 data services in portal,
290 services in IVOA registry,
1000 users per month



SPIDER
6 new planetary
space weather services
3 run-on-request



GMAP
1000+ geological
planetary mappers
in GMAP community

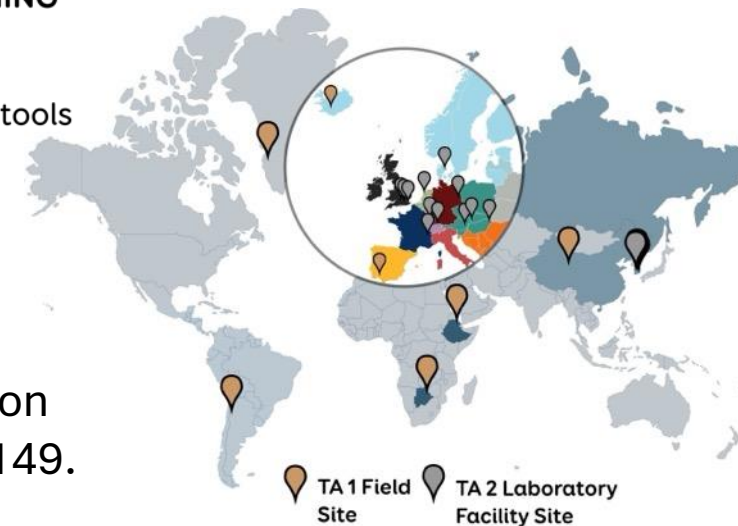


MACHINE LEARNING
7 new
open-source
machine learning tools

1 February 2020 – 31 July 2024

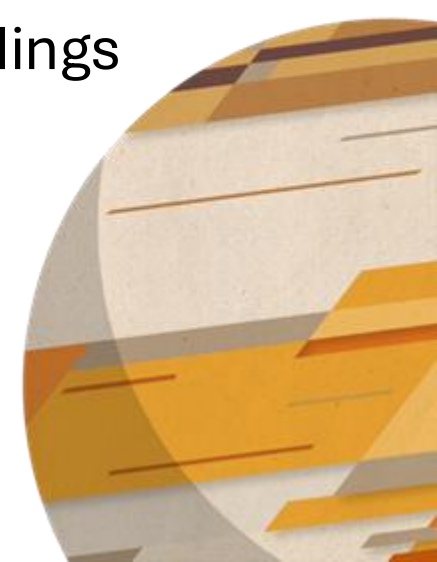


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- Overall scope of evaluation work defined at project proposal stage, with evaluator and budget defined before submission
- Presentation by evaluator at Kick-Off meeting and brainstorming with activity leads to define indicators and preferred methods of reporting
- **Aim:** to capture the experiences and impacts arising from participation in the project, beyond metrics uploaded to the European Commission's portal
- Evaluation tailored to the needs of the various strands of the RI




- Reporting forms set up on website, plus shared spreadsheets for logging metrics and indicators on a regular basis
 - Input requested from evaluator for annual reports, periodic reports and Council Meetings
 - At least 6-monthly informal catch-ups with Work Package leads and, in some cases, in-depth interviews
 - Enabled systematic and robust data gathering throughout the project
 - Focus of evaluation adapted and extended in response to emerging findings
 - Scope of evaluation adjusted during project to account for extensions and new activities resulting from Covid-19 pandemic
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- TA **visitor** feedback evaluated through:
 - Survey forms
 - Post visit evaluation form (n=197)
 - 1 year follow-up form (n=65)
 - 2-year follow-up form (n=19)
 - Questions gathered data on:
 - Nationality, gender, career stage, institutional details, domain of research
 - Participation in other Europlanet programmes (past TA visits, VA interactions, networking)
 - Overall experience (interactions with host before/during/after, quality of facilities, logistics, expectations met, opportunities for improvements)
 - Project details (scientific domain, any interdisciplinarity or cross-collaboration)
 - Publications and conference presentations arising
 - Outreach, media engagement & other impacts from the visit (e.g. new lines of research, collaborations, proposals)
 - Interviews with Evaluator (those who gave consent to be contacted)
 - In-depth qualitative feedback (n=62)



- TA **facility** impact was evaluated through a separate form:
 - Sent out every 6-12 months (n=137)
 - Opportunity to report impact from ongoing project **and** past projects
 - Questions gathered data on:
 - Scientific meetings
 - Collaborative research
 - Training
 - Publications
 - Engagement with industry
 - Policy engagement
 - Outreach
 - Letters of Support
 - Knowledge or technology transfer
 - Registered IP or patents
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- More complex to evaluate and identify indicators
 - Metrics included:
 - Users
 - Accessible services
 - Files using access protocol
 - Publications and conference presentations
 - Contributions by early career researchers
 - Winter Schools evaluations
 - Insights into building a community of planetary mappers
 - International reach
 - Interviews with services leaders brought out other aspects:
 - Monitoring user numbers can be tricky, as data can be accessed through different routes
 - That user numbers aren't necessarily that useful (who can be more important than how many) e.g. for mission planning and operation
- 



Post-visit evaluation form responses (responses from Early Career Scientists (ECS) only in brackets)

Area	TA1 (N=40; ECS=25)	TA2 (N=152; ECS=86)	Overall (N=192; ECS=111)
Planning future collaboration	83% (72%)	93% (92%)	91% (87%)
Interactions with hosts (out of 6)	5.65 (5.52)	5.92 (5.94)	5.86 (5.85)
Quality of lab/field environment (out of 6)	5.68 (5.52)	5.89 (5.90)	5.85 (5.90)
Overall visit rating (out of 6)	5.78 (5.68)	5.90 (5.90)	5.88 (5.85)
Interdisciplinary	65% (72%)	45% (41%)	49% (48%)
Data quality as expected	98% (96%)	95% (95%)	95% (95%)
New lines of research	83% (76%)	62% (58%)	66% (62%)
Number of expected publications	86 (55)	231 (127)	317 (182)
Number of expected conf. papers	104 (64)	319 (169)	423 (233)
Outreach planned	68% (72%)	41% (37%)	45% (43%)

Quantitative results (example 2)



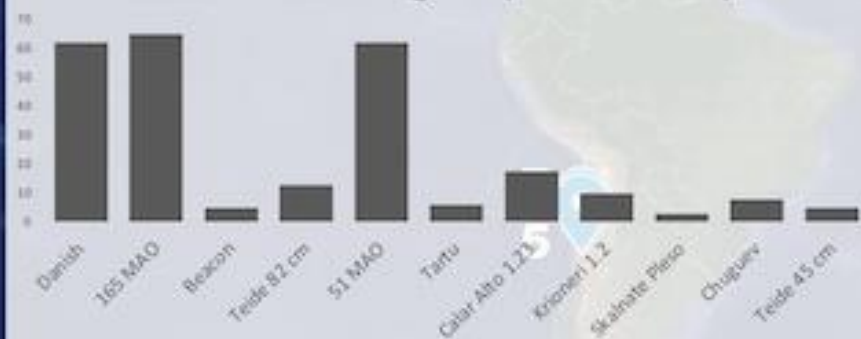
Career Stage of Observers



Gender Breakdown of Observers




Observation nights per telescope




Country Breakdown of Observers



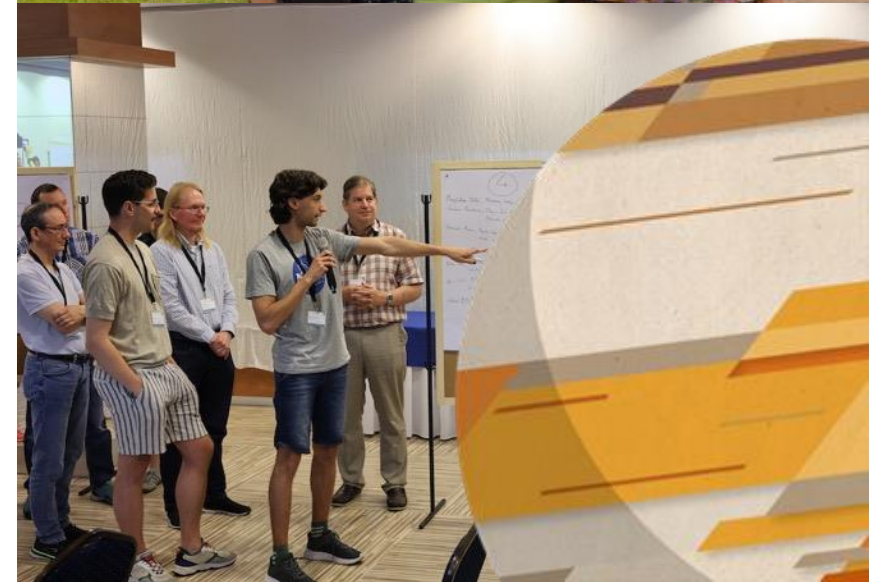
- **Qualitative data was gathered through**
 - Open-ended questions in surveys
 - Interviews with project participants, including
 - TA Visitors
 - Mentors and Mentees
 - Expert Exchange visitors and hosts
 - Amateur astronomers
 - Work Package leaders
 - Offered in-depth insights beyond the metrics
 - Highlighted how participants moved from one area of activity to another (e.g. how participation in a training workshop led to TA visit)
 - Produced the basis for case studies
 - Put emerging findings into context
 - **Evaluator also served as a neutral point of contact for any issues arising**
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- Covid-19 pandemic made the evaluation much more complex, due to restrictions on meetings, delays, changes and restructuring of the project
- Following up with individuals and multiple tasks was very time-consuming
- Identifying meaningful and trackable indicators in some areas could be challenging
- The interdisciplinarity of the project meant that support and discussions with management and work package leader were needed to provide context and unpick jargon

- **Significant scientific benefits beyond publications, especially in collaborations**
 - Over **90%** of TA hosts & visitors planned future research activities together,
 - Formation of consortia for research bids,
 - co-funding of doctoral studentships
 - contracts between industrial partners
 - Ongoing partnerships between European, African and South American research communities resulting from TAs and global collaboration activities.
 - **The impact of the RI was particularly strong for early career participants**
 - Over 50% of TAs were by early careers
 - Opportunities not otherwise accessible to them
 - Impacts amplified into the future
 - **Networking support very important for early careers and researchers from under-represented states**
 - Mentoring, expert exchanges, training all highly valued
 - Particularly impactful during the pandemic
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- **Amateur astronomers play an important role in space sciences and are a rich source of data**
 - Coordinated programme of engagement (alerts, campaigns, training, telescope access & dissemination workshops) not otherwise available to amateur planetary observers.
- **Investment through the JRA facility upgrades played an important role in building capacity in under-represented countries**
 - Case study of HUN-REN Atomki, where installation of two new beamlines for ice irradiation studies has led to establishment of international astrochemistry hub and additional large-scale grants
- **Longer-term follow-ups with participants from previous RIs revealed impacts on both individual scientists and organisations**
 - Helpful in tracking publications that may emerge several years after a project's end
 - Longstanding collaborations established, including with industrial partners
 - Formation of an SME resulted from a TA visit
- **Collaboration and networking help deliver world-class research**
 - Spending time together during visits helps refine ideas and leads to better science

- Low TA success-rate (35% vs 50% overall) for researchers from under-represented states (URS) in Central, Eastern, Northern and Southeast European countries
- Holding physical meetings/training in target countries found to be effective for widening participation from URS, but difficult to implement in Covid-19 timeframe
- Industry engagement another area where face-to-face is important and suffered during pandemic
- Lack of industry-academia engagement down to lack of awareness on how to get started (at least on academic side). Needs more targeted support.
- Surveys and interviews help refine strategy for future activities and engagement



- **Embedded, systematic evaluation can give insights into project impacts that would not otherwise come to light**
 - **Qualitative data from open-ended surveys and interviews provides in-depth information, context and understanding of interlinked or cross-cutting activities**
 - **Insights reveal how collaboration and networking are pathways to impact as well as indicators of success**
 - **Robust evaluation leads not only to good science, but to an outward facing ethos where impacts are amplified, strengthening the scientific community and its role in society**
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Questions?



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