

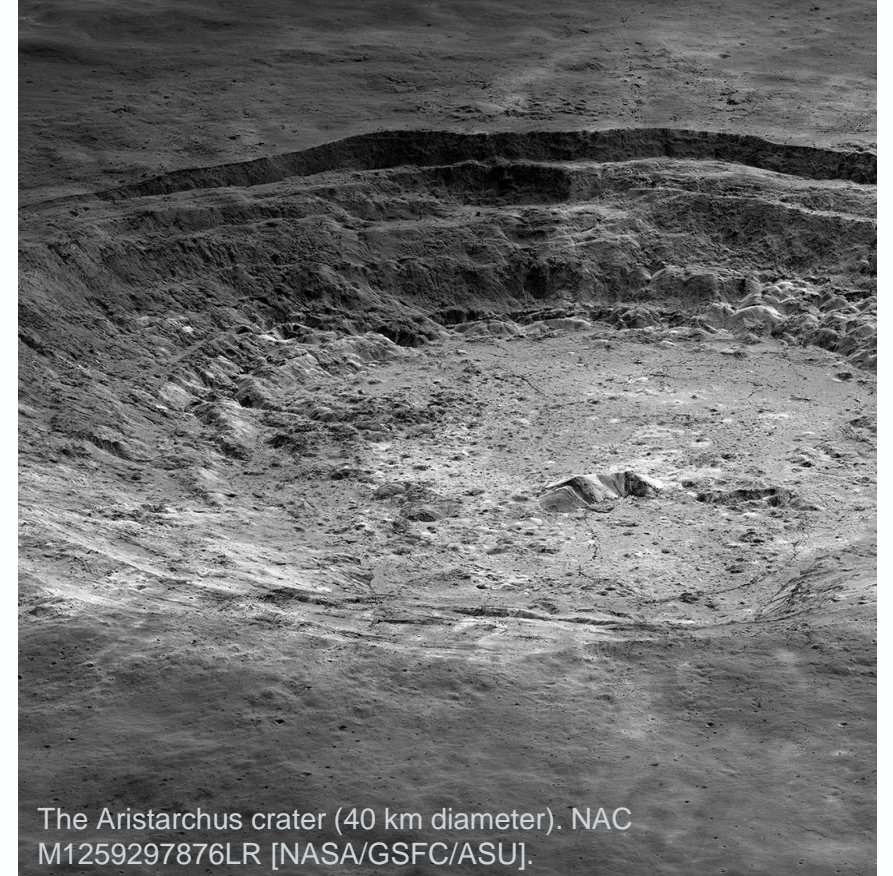
ESA SciSpacE AO – Information Workshop

Reserve Pool Of Science Activities for the Moon

ESA SciSpacE
13 July 2022

AGENDA

- 14.00 Welcome
- 14.10 Announcement of Opportunity (AO) Information Presentation
- SciSpacE background
 - Previous calls
 - AO introduction
 - How to submit a proposal
 - Selection criteria and evaluation process
 - Implementation of selected activities in the reserve pool
 - Refreshing the reserve pool
 - AO important dates
- 14.40 Q & A session (type questions in chat box or raise virtual hand)
- 15.00 Close



Sincere apologies for the unforeseen interruptions to the OSIP platform, which for some affected accessing the workshop. Any questions moving forward, please ask in the OSIP discussion section or via private chat within your submission form.



ESA SciSpacE AO

Reserve Pool Of Science Activities for the Moon

ESA SciSpacE
13 July 2022

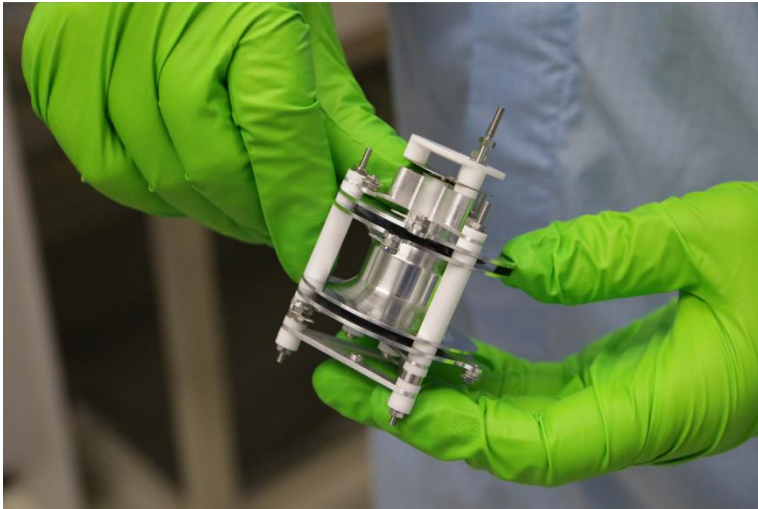
- SciSpacE is part of ESA's European Exploration Envelope (E3P) programme within the Human and Robotic Spaceflight Exploration (HRE) Directorate.
- SciSpacE prepares and delivers multidisciplinary science activities across varied research platforms:
 - Ground-based space analogue and micro-gravity facilities,
 - The International Space Station (LEO),
 - Moon and Mars (BLEO).
- SciSpacE:
 - Fosters innovative, world-class science research
 - Helps to deliver solutions to challenges on Earth and in space
 - Supports European economy
 - Prepares responsible human and robotic space exploration
- The current AO advances and further enhances ESA's strong SciSpacE research programme in preparation for near-term lunar flight opportunities and builds upon previous ESA lunar science exploration calls.

2018 Call: Lunar Exploration Campaign Science & Tech. Payloads

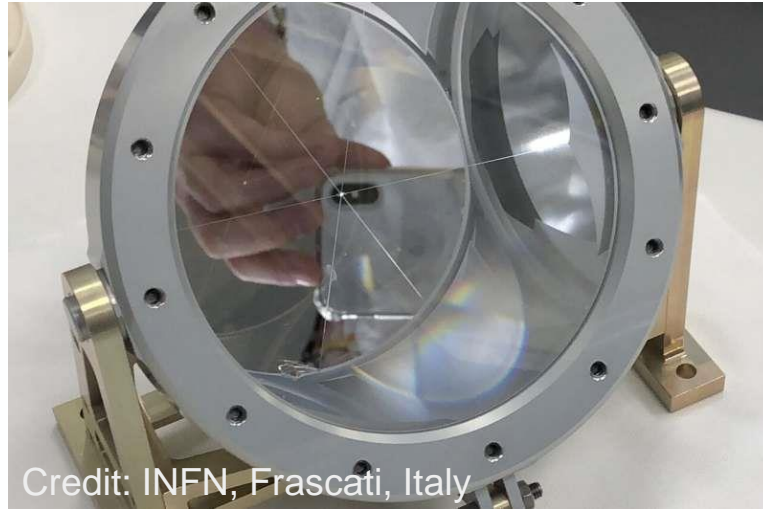
- **Objectives:**

- Gather information on European payloads that can contribute to a possible E3P lunar mission campaign
- Identify payloads to fly on missions of opportunity in the 2020 to 2025 timeframe

- **Outcome:** Several European lunar science payloads being developed for flight implementation during EP3 P2 (2022-25)

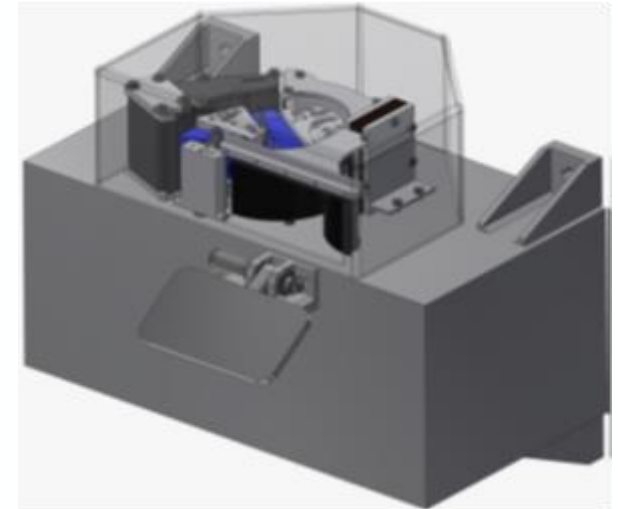


Exospheric Mass Spectrometer (EMS)
– PI: OU, UK. Detection of lunar volatiles. NASA CLPS Astrobotic mission to Valles Mortis (2022). Also being developed for JAXA LUPEX mission (2024).



Credit: INFN, Frascati, Italy

MoonLIGHT laser retroreflector – PI: INFN, Italy. Precise measurements for general relativity, geophysics and Earth-Moon dynamics. NASA CLPS flight to Reiner Gamma region (2024).



Negative Ions at the Lunar Surface (NILS) – PI: IRF, Sweden. Investigating surface-bound exosphere interactions and dynamics. CNSA Chang'E 6 lunar farside or polar mission (2024, TBC).

2020 Call: Exploring the Moon with a Large European Lander

- **Objectives:**

- Gather novel ideas for ways to utilise the capabilities of a large European lunar lander
- Build a portfolio of mission concepts for study and use to help define lander design for a diverse set of uses
- Leverage this information to support E3P programmatic decisions in preparing lunar surface exploration

- **Outcome:**

- Identification of key science themes of European interest and expertise utilising the Moon
- Identification of key technology and infrastructure interest for preparing sustained lunar surface activity
- Numerous CDF studies and Pre-Phase A industrial studies at payload facility and mission concept level



Credit: NASA. Apollo 17 Panorama

2022 Call: Reserve Pool of Science Activities for the Moon

As a next step of a rapidly growing E3P lunar mission campaign ESA invites the science and research community to submit innovative science activities to this new Announcement of Opportunity (AO).

- **Objectives:**

- Create ability to respond to emerging near-term lunar flight opportunities to with world-class European science research activities and payloads,
- Achievable through establishing a reserve pool of multidisciplinary science research activities that can be undertaken at the Moon from 2025 onwards.

- **Potential flight opportunities:**

- Contributions to international partners' lunar missions
- Commercial lunar payload deliveries
- ESA-led lunar missions



Credit: NASA. Apollo 17 Panorama

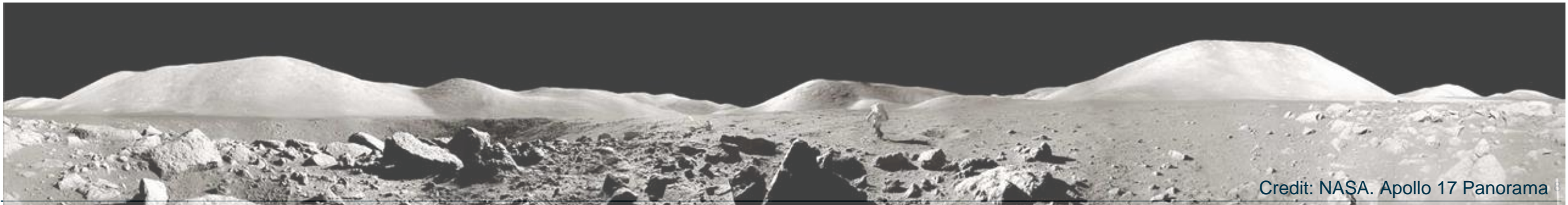
2022 Call: Reserve Pool of Science Activities for the Moon



As a next step of a rapidly growing E3P lunar mission campaign ESA invites the science and research community to submit innovative science activities to this Announcement of Opportunity (AO).

- **Important aspects:**

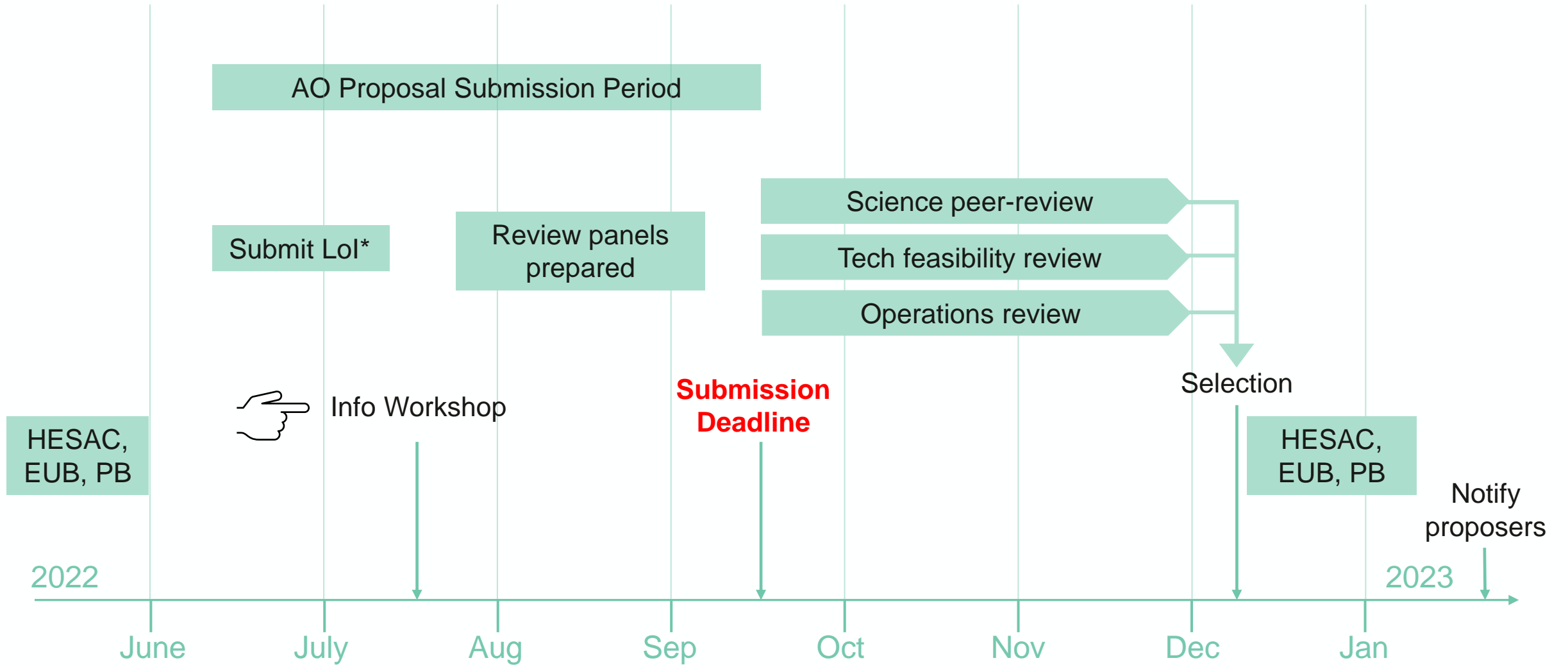
- Emphasis is on European payloads of sufficient maturity that are capable of being developed to flight readiness within 3 years of an identified compatible flight opportunity.
- Human subject research is excluded from this call.
- Lunar orbital payloads are out of scope of this AO
- Proposed activities are to be science goal driven, with a clear justification for utilising the Moon as a research platform.
- In support of their application, proposers are asked to identify alternatives to ESA funding for payload development.



Credit: NASA. Apollo 17 Panorama



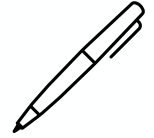
AO Selection Process Timeframe



**Letter of Intent (Lol) is optional but encouraged*

- **How to submit a proposal?**

- Via the online Open Space Innovation Platform (OSIP) at ideas.esa.int
- On the OSIP AO overview page click on the “Submit Your Idea” button
- You may edit and update your proposal, even after submitting, up until 15 September 2022.
 - If you have submitted a Letter of Intent, please update the same submission form to provide the full proposal
 - Updates will be saved automatically



- **What to include?**

- Complete all sections of the online proposal submission form (option to upload supporting documents is available)
- Selection criteria and assessment protocol are detailed on the information page for guidance and transparency

- **Other points to note**

- Privacy Notice Consent Forms: Must be completed, signed and uploaded by all proposing team members
- Eligibility to submit a proposal: The institute of the lead coordinator must be located in an ESA Member State or Associated Member State that contributes to ESA’s EP3 programme

- Scientific merit criteria (independent peer-review):
 - Significance (30%)
 - Approach (25%)
 - Personnel and Environment (25%)
 - Innovation (20%)
 - Relevance for Moon Utilisation
 - Technical and programmatic feasibility (ESA-expert review)
 - Capability of being developed to flight readiness within 3 years of identified opportunity
 - Technical complexity and credibility
 - Alternatives to ESA funding for development have been identified
 - National agency has been informed
 - Safety and programmatic risks
 - Compatibility for lunar application
- Selection / evaluation criteria and assessment protocol are further detailed on the AO information page on the OSIP.

Boundaries

- The AO is open to multidisciplinary science activities utilising the Moon surface as a research platform
 - Human subject research activities are excluded from this AO
 - Lunar orbital payloads are excluded from this AO
- Stand-alone technology demonstrations are out of scope of this AO
 - If a technology demonstration is an integral part of a proposed science-focused activity addressing identified science goals and questions, then this may be submitted and assessed

Guidance

- Activities would benefit from the capability of fitting into different mission scenarios
 - E.g., modular, flexible units; activities/payloads that are adaptive to different landing sites or mission scenarios
- Assume a baseline of purely robotic mission scenarios
 - Can indicate where crew support would be beneficial and how this may change the technical / operational requirements of the proposed activity

Guidelines for lunar payload scaling and complexity

- No specific boundary conditions for interfaces are imposed
- Some payload scaling guidelines are provided below regarding compatibility with future flight opportunities*
- These are suggested guidelines only and are not a limit

Parameter	Guideline (not a limit)
Mass	Less than 5kg. More massive payloads may be proposed.
Volume	Less than 5L. Larger payloads may be proposed.
Power	Typically <10W peak. Higher power and/or duty cycles may also be accommodated.
Envelope	Single integrated units are typically preferred and are easier to accommodate.
Data	Data rates from the Moon are typically 1MB/s but can be higher. Data rates need to consider that all users will share a given bandwidth. Continuous visibility cannot be assumed. Store and forwards is a capability that needs to be considered internally or requested from a lander.
Thermal	Landers will typically not provide thermal management of a payload.

**See also attachment, "Lunar Activity Guidelines" on the AO information page on the OSIP*

Guidelines for lunar payload scaling and complexity

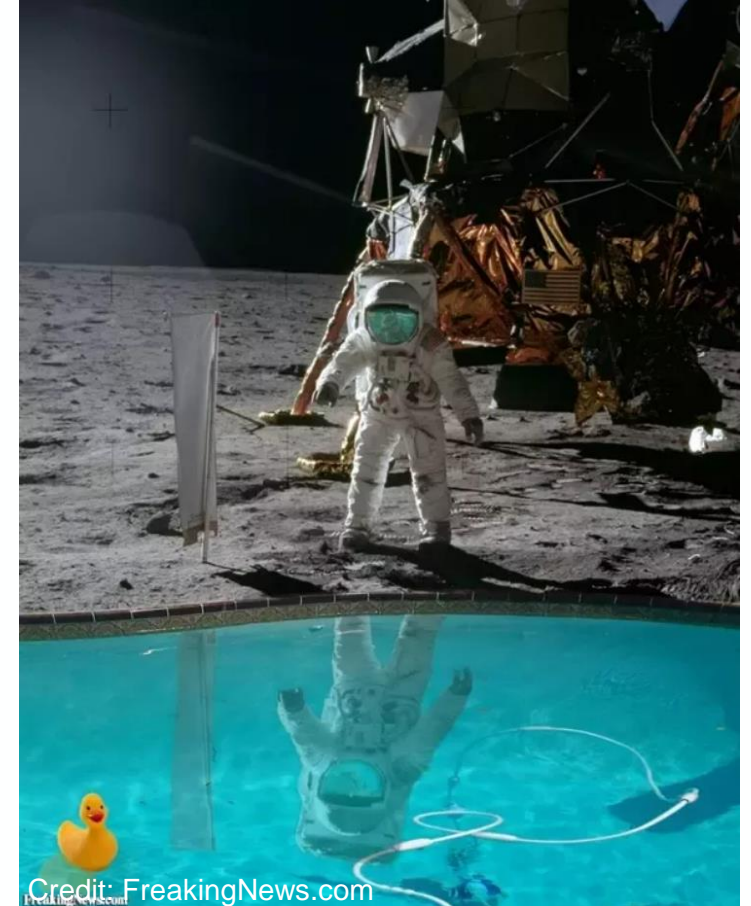
- No specific boundary conditions for services are imposed
- Some guidelines are provided below regarding compatibility with future flight opportunities*
- These are suggested guidelines only and are not a limit

Parameter	Guideline (not a limit)
Night survival	Night survival cannot be assumed but may be available in some cases.
Mobility	Mobility systems may be available but cannot be assumed. Instruments contained in their own mobility systems can be proposed, noting that in both cases there may be a reduction in opportunity compatibility.
Robotics	Robotic deployment, positioning or sample acquisition / transfer cannot be assumed to be provided but may be available.
Sample return	It is recommended to assume a baseline of no sample return, either of terrestrial uploaded samples or lunar samples, and then, if applicable, describe where sample return would be beneficial if the opportunity were presented.
Other	Other services that increase complexity and resources, e.g., cold stowage, may be available but can not be assumed and may reduce opportunity compatibility.

**See also attachments, “Lunar Activity Guidelines” and “FAQs” on the AO information page on the OSIP*

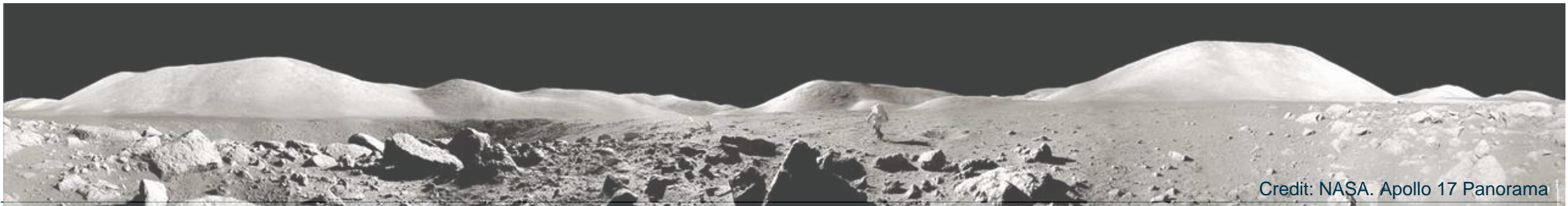
Implementation of Selected Activities

- An Activity Requirements Document (ARD) shall be prepared for all activities selected for the reserve pool.
- Assignment to a flight opportunity is subject to:
 - Passing a technical and safety review
 - Availability of a relevant flight opportunity
- Identification of a relevant flight opportunity will be based on:
 - Identifying shared objectives and boundary conditions compatibility
 - Assessing benefits, drawbacks, costs and risks
- Different development routes for science activities will be explored on a case-by-case basis when a relevant flight opportunity is identified.
- An ESA Payload Development Manager and an ESA Project Scientist will coordinate with selected activity proposers in preparing for a flight opportunity.
- **Please note that the acceptance of a proposed science activity to the reserve pool is not a guarantee for a flight opportunity**



Refreshing the Pool

- Accepted proposed activities will remain in the reserve pool for three years.
- After three years activities and associated payloads that have not been assigned a flight opportunity will undergo a review
 - Recommendations will be made to PB-HME on any deselection of activities from the reserve pool.
- Refreshing and topping up of the reserve pool may then occur via a new AO.
 - Activities deselected from the reserve pool and previously submitted unsuccessful proposals may be updated and resubmitted to future announcements.



Back Up Slides



SciSpacE Research Goals

SciSpacE prepares and delivers multidisciplinary science activities utilising varied research platforms including ground-based space analogue facilities; micro-gravity and LEO facilities, and is expanding to BLEO destinations

- Fosters innovative, world-class, science research
- Helps to deliver solutions to challenges on Earth
- Supports European economy
- Prepares responsible sustained human and robotic exploration

