

Submission Form

Call for Contributions, APRSAF SE4AWG

This form should be used for the submissions of contributions to the Space Education Initiative of the APRSAF SE4AWG 2022. In describing interesting case studies on space education policies or practices in your country, please avoid using acronym or national jargon that may be hard to understand for others. All the submissions will be made publicly available by the organizers.

1. Title of the contribution

Multidisciplinary approach to space education: APOSA's Cosmic Sandbox workshops

2. Organization and/or person submitting the contribution

Including full address and contact information (only the organization's and or person's name will be disclosed to the public)

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3. Date of submission

28 October 2022

4. Short description of the space education policy or practice (max. 1000 words)

Please describe the background and origin of the policy or practice, the details of implementation, stakeholders, technical details, etc.

In most emerging countries, the space ecosystem has not yet matured from multiple perspectives. Be it the development of technological capabilities, the securing of funding, or the establishment of legal and policy frameworks, everything needs to be carried out in parallel to advance in the space race.

The young generation in these emerging countries will have a central place in building their indigenous space ecosystem. Hence, it is essential to equip them with knowledge of all the dimensions of the space industry. The young generation should be empowered with an entrepreneurial mindset to create what they want as they progress in their task. An entrepreneurial mindset can be achieved by training them to think about the challenges in their current ecosystem from different perspectives such as technology, funding, economy, business model,

legal, policy, and governance structures. They should also be trained to evaluate the impact of creating the space ecosystem in their respective countries quantitatively to convince the relevant stakeholders to invest time, effort, and money. Hence, we need an interdisciplinary approach to space education and capacity building. The stakeholders of this education program shall be policymakers, respective space agencies/offices/entities, entrepreneurs, technology experts, social scientists, economists, and investors.

To realize this vision, APOSA has launched the Cosmic Sandbox program. Each Cosmic Sandbox workshop is designed as a case study on a specific country of choice, and participants are asked to proceed as follows:

1. Mapping of the complete space ecosystem in the country, for basic understanding
2. Reviewing pressing issues faced by people in the country that can be solved using space technology
3. Identifying the affected communities and actively reaching out to them to understand the problem landscape. The stakeholders collaborating with the program help them to connect with relevant communities. This type of user-centric solving approach gives students a concrete reason as to why they are doing what they are doing
4. Identifying and remapping the stakeholders involved in addressing the problem
5. Assessing the indigenous capabilities for implementing the solutions and conducting a cost-benefit analysis on whether the stakeholders should invest in building the technology indigenously or utilize internationally available resources. A calculation on the social impact should also be done to justify the investments into the solution across different stakeholders.

5. Successful outcomes and reasons (max. 500 words)

Please describe the successful outcomes of the project and the reasons for such successes.

As of the day of this submission, APOSA has conducted three Cosmic Sandbox workshops based on these multidisciplinary user-centric approaches. The details of the three workshops and corresponding outcomes are mentioned below.

Two workshops were conducted on the challenge theme 'Earth Observation application for disaster management' and 'Earth Observation application for Earth Intelligence'.

The first Sandbox was conducted as a side event APRSAF-27 in October 2021. The second sandbox was conducted in May 2022 as a stand-alone event. The [link](#) provides the complete workshop details, guidelines, and templates used in the second sandbox workshop for reference. The sample outcome of the sandbox brainstormed and filled by the participants can be found in this [link](#).

The participants were encouraged to first choose a vulnerable community and empathize with them. This exercise provides an opportunity to investigate a typical day living in the affected community.

From the mood board presented at the bottom of the brainstorming template, we can see how the emotions of the participants changed from negative to positive while they moved from experiencing a day in the affected community to exploring problem space to ideating a solution. The total number of participants for this second workshop including moderators was 13.

The third sandbox workshop was conducted on the challenge theme 'Sustainable lunar village' in collaboration with Moon Village Association. The sample outcome of this sandbox can be found in this [link](#).

Each team also presented their motivation as to why we must establish a moon village. The participants shared their views on the activities, basic rights, values, fears, wants, and needs of the people who will be potentially living in the lunar village in the future. More often these attributes go missing and we tend to focus only on technological advancements at the first sight. The total number of participants including moderators was 16.

We also got feedback from the participants that it made them think deeper and understand the problem landscape more meaningfully. It also led to creating an entrepreneurial mindset as they think deeper about the problem and the community who are the potential customers of the business in future.

We are also conducting the next sandbox workshop on the challenge theme 'Space4Climate' as a side event of APRSAF-28 in November 2022. We will be exploring the problem landscape further and investigate different types of user segments in the vulnerable community and the problems faced by them. This discussion will then be followed by what technologies in space can be used to solve these problems in an affordable way.

We also create a multidisciplinary knowledge repository through the sandbox. The outcomes of the past sandboxes will eventually be published as blog articles on our website for community access to information.

The information gathered will also be used as resource for our upcoming hackathon to be conducted in early 2023. The hackathon will involve exploring the problem landscape, ideating for the user-centric solution and preliminary prototyping from different perspectives such as developing business model, technological solution and the corresponding policy drafts for a specific country of choice.

For every sandbox workshop, we also invite experts who are working on the sandbox challenge themes from various perspectives on our social media channel, Space Smurfs to create and share the knowledge with the participants of the workshop and the general audience. Example of such podcast on Space Smurfs is provided in the [link](#).

More details about APOSA, our various activities and reach can be found in the [link](#).

6. Challenges of implementation and lessons learned (max. 500 words)

Please describe the main hurdles that were faced during the implementation of the policy or practice, and lessons that you would like to share with other countries or organizations willing to try the same approach.

Firstly, bringing the expertise of different disciplines together is challenging. Secondly, designing the program flow to include the multidisciplinary concept is unique and more often requires dedicated time to design an effective learning experience.

The approach also requires commitment from the learners to complete the intense brainstorming sessions and be open to absorbing the high influx of knowledge. The learners are also expected to have interest in knowing the multidisciplinary nature of the space industry.

Creating awareness about why this multidisciplinary concept is important can also be challenging. More often the learners are focused on mastering only a few specific areas of the industry. Online platforms can also be a challenge to implement as it causes fatigue to complete such intense programs.

Each team has to have dedicated facilitators to ensure the effective learning process. Finding manpower to be facilitators for running the workshop can be challenging and time consuming to train them.