

# Participation of Emerging Space Countries Final Report

November 2020

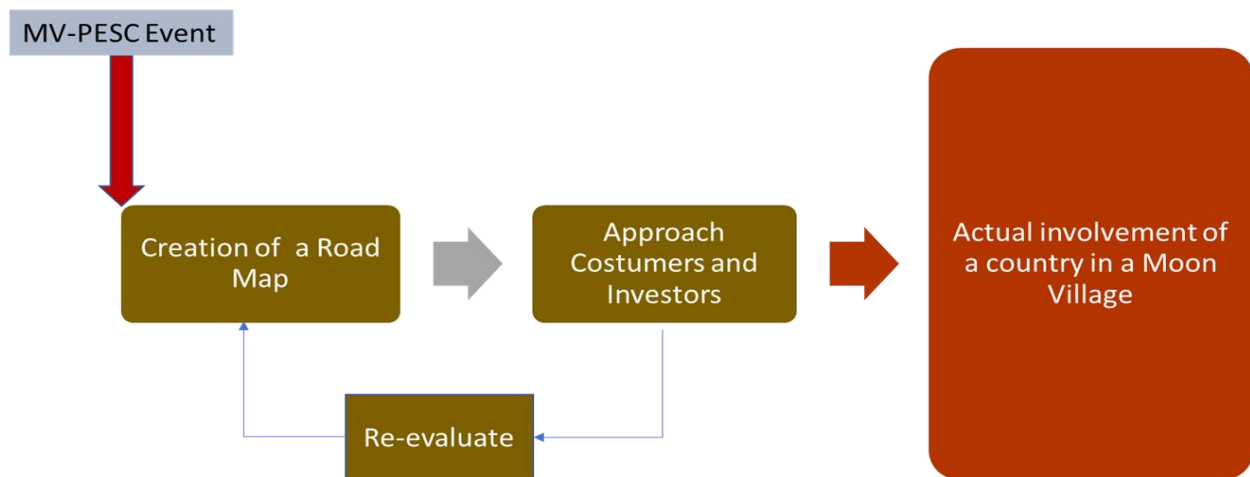
## Abstract:

The first version of the Moon Village – Participation of Emerging Space Countries (MV-PESC) program was concluded in October 2020. The aim was for each participating team to produce a roadmap on how to involve their countries in the Moon Village. The Moon Village Architecture working group published a white paper in January 2020. The paper was about a roadmap for a moon village. The PESC project adapted this roadmap and the participating teams used it as a main reference for their country's roadmap.

This report summarizes the activities conducted during the PESC program and the results from each country.

## PESC Project:

The PESC project aims to involve developing countries to the moon rush by supporting teams from around the world to write roadmaps on how their countries can be involved in the Moon Village. Writing the roadmap is just the beginning and involving local stakeholders is an iterative process as can be seen in the PESC block diagram below:



The Moon Village Association supported the selected 13 teams to write their roadmaps. This support was provided through a series of webinars, shared documents and meetings. After the teams submit the roadmaps, MVA will provide feedback and the PESC team will follow up on the progress.

## **Applications received:**

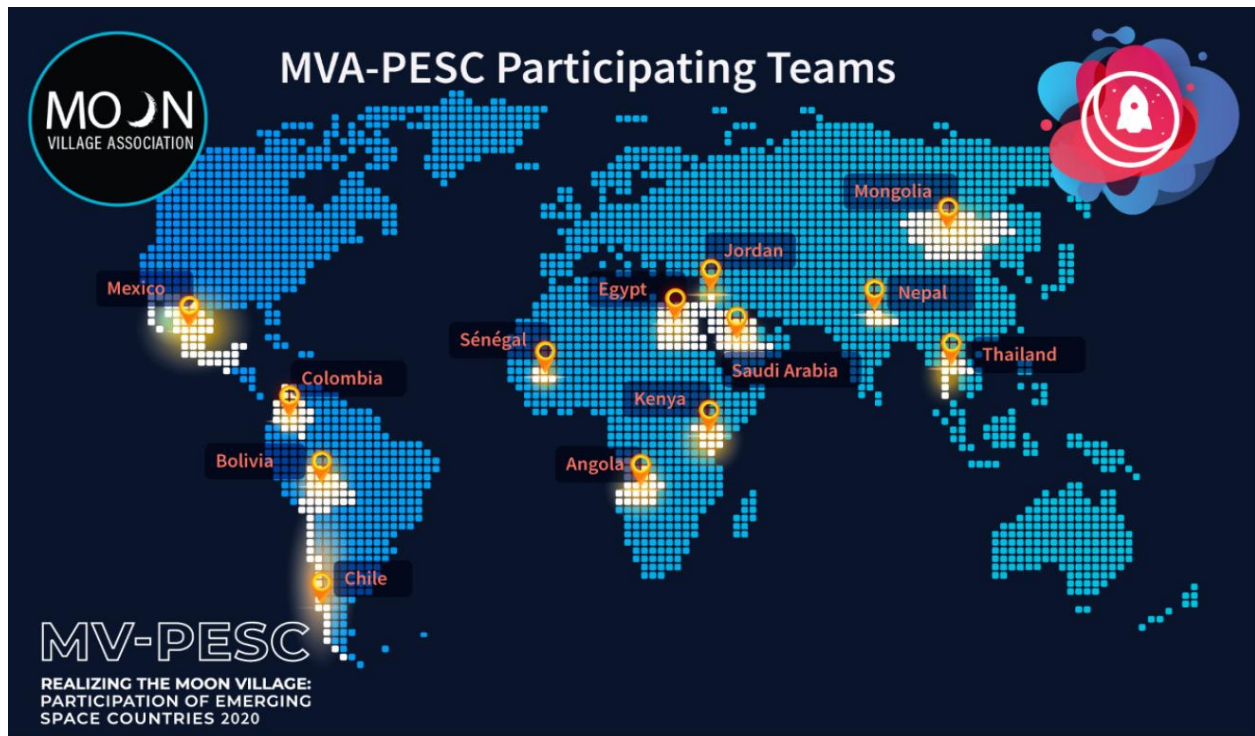
A general criterion was used to select the teams to the PESC project are as follow:

- 1- The background of the applicants.
- 2- The involvement of the youth in the team.
- 3- Connection to space agency.

The PESC team received 16 applications. Initially, it was planned to only accept 3 countries per region. However, due to the good applications from Latin America, it was decided to accept the 4 applications received from Latin America. The applications received were from the following countries.

- 1- Middle East: Egypt, Saudi Arabia, Turkey, and Jordan
- 2- Asia Pacific: Thailand, Malaysia, Nepal, Mongolia
- 3- Africa: Kenya, Angola, Senegal, Burkina Faso
- 4- Latin America: Chile , Mexico, Colombia, Bolivia

Malaysia, Turkey, and Burkina Faso applications were rejected. Malaysia and Turkey's applications were rejected because the applicants have no connections to the space field and their backgrounds are not space – related. Burkina Faso application was rejected due to the fact that no youth were involved, and no plan was presented to involve the youth. Therefore, the PESC team accepted 13 countries as shown in the picture below:



The selected teams are as follow:

Middle East: Saudi Arabia, Jordan and Egypt

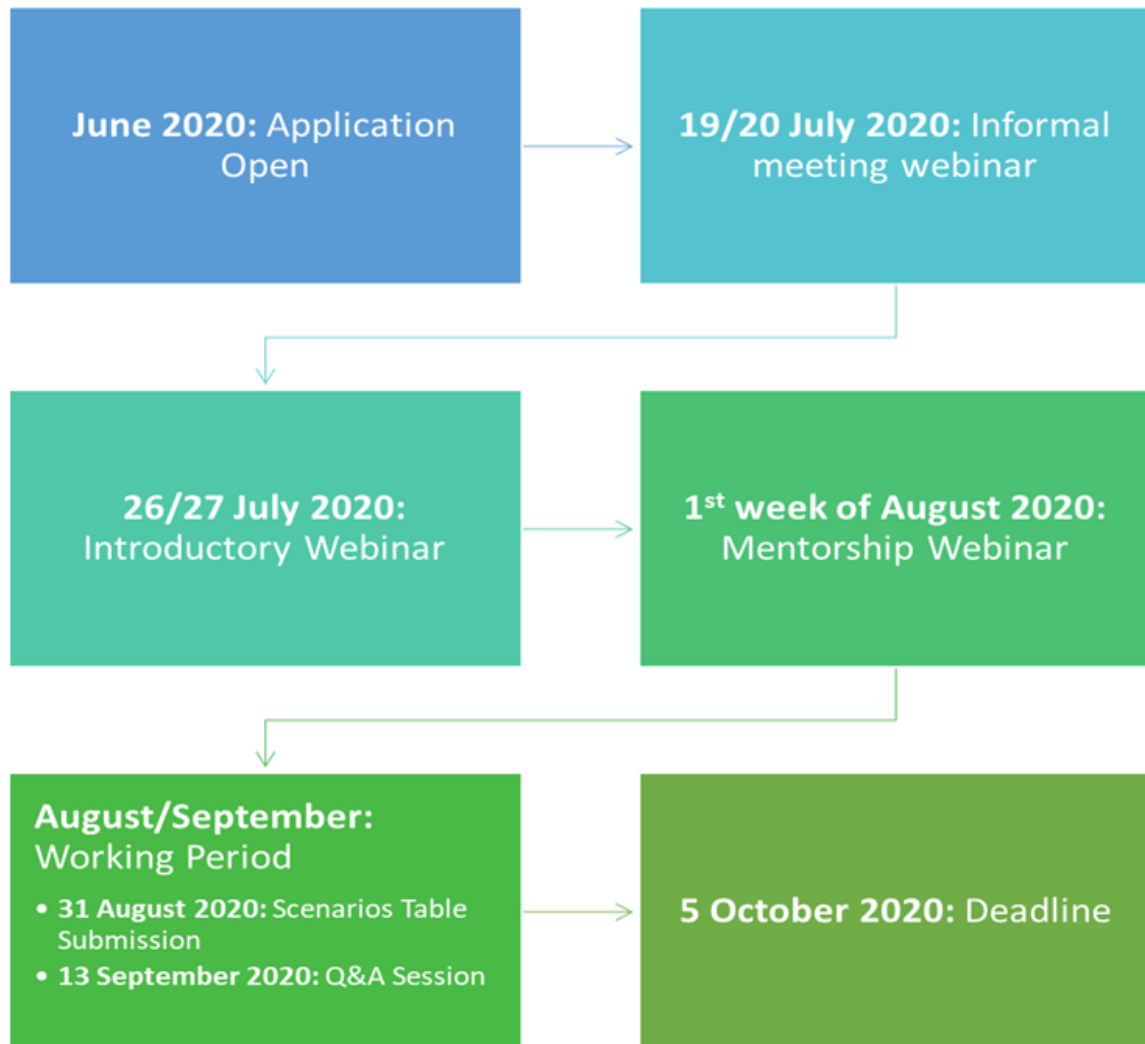
Africa: Kenya, Angola and Senegal

Asia: Mongolia, Nepal and Thailand

Latin America: Mexico, Colombia, Bolivia and Chile.

## Webinars Series and PESC Program Timeline:

To inform accepted teams about the PESC project concept, a series of webinars were organized exclusively for the teams. The following block diagram shows the webinars:



**Informal Webinar:** Which was held on 20 July 2020. The webinar was to introduce the teams to each other and help them understand the motivation to participate in the PESC project. The participating team members expressed their interest to be involved in moon activities. The webinar was recorded and shared via Google Drive. It is accessible in the following link:

<https://drive.google.com/drive/u/1/folders/1PATk7jZC4a31IRNkXEXE8BGm2nSRyDNo>

**Introductory Webinar:** Which was held on 27 July 2020. The webinar objective was to introduce the participating teams to the concept of the PESC project and what was expected from them. The PESC Guide document was shared with them and can be found along with the webinar recording at the following link:

<https://drive.google.com/drive/u/1/folders/1K5T6DxnX640PU77DZqUYEL6b9466lSrt>

**Mentorship Webinar:** Which was held on 3 August 2020. During the webinar, the roadmap was explained in more detail as the main deliverable from the participating teams. A roadmap template was presented to be followed by the participating teams. Another document called the Mentorship Program was also shared with the teams. In this document, some tips and important questions that might be helpful for the team to draft their roadmaps were presented. The White Paper published by the Moon Village Architecture Group was also presented and teams were encouraged to select Building Blocks as explained in the paper. The recording and the document are accessible using the following link:

[https://drive.google.com/drive/u/1/folders/1qnbDmJ2chaBZ\\_Vf98ompCZv21b8Zrj1z](https://drive.google.com/drive/u/1/folders/1qnbDmJ2chaBZ_Vf98ompCZv21b8Zrj1z)

**Q&A Webinar:** As the teams were writing the roadmap and brainstorming ideas, the Q&A webinar was dedicated to hear from the teams and provide further support for them. The following link is the recording of the webinar:

<https://drive.google.com/drive/u/1/folders/1RR1H5KkF8fvCV1Im6LA-546CcsNknKzD>

The figure above shows the timeline of the PESC project. Initially, the deadline to submit the roadmaps was 5 October. However, we received several requests to extend the deadline. The deadline was extended to 13 October 2020.

## Countries Roadmaps results:

### Middle East:

1- Saudi Arabia: Did not submit a final roadmap; a draft was submitted for an early deadline and deemed insufficient by the MV-PESC team. The team provided written and verbal feedback, but no further deliverables were submitted.

2- Jordan:

Project #	Project Title	Follow – Up Activities	Comments
1	Analog Facility and Technological Research	Meeting with Crown Prince Foundation and other stakeholders,	Located in Wadi Rum Desert (both new projects within Jordan and hosting

		identify specific research goals	researchers from other countries)
2	Community and Stakeholder Engagement	Conceptual branding, establishing marketing strategy and social media channels	Goal is to engage public as well as institutional stakeholders

### 3- Egypt:

Project #	Project Title	Follow – Up Activities	Comments
1	Scenario Alpha: Low Lunar Orbit (LLO) Operations	Hold university competitions and workshops to solicit ideas and train younger generation	science missions and payloads; imaging and remote sensing (i.e. SAR, hyperspectral imaging)
2	Scenario Beta: Lunar Surface Operations	Initiate fundraising campaign with national stakeholders (NOTE the team may focus only on project 1 for now)	resource exploration and characterization (lunar mining rover)

### Africa:

1- **Senegal** : withdraw 27 September 2020

2- **Angola** :

<b>Project #</b>	<b>Project Title</b>	<b>Follow – Up Activities</b>	<b>Comments</b>
1	Design, Management Engineering and development of Nano technology missions for orbit and Surface Exploration/Activities	Meeting; WhatsApp group; Calls	Angola missed the two deadlines (30 August, 5 October) for submitting the improved roadmap.
2	Moon Analogue Site - Namibe - Neuroscience, Human Physiology and Human Life and exploration of Extreme conditions	Idem.	Idem.
3	Self organization Fractal Algorithms in African Societies, Biomimicry and Mining Techniques to develop and organize settlements.	Idem.	Idem.

3- Kenya :

<b>Project #</b>	<b>Project Title</b>	<b>Follow – Up Activities</b>	<b>Comments</b>
1	Agriculture and Biosystems	Meeting; WhatsApp group; Calls	Clear and interesting: 2 scenarios Beta and Gamma implicated on the time-line 2020-2100.
2	Project Launch Capabilities	Idem.	Excellent project which claim to reignite the Kenya launching capabilities with the Africa space agency

3	Astronomy	Idem	Interesting project in astronomy and astrophysics linked with the square Kilometer Array (radio astronomy)
4	Communications & Networks	Idem.	I can't appreciate, no background on this topic
5	Nuclear Power Sources	Idem.	Big project connected to the moon
6	Science missions (Lunar resource exploration)	Idem.	Research on geological procedures to be applied on the moon: more precision is needed.

## Asia:

### 1- Thailand:

Project #	Project Title	Follow – Up Activities	Comments
1	Scenario Gamma: Space Consortium for Private Ventures	The team has initiated the formation of a Lunar Policy Development Committee of Thailand (LPDCT) and invited a	Goal is to engage private companies, government agencies, academic institutes, and public sectors in general, in order to



		considerable number of space organisations (private or public) to join. The LPDCT has engaged the Subcommittee on Science, Technology, Research and Innovation To drive the country - a sub-committee of the national Thai council regarding space economics	guide the creation, research, and development of Thailand's first Lunar policy
2	Scenario Gamma: Lunar Early Access Mission (LEAM)	To initiate studies and projects to develop early lunar missions that do not require local Thai launch vehicles or delivery systems	Focus is on potential study of lunar robotic landers and lunar orbiter and orbital satellite
3	Scenario Gamma: Space Education Initiative	To partner with private enterprise to launch academic institutes for space related education, training, and human resource development	Goal is to promote lunar exploration among the youth and train a crew of Thai youth who can bring lunar exploration in Thailand to the next level

2- Nepal:

Project #	Project Title	Follow – Up Activities	Comments
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1	Scenario Alpha: Analog astronaut mission base in the Himalayas	Connect with organizations dedicated to analog astronaut training missions (Austrian Space Forum, Mars Academy USA, ESA, NASA, International MoonBase Alliance, etc)	Goal is to have Nepal contribute to developing a detailed understanding of human biology and behavior and the way it reacts in a confined space-like environment
2	Scenario Beta: High-altitude Observatory in the Himalayas	Conduct a feasibility study to build an observatory at one of the highest destinations in the world, the Himalayas and search for potential collaborators interested in building the same to observe the lunar surface and distant objects from a high vantage point	Nepal is home to 8 of the world's 10 highest mountains, high altitude provides significant advantages for astronomy in terms of clarity
3	Scenario Gamma: Tourism destination similar to lunar habitation pods/modules	Collaborate with the existing strong tourism sector of Nepal for investments, universities in Nepal and abroad who want to showcase their lunar projects	Goal is to attract thousands of tourists every year to Nepal and promote space education and outreach

3- Mongolia:

Project #	Project Title	Follow – Up Activities	Comments
1	All scenarios: Open-access lunar analogy and testing site for the international community	<ul style="list-style-type: none"> <li>- Conduct a baseline study on lunar analogy in the Mongolian Gobi</li> <li>- Contribute to lunar research projects by opening up such opportunities in countries where it is not possible to build lunar analog, or simulate moon-like conditions in their own countries</li> <li>- Expand the cooperation between international parties in the field of Moon village</li> </ul>	<p>The following factors, such as dry atmosphere and soil, extreme temperature difference, less precipitation in any season, less populated area, and less air traffic mean the Mongolian Gobi is the ideal place for a Moon/Mars analog. In addition, for any activities of peaceful use of space, there are no political and legal obstacles in Mongolia to collaborate with any other countries in the world</p>
2	All scenarios: “Mongolian Gobi – Moon Challenge” International Competition - Moon rover and Robotic vehicle contest	<ul style="list-style-type: none"> <li>- Organise an international Moon rover and Robotic vehicle contest</li> <li>- Engage government agencies, universities and research institutes, commercial companies, NGOs &amp; amateur groups</li> </ul>	<ul style="list-style-type: none"> <li>- To give the opportunity to test equipment or technology in the field to the participants</li> <li>- To support lunar research teams by promoting their work</li> </ul>

3	All scenarios: "Mongolian Gobi – Moon Challenge" International Workshop	<ul style="list-style-type: none"> <li>- Organise an international workshop and meeting</li> <li>- Engage government agencies, universities and research institutes, commercial companies, NGOs &amp; amateur groups</li> </ul>	<ul style="list-style-type: none"> <li>- To give the opportunity to test equipment or technology in the field to the participants</li> <li>- To give the opportunity to share knowledge and experience between participants</li> </ul>
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## Latin America:

### 1. Chile

Project #	Project Title	Follow – Up Activities	Comments
1	Laboratories and capability building	<ol style="list-style-type: none"> <li>1. Engage the Ministry of Science, Technology, Studies and Innovation,</li> <li>2. Engage Universities, national satellite project (SNSAT) developed by the Chilean Air Force</li> <li>3. MSc Pedro Serrano, Director of the Extreme Architecture Unit in the university Universidad Técnica Federico Santa María, UTFSM will continue his research area with a project for the design and installation of self-sustaining laboratories in analogues zones located in the desert and the Antarctic;</li> <li>4. ACHIDE will also promote the construction of a medium</li> </ol>	<p>The aim is to support lunar research teams by promoting their work. The Chilean government will focus on supporting issues that are related to national development in the next two decades. It is expected that a governmental structure will be created to support research activities and to support scientific and technological progress in space activities with government funding programs for just a few specific projects</p>

		<p>size Vacuum Chamber as part of the Space Technology Laboratories, to support all organizations making space and health research in Chile.</p> <p>5. Activities that public and private organizations are expected to carry out.- ACHIDE – Universities</p> <p>7. Activities that private companies are expected to carry out, mainly profit oriented.</p>	
2	Lunar regolith management & resources mining	<p>ACHIDE and UNIVERSITIES UTFSM &amp; U LA SERENA will develop</p> <ul style="list-style-type: none"> <li>- Lunar materials research for underground architecture</li> <li>- Research on Oxygen recuperation from regolith and dust management.</li> <li>- Lunar architecture materials.</li> <li>- Sustainable life support systems. <ul style="list-style-type: none"> <li>• Earth analogue sites.</li> <li>• Human operations <ul style="list-style-type: none"> <li>• Habitation</li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>- A Corporation will be created to carry out research around regolith use &amp; management and mining for the exploration, characterization, and extraction of rare earth elements on the Moon.</li> <li>-The team will also research the process to recover oxygen from regolith. ACHIDE hopes to bring other scientists and organizations into this project in the future.</li> </ul>
3	Underground architecture and life support systems	<p>ACHIDE and UNIVERSITIES UTFSM &amp; U LA SERENA will develop</p> <ul style="list-style-type: none"> <li>-Lunar materials research for underground architecture. - Underground architecture research.</li> <li>-Sustainable life support systems design and testing; will study</li> <li>-Earth analogue sites.</li> <li>-Earth Habitation -Human operations; Lunar architecture design, building and testing.</li> <li>- Sustainable life support systems design and testing.</li> </ul>	<ul style="list-style-type: none"> <li>-The Extreme Architecture Unit of the UTFSM, is working on the design of habitable volumes arranged in lunar intumescences or caves. ACHIDE hopes to bring other scientists and organizations into this project in the future.</li> </ul>

		<ul style="list-style-type: none"> <li>- Earth analogue sites.</li> <li>- Human operations - Habitation - Transport and Logistic</li> </ul>	
4.	Space/Lunar agriculture and food production	<p>ACHIDE and UNIVERSITIES UTFSM . UMAG, Agni SCS and Other Companies will Research on spirulina and other vegetables production and process, Habitation - Transport &amp; Logistics, - Space/Lunar agriculture and food production. -Artificial intelligence in food production. -Habitation</p> <p>-Create business opportunities for the national industry in space.</p>	<p>-The Chilean company Agni SCS has specialized in the cultivation of Candeal Wheat, leading the development of new varieties for the industry, they also multiply counter-season seeds for the main companies worldwide (Syngenta, Bayer, Semences de France, etc.).</p> <p>-Eng. Carlos Palma, entrepreneur in charge, has made his laboratory in southern Chile available to the PESC program for research in lunar agriculture and the production of food in space, from species that prove to be cultivable. The research will be supported by Pedro Serrano and scientists from other universities, and ACHIDE hopes to bring other organizations into this project in the future.</p>
5.	Wardrobe design	<p>FACH, ACHIDE and UNIVERSITY UTFSM, Aura DT and Other companies will Research on wardrobe requirements and design, testing and production for space and Lunar operations design</p>	<p>The Chilean company Aura DT currently designs and manufactures Smart Clothing, for use in high risk tasks in the Forestry and Mining industry. The clothing incorporates sensors and communication systems that allow the coordination</p>

			and monitoring of activities, as well as environmental conditions and radiation, lighting and alarms. A team with scientists and researchers will be organized to work on the design of work and rest clothing for use on the Moon, in controlled indoor environments.
6.	Artificial intelligence and data management.	ACHIDE, UNIVERSITIES and PRIVATE COMPANIES will research artificial intelligence applications for space operations and data management, A.I. applications on food production and minery, - Design of artificial intelligence applications for space operations and data management. - Utilities control systems, Robotic exploration and mining -Space/lunar agriculture and food production.	ACHIDE will coordinate work teams with researchers who have expressed interest in the development of various applications related to artificial intelligence and data management, both for habitability systems and processes, and in support of various robotic systems.

## 2. Mexico

Project	Project Title	Follow – Up Activities	Comments
1	Development of a multi-purpose robotic infrastructure on the lunar surface	This project is divided in stages and relies on the cooperation of several actors inside and outside Mexico, for example, a key part of this infrastructure is made of rovers or mobile vehicles, which will be developed in cooperation of universities and private	The purpose of the project is to develop and deploy the necessary robotic infrastructure to fulfill several needs on the Moon, in other words, to become a service provider to support human presence on the Moon.

		companies, with government support and with commercial technology from international partners or suppliers. Launching services will also be provided by space agencies and private companies outside the country.	Such activities include but are not limited to mapping, equipment and payload transportation, mineral prospecting, scientific research, in situ resource utilization, human activities support, mining activities support and construction.
2	<b>Resilient communications on the Moon surface for robotic-human operations</b>	A series of satellites orbiting the Moon, as well as relay homologated ground equipment will provide the reliability needed to ensure safety of the human settlement as well as support the investments made in the Moon. A proposed Point of Presence in the Moon will provide the main Data Center for ground communications as well as a main connection to Earth. Ground rules for the use of such PoPs and technology will need to be discussed prior to the deployment on the Moon.	Building the basic blocks for a community is a necessity both on Earth and other bodies of the Solar System. A resilient communication network will be key for any settlement that has humans and robots working together for obtaining resources or new capacities on the surface of the Moon.

### 3. Colombia

<b>Project</b>	<b>Project Title</b>	<b>Follow – Up Activities</b>	<b>Comments</b>
1	Communications & Networks. Use of 30m Choconta Antennas to Supplement the	Technical reports made by different universities to the potential stakeholders show the capabilities of the antennas, currently without	MVA can support Colombia, connecting the local telecommunications and radio astronomy groups with potential buyers for the



	Deep Space Network.	use, to be adapted to new communications requirements and the possibilities to sell services internationally.	services offered by the antenna's infrastructure
2	Computing and Data Management. Use of Data Science Through management of Data centers.	In Colombia there are an increasing number of initiatives from academic institutions to strengthen connections among them, but also with tech companies, through projects making use of computing capabilities and data analysis.	MVA can support by facilitating connections with tech-companies and accompanying proposals.
3.	Manufacturing of spare parts for surface transportation systems.	Colombia has manufacturing capabilities already developed previously that leave a good profit margin and today generate more than 4 million jobs. It is possible to approach the companies that produce parts in the automotive sector with the argument that they do not have to develop capacities from scratch but only direct part of their infrastructure and efforts to the manufacture of specific parts and adapt their practices and needs to the	MVA can provide advice on current regulations for the production of lunar export parts and the contacts or communication channels necessary to dialogue with potential buyers.

		regulations that exist. at the time	
4.	Dust mitigation: Lunar regolith simulation to test dust mitigation in systems.	The idea is to present the different used of lunar regolith to produce novel and robust systems, and how this could improve some manufacture system, for example manufacturing glasses and mirrors	MVA can support this project with the knowledge transfer from those institutions have already worked on with lunar regolith, it can bring to the project to base knowledge to get start research around his applicability in the industry.
5.	3D printing of habitats. Impact positively in Colombia for vulnerable population houses with lunar base designs.	Some companies and Colombian colleges have started to work on this technology since 2013, in this way, it is necessary to identify deeply the interest of these companies and determine the state of development on this technology.	MVA can support them as intermediary between institutions that has work in this lunar concepts with 3D printing technology
6.	Organic waste management through composting plants	It is important to show the benefits and advantages of the implementation of waste treatment plants, promoting the economic development of the country and its environmental impact.	MVA can support this project providing a communication channel with institutions that have already worked on this topic, in this way, the country can get a knowledge base in regards to this field.
7.	Textile manufacturing	Colombia has become a point of reference for the textile industry in latin-america. In 2014 was the third this industry after	MVA can provide through knowledge of the standards required for the manufacture of textiles in outer space

		<p>Argentina and Brazil. This has made important foreigners textile firms come to invest in Colombia industry and it has become a priority sector for the government.</p> <p>The advantage is directed to the fact that Colombia is a country with a privileged geographic location for export and import purposes, relatively cheap labor and a demand for moon boots that will increase in the coming years.</p>	
.8.	Agricultural systems	<p>The approach to the stakeholders would be made by showing the potential that the country has in agriculture. From academia, government entities and private companies. The development of efficient agricultural systems would not only have applications for the Moon, but these technologies would be used to strengthen the Colombian economy.</p>	<p>MVA could help the implementation of this project, through the training of human capital with scientific bases in botany, biology and earth sciences so that they can extrapolate this knowledge to the conditions that are expected to exist on the Moon</p>
.9.	Analog missions	<p>First, it is necessary to identify the government dependencies that could</p>	<p>The main actor of this project will be colleges, those are the starting point to develop it,</p>

		<p>allow us to use the regions that can be a potential place for an analogue mission. Then, it will be shown them the benefits of this infrastructure in the country and how it could be offered to the continent.</p>	<p>Some institutions have already thought about this idea, so some kind of alliance is needed to support the project. MVA can be a helpful support with the networking that they already have, it will be necessary to share it with organizations that have been working on this kind of project and this will help to have a knowledge base on this field. The MVA can also support by organizing analog research campaigns that take place in the identified locations in Colombia, and by spreading the results from the local research.</p>
10.	<p>Habitable Volume. Implementation of architectural concepts of Lunar Habitat in analog missions.</p>	<p>Some early work on space architecture has been developed by research groups in Colombia. Therefore, the approach to these institutions can occur through the proposal to resume or start design activities, with the possibility of participating, in a real way, in the human stay on the lunar surface.</p>	<p>MVA can support them by facilitating norms or regulations, promoting their creation if they do not yet exist, for the development of lunar habitats. Creating spaces for discussion to meet the needs of people involved in missions</p>
11.	<p><b>Medical Care Systems. Human physiological research</b></p>	<p>Firstly, the program director will be contacted to present the program and to establish this research oriented program and ways</p>	<p>MVA can support them by creating a public database of academic institutions that are interested in moon related biomedical sciences</p>

		<p>to get financial support. Secondly, COLFISIS, directive chair will be contacted to include this program into the activities and finally, through their contacts, increase the networking to biomedical sciences programs and research centers.</p>	<p>research to promote international cooperation.</p>
12.	<p>Development of law framework for Colombia in the support of lunar missions</p>	<p>In reference to the United Nations treaties for the Pacific Use of Outer Space, it is necessary to regulate lunar missions by the government, seeking a benefit for Colombia as an emerging country in space. Having a law framework generates trust and opens the doors to space companies.</p> <p>In addition, in order to seek cooperation with countries that have developed space capabilities, companies will be able to guide and invest in lunar missions, seeking to be a reference at a regional level, attracting companies from other countries, making them establish themselves in Colombia.</p>	<p>Through the Vice presidency, the Colombian Space Commission, the Colombian Air Force and its Office of Space Affairs, it will be possible to carry out this project, to work and follow up.</p> <ul style="list-style-type: none"> <li>• MVA can support them by collaborating with training on the construction of road maps in space law and others related to policy making. On the other hand, with a visit directed to the government and companies in order to demonstrate the importance of the lunar missions.</li> </ul>
13.	<p><b>Development of an aerospace</b></p>	<p>Firstly, approach the main academic institutions that</p>	

	<p><b>educational ecosystem in Colombia.</b></p>	<p>have interest on space topics to present moon topics, then work with them on working areas that they could have interest in and according to their capabilities.</p> <p>Secondly, consolidate a list of interested institutions and then present to MINCIENCIAS the needs and possible requirements for scholarships and research funds. Among the research funds, once a call to participate is created, it is possible to include the participation of the private sector.</p>	<p>MVA could support this project in different ways; firstly, creating a scholarship program among universities and technological institutes that can offer scholarships for space emergent countries. Secondly, participating in some meetings to present advances and initiatives on moon related sciences to our potential stakeholders.</p>
<p>14.</p>	<p>Space and cis-Lunar economy development in Colombia</p>	<p>Concise and specific economic endeavors should be proposed as a first step.</p> <p>The government should provide guarantees for the continuity of the colombian companies by providing requirements and contracts, while the technology achieves a more mature and established state. Industries that do not traditionally use the space field should be contacted to inform them of potential application of space assets to their fields, and options for them to</p>	<p>MVA can support through the sharing of experiences with potential stakeholders that would activate an economic ecosystem.</p>

		serve as providers, given their current installed capacities.	
15.	<b>Space weather</b>	Highlighting the relevance of the topic for research groups within academic institutions and the role of the Colombian Academy of Sciences should play leading the relationship with the Ministry of Science and the Ministry of Information and Communication Technology to support this initiative and become leaders in the andean region.	MVA can support by connecting institutions and different actors across the world and help out to have more visibility of the risk of space weather in different sectors.

4. Bolivia Ceased any communication with us since September 2020.

## Lessons Learned and conclusion:

- 1- From the experience of dealing with 13 different teams, next year we will only accept 2 applications per region, with a total of 8 countries only.
- 2- Work for next year will be more systematic and clearer.
- 3- Media and outreach require more effort. We will request a call for an outreach officer.
- 4- An email was sent to the teams asking for their opinion about the project. Two teams replied and the replay was positive.
- 5- The PESC project was the largest and most structured activity in the world to involve developing countries in moon activities.

The Roadmap submitted by the end of the program were find to exceed expectations in terms of quality. The webinars series seemed to be successful to communicate the concept of the PESC project. The diversity of the teams and the numbers of the members involved in each team made the PESC project the largest moon activity for the developing countries to participate in moon activities. All this has created a true momentum.

It is critical now to think for the future and how to not only keep the momentum but accelerate it.