

SeleneCO-1 Mission

2030 Crater Garavito Target

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The Moon

is again in the sights of many nations and companies



The two principal goals of Artemis program are:

- In the next years, create a sustainable human moon presence in the surface and also in orbital bases.
- Prepare technology to perform the first human missions to mars

All national agencies are working to get a position in:

- Scientific research
- Politics leadership
- Human exploration and robotic perdurable value
- Substantial economic growth
- Increased competitiveness to actively participating nations



Andrés Felipe Molina



CCE is an entity attached to the President of the Republic, created by executive order 2442 of July 18, 2006. It is the cross-sectoral body for consultation, coordination, orientation, and execution of the national policy for developing and applying space technologies.



Focus Eight: Basic and Space Sciences

Ciencias del espacio

Astronomía, astrofísica, astrobiología, cosmología, medicina aeroespacial, ingeniería espacial, ciencias planetarias, derecho espacial.

WHY EXPLORE SPACE?

NASA and other space agencies have found that there are many economic and competitive benefits for nations and people. For example:

- * Development of space technologies
- * Scientific discoveries in the space area
- * Opportunity to include commercial and social initiatives
- * Consolidation of public and private alliances, linking academy, industry, government, and society, as a basis for growth and innovation.

Today it is cheaper to go to space, based on Commercial Orbital Transportation Services (COTS) and launch opportunities and facilities.

Emerging nations will be able to access space in the new Space 4.0 era.

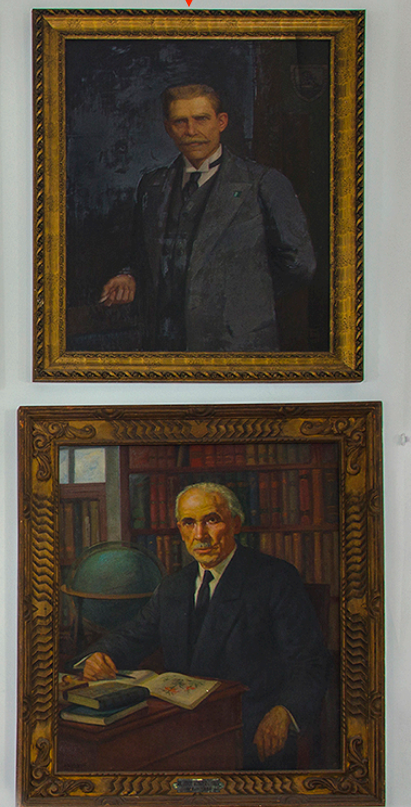
On May 10, 2022, Colombia became the 19th country to sign the Artemis Agreements, based on the Peaceful exploration of space.

First Astronomical Observatory in America “Observatorio de Santa Fe 1803”

Julio Garavito Armero 1893-1920



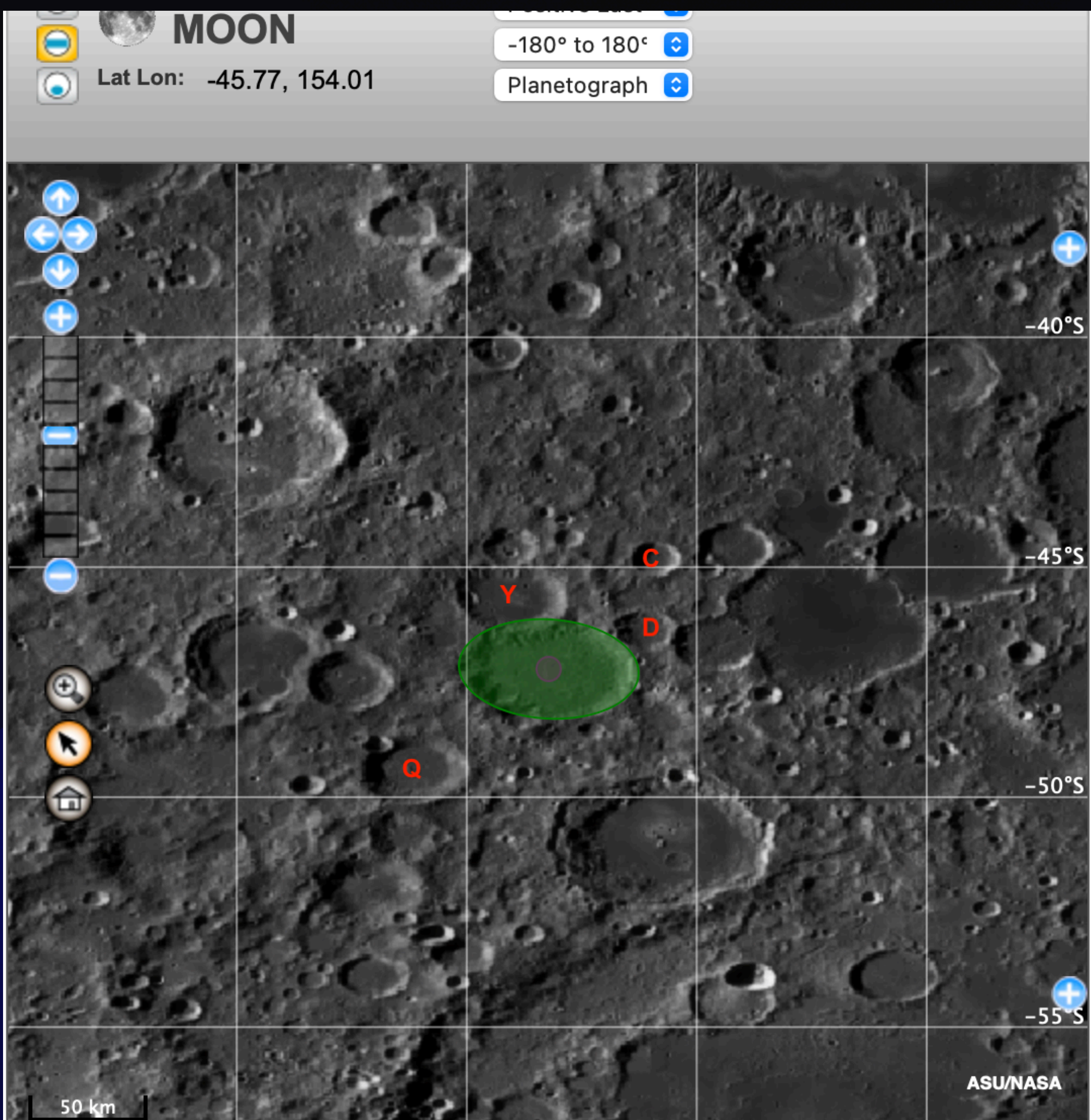
Jose Celestino Mutis Francisco José de Caldas



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Target Garavito Craters



| + | Feature Name | Target | Diameter (km) | Center Latitude | Center Longitude | Coordinate System | Approval Status | Approval Date | Origin |
|---|----------------------------|--------|---------------|-----------------|------------------|-------------------|-----------------|---------------|--|
| | Garavito | Moon | 81.05 | -47.21 | 156.78 | +E (0-180) | Approved | 1970 | Julio Garavito Armero; Colombian astronomer (1865-1920). |
| | Garavito C | Moon | 23.5 | -44.8 | 159.14 | +E (0-180) | Approved | 2006 | Julio Garavito Armero; Colombian astronomer (1865-1920). |
| | Garavito D | Moon | 28.42 | -46.37 | 158.9 | +E (0-180) | Approved | 2006 | Julio Garavito Armero; Colombian astronomer (1865-1920). |
| | Garavito Q | Moon | 45.93 | -49.37 | 153.93 | +E (0-180) | Approved | 2006 | Julio Garavito Armero; Colombian astronomer (1865-1920). |
| | Garavito Y | Moon | 52.89 | -45.53 | 156.06 | +E (0-180) | Approved | 2006 | Julio Garavito Armero; Colombian astronomer (1865-1920). |

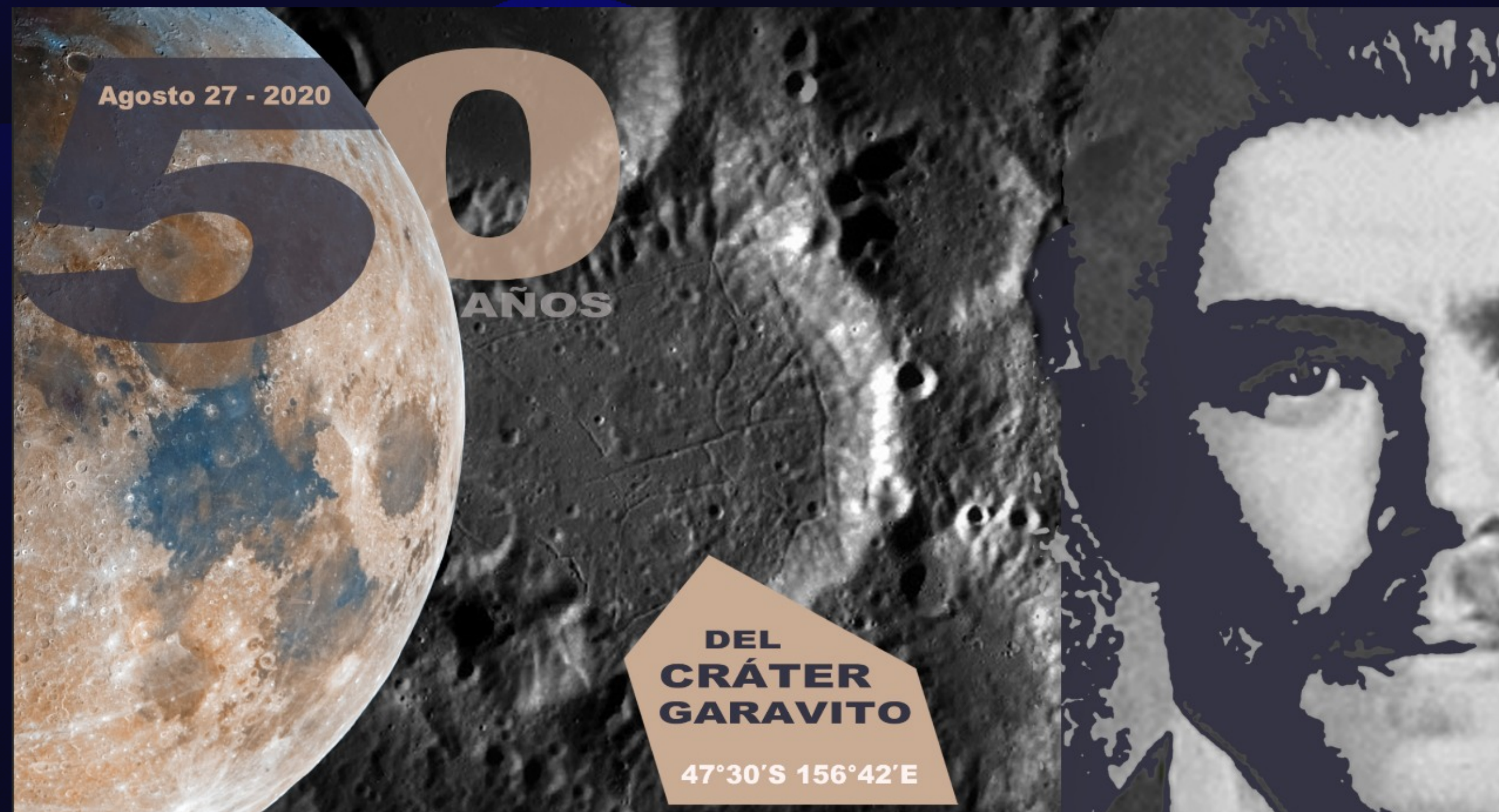
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The dream

The initiative arose during the celebration of the 200th anniversary of the National Astronomical Observatory (2003).

The idea took shape, in 2020, with the proposal to design a lunar rover.



Development our country

Boosting national aerospace technologies.

Increase the synergy between government, academy, industry, and society.

Talent formation from high school to postdoctoral.

To promote student project seedbeds.

Depositing a time capsule on the moon.

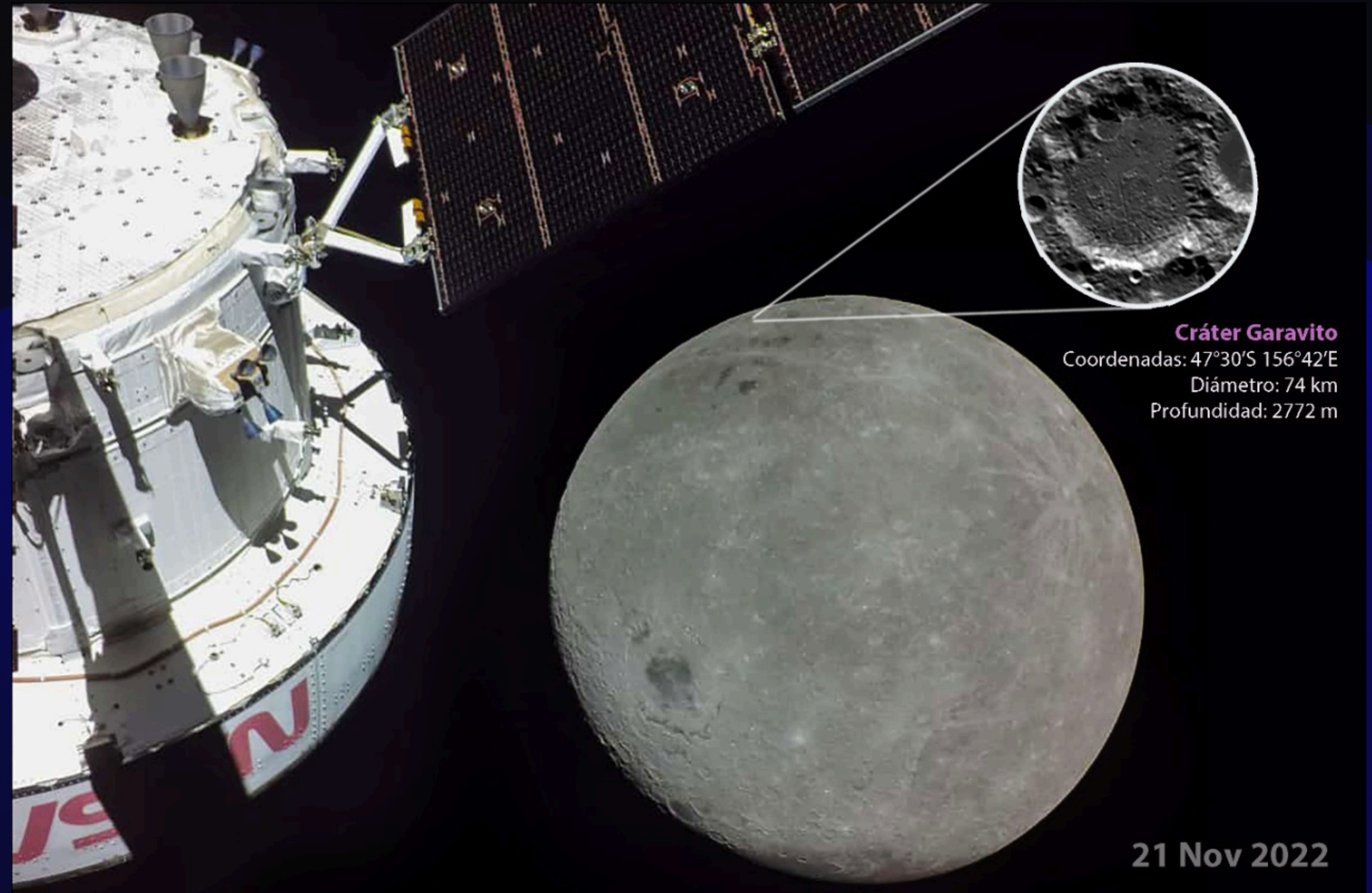
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SeleneCO-1. Mission 2030: Crater Garavito Target

The SeleneCO-1 mission is to perform studies from the moon's surface at the Garavito crater to prove the technology and capabilities of Colombia's space development.

A group of experts identifies the steps of a space mission to design, manufacture, integrate, and test a service module with its payload.



NASA

INITIAL STAKEHOLDERS



The Julio Garavito mission is to explore the lunar surface; to demonstrate and test Colombian technology capabilities.

- To integrate the national companies, national government and universities.
- To design a micro-robotic surface vehicle to explore the moon (SeleneCO-1)
- To develop new products and increase the Colombian participation in the global space economy.
- To establish a successful partnership between different Colombian stakeholders to impulse the Colombian space industry.
- To demonstrate the capabilities of Colombia in facing technological challenges of new space and 4.0 Industry.



Needs

Primary Need:

Colombia needs to acquire capabilities in human and technological resources to be competitive in the space area, taking advantage of the strategic alliances established for the participation of projects with projections of economic and technological growth, such as the one established within the framework of the Artemis program.

Secondary Needs:

Colombia needs:

- A workforce in the space area.
- To inspire a new generation and build careers in STEAM.
- To create opportunities and economic growth through space exploration.
- To prove technology and capabilities for space development.
- To make discoveries on the moon's surface about topography, geomorphology, and structure; Solar radiation intensity; Grains and rock structure; the possible presence of frozen water; study origin and composition of the regolith.



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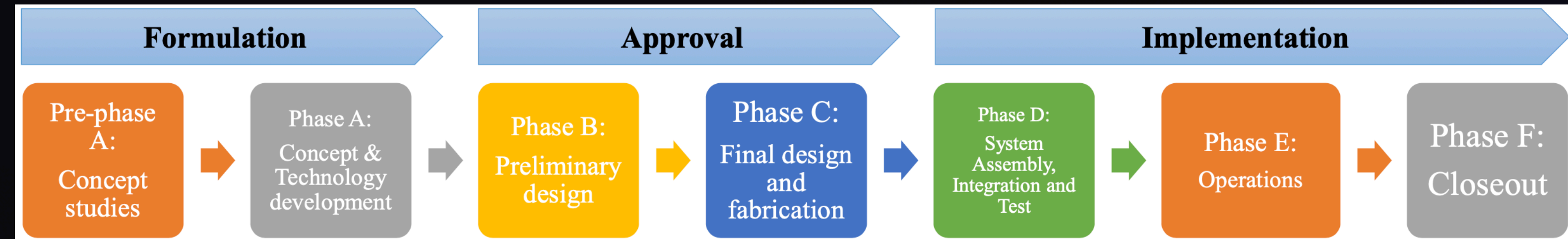
Goals of the mission

Julio Garavito

- To explore the lunar surface.
- To design systems from COTS able to operate in the environment and moon surface.
- To promote synergy between industry, academia, and government to improve Colombian capabilities in space technology

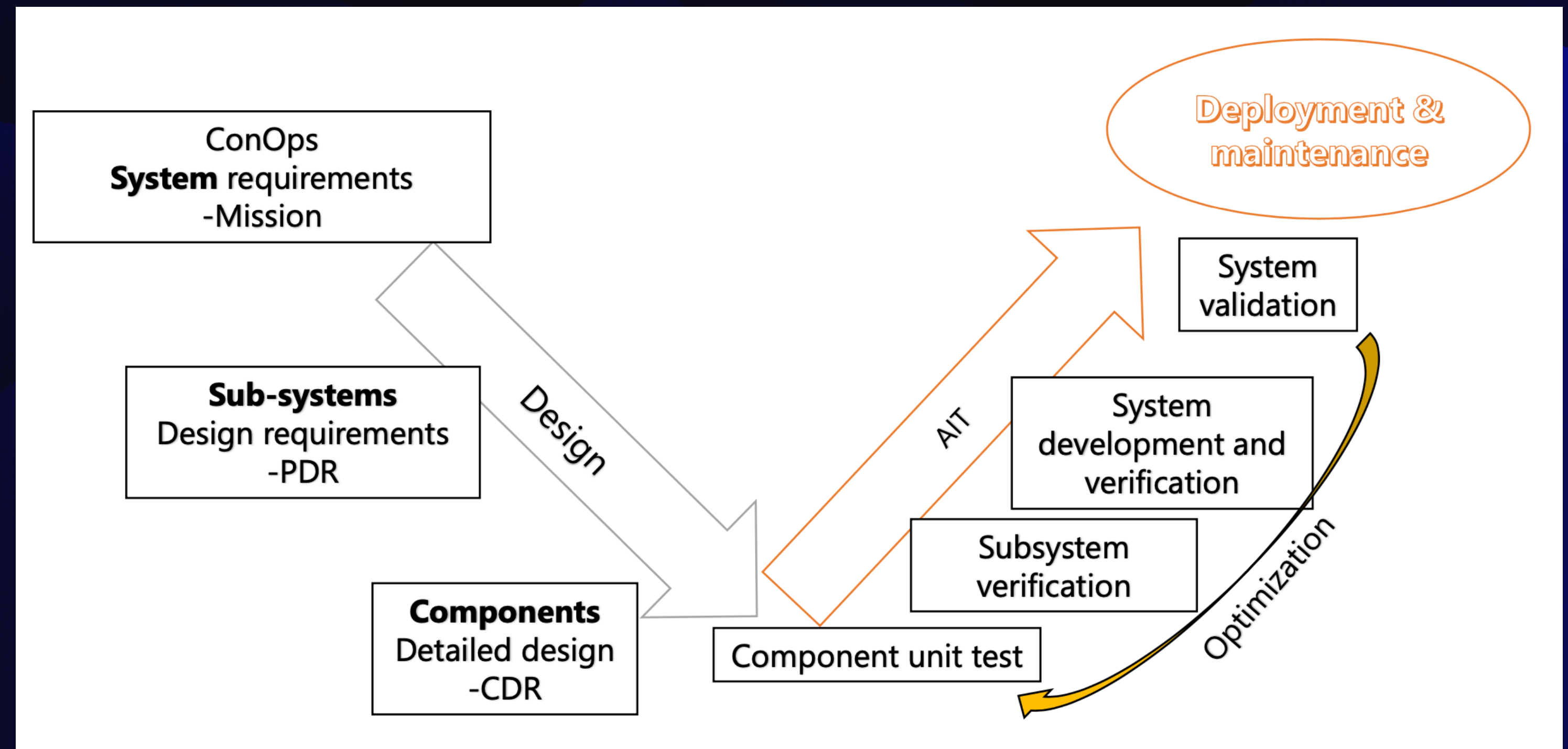
NASA Systems Engineering's methodology for product life cycle and space mission.
(Hirshorn et al., 2017)

Is divided into three main activities and seven phases:



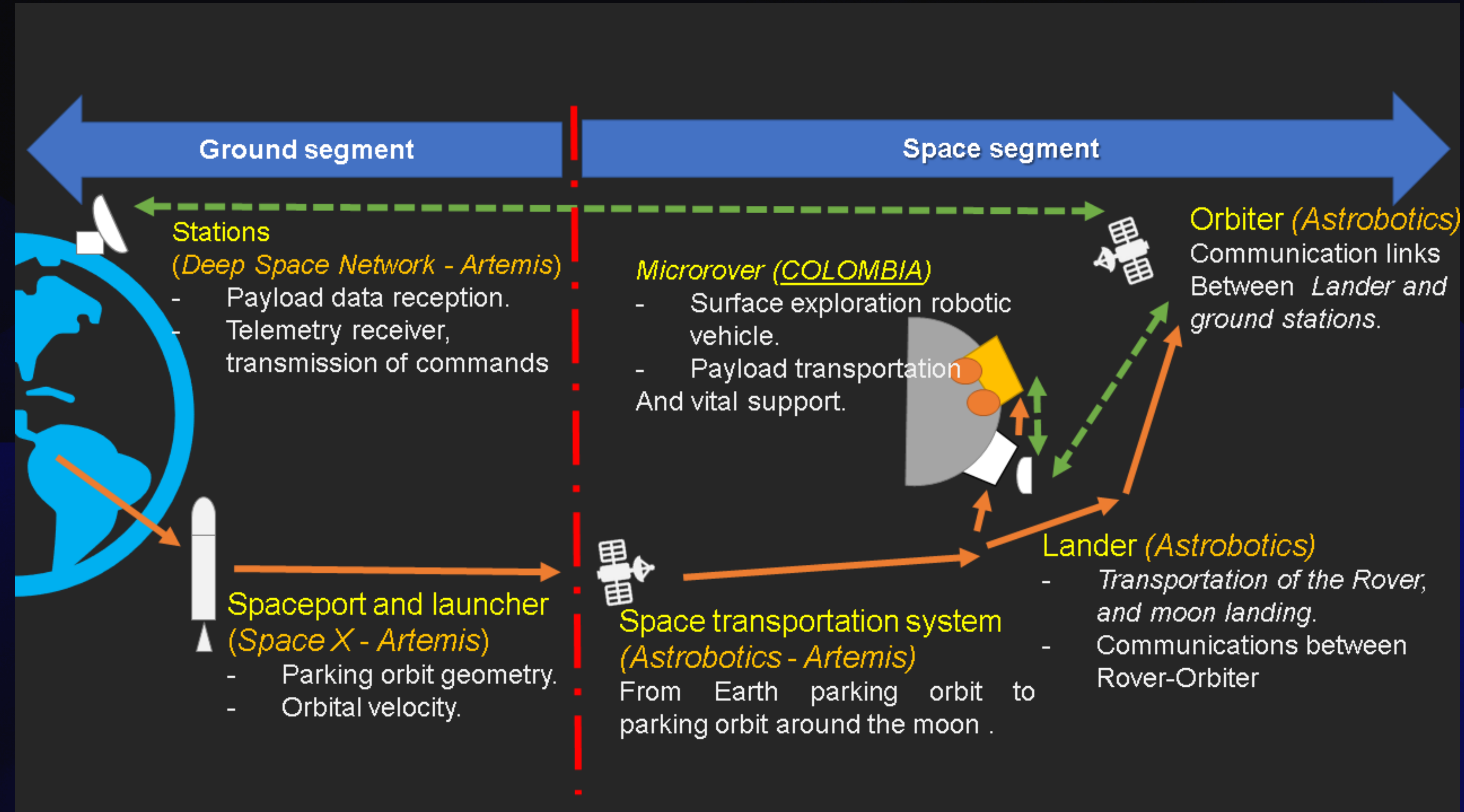
Source: Adapted (2016) NASA System Engineering Handbook, Rev. 2, p. 8, NASA

The V-process methodology of systems engineering will be the basis for the preliminary design process, manufacturing, and final assembly.



Mission preliminary ConOps

Phasing and support instrumentation on Earth and Moon



Ground station in Chocontá. Possible application in Satellite communications



ICRA

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