

The background of the slide is a blue-tinted image of Earth from space. The horizon of the planet is visible, with a bright light source (the sun) just above it, creating a lens flare effect. The sky is dark with some stars visible.

Astro-1 Honors 2020

Class 8: Politics of Lunar Colonization

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The United Nations has an extensive program to promote access to space for all nations.

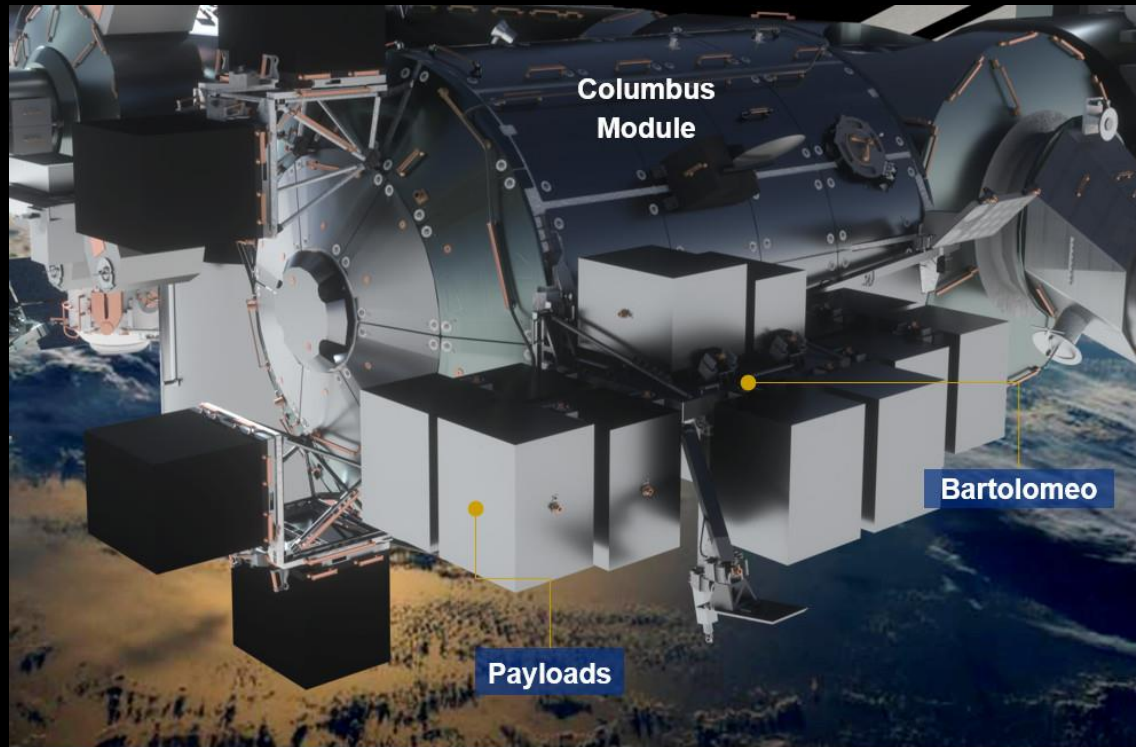


The Committee on the Peaceful Uses of Outer Space (COPUOS) was set up by the General Assembly in 1959 to govern the exploration and use of space for the benefit of all humanity: for peace, security and development.

<http://www.unoosa.org/osa/index.html>

Has the UN been successful at keeping peace on Earth? Will they be successful at keeping peace on the Moon? Or will we need a United Lunar Council?

Accessing Space with the ISS Bartolomeo Platform – open to all UN members.



<http://www.unoosa.org/oosa/en/ourwork/psa/hsti/orbitalmission/bartolomeo/index.html>

United Nations Office for Outer Space Affairs (UNOOSA) offers United Nations Member States the opportunity to accommodate a payload on the Airbus *Bartolomeo* external platform on the International Space Station. Open to all member nations. Deadline to apply is 04/30/2020

The UN is looking for public opinion: Should we go back to the Moon? So members conducted a survey.

<http://www.unoosa.org/documents/pdf/copuos/stsc/2020/tech-31E.pdf>



MOON EXPLORATION GLOBAL SURVEY RESULTS

By

A. Decadi, G. Reibaldi, A. Angelidis

STC-COPUOS.
Vienna, 7 February 2020

- Implication of the public from around the world :
 - 370 people have answered the survey
 - 42 nationalities around the world



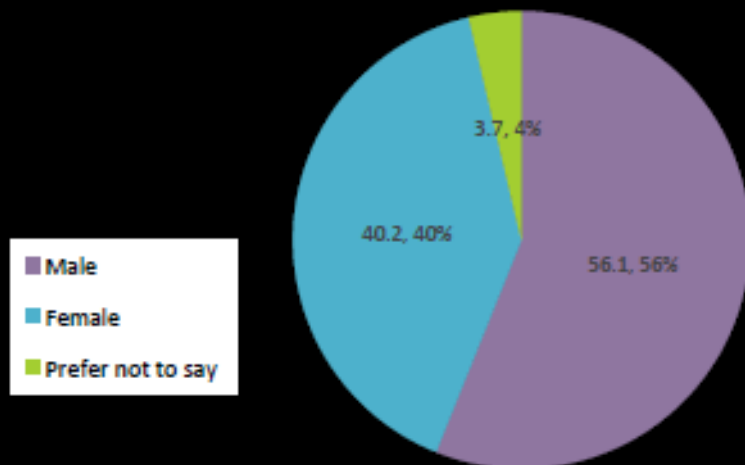
RESULTS



Feedback of the public from around the world

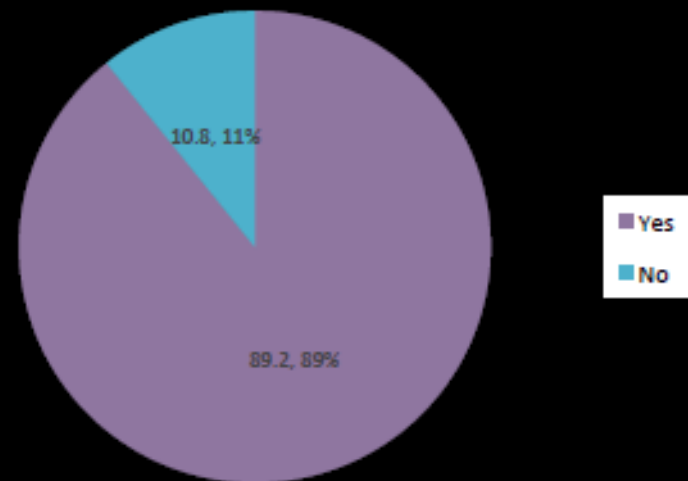
Gender repartition :

- 56 % male – 40 % female



Special interest :

- 90 % interested in Space Exploration

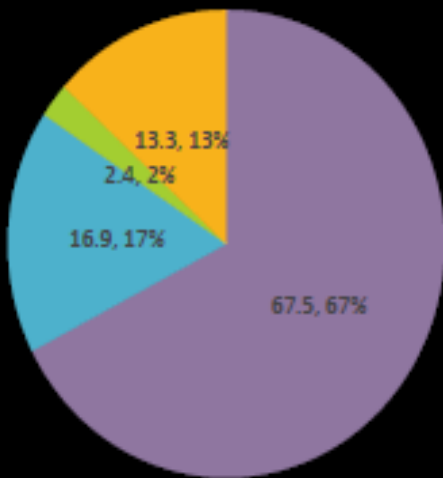


Interesting – children vs. adults

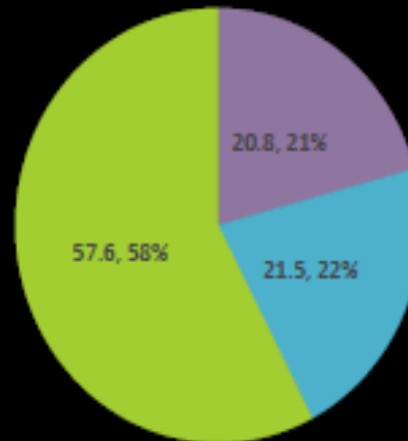
Should we go back to the Moon ?

67 % adults say YES

57 % Children say YES, but we should also take care of the Earth at the same time



- It is time to go, stay and expand there
- It is sufficient to continue lunar robotic exploration only
- There is no interest for humans to come back to the Moon
- Humans shall go directly to Mars or asteroids



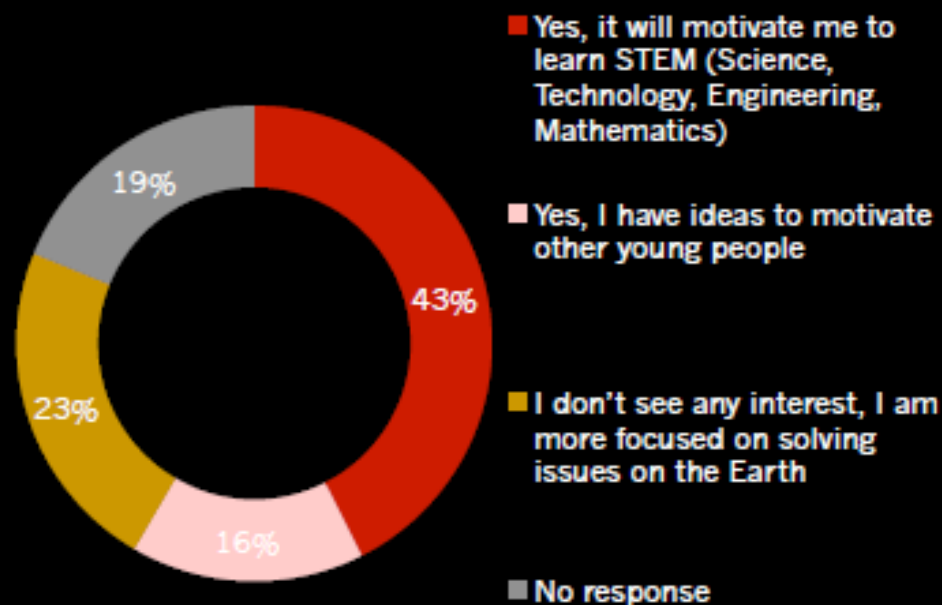
- Continue exploring space, settling on the Moon and then going to Mars
- Rather take care of the Earth and solve the ecological problems
- Do both, since going in space allows to find ideas to solve the problems on Earth

Traveling to the Moon is perceived as an exciting experience that offers the opportunity for new discoveries. Most kids believe that the Moon Village would be motivating for their future education

If you were an astronaut, what would be the main reasons for you to go to the Moon?



Do you think that the creation of a Moon Village is important?



Which countries have already sent probes to the Moon and are planning to return with humans?

USA

Russia

China

Japan

ESA Member Nations

India??

Only the USA has sent humans to the Moon and back.

Outer Space Treaty, signed in 1967

Under the terms of the treaty, the parties are prohibited from placing nuclear arms or other weapons of mass destruction in orbit, on the Moon, or on other bodies in space.

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Their space installations and vehicles shall be open, on a reciprocal basis, to representatives of other countries, and all parties agree to conduct outer-space activities openly and in accordance with international law.

87 countries were members of the committee in 2019.

Space agencies listed on the UNOOSA website:

**Algeria, Australia, Brazil, Canada, China,
Denmark, France, Germany,
India, Israel, Italy,
Japan, Kenya, Luxembourg,
Mexico, Netherlands, New Zealand,
Norway, Pakistan, Peru,
Korea (South), Romania, Russia,
South Africa, Spain, Ukraine,
UAE, UK, USA**

<http://www.unoosa.org/oosa/en/ourwork/space-agencies.html>

But...

On June 18, 2018, President Donald Trump directed the Pentagon to begin planning for a Space Force: a 6th independent military service branch to undertake missions and operations in the rapidly evolving space domain.

Space Force was signed into law Dec. 20, 2019 as part of the 2020 National Defense Authorization Act. SpaceForce.mil went live shortly thereafter.



<https://www.military.com/space-force>

<https://www.spacecom.mil/>

Trump's Space Force Isn't the Only Military Space Program: Here's What China and Russia Are Up To:

Russia is ... pursuing counterspace systems to neutralize or deny U.S. space-based services, both military and commercial, as a means of offsetting a perceived U.S. military advantage and is developing an array of weapons designed to interfere with or destroy an adversary's satellites.



<https://foxtrotalpha.jalopnik.com/as-trump-s-space-force-ramps-up-what-are-russia-and-ch-1832772367>

What about China? Already mistrust is brewing...

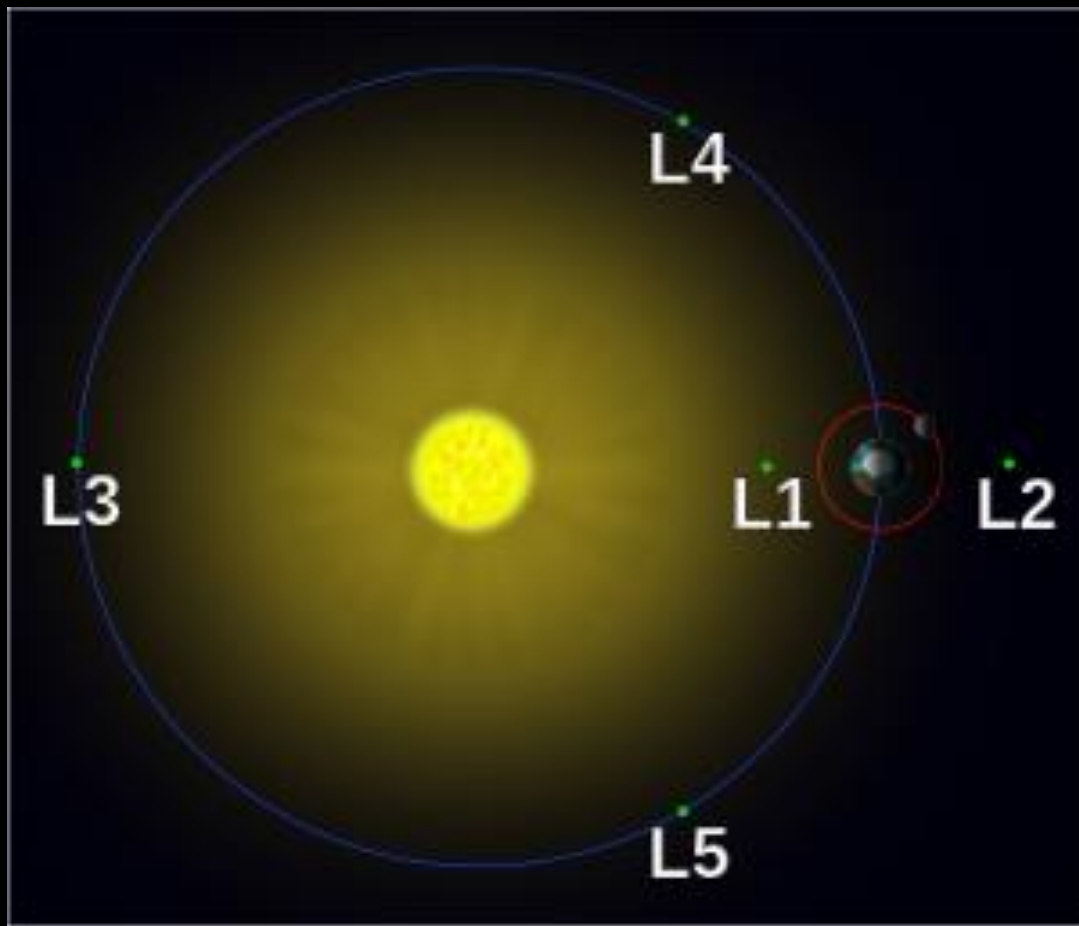
The U.S. intelligence community ... believes China and Russia's space capabilities are a risk to U.S. forces, even as both countries push for international agreements on the non-weaponization of space.

<https://foreignpolicy.com/2019/02/08/us-military-warns-of-threat-from-chinese-run-space-station-in-argentina/>

China's Moon Missions Could threaten US Satellites: Pentagon

A satellite on the far side of the moon might not be quite what the Chinese say, Air Force official warns.

<https://www.defenseone.com/technology/2018/10/chinas-moon-missions-could-threaten-us-satellites-pentagon/152084/>



“A satellite at L2 could ...enable Chinese spacecraft to sneak up on critical U.S. intelligence and communications satellites in geosynchronous orbit, just 28,300 miles up.”

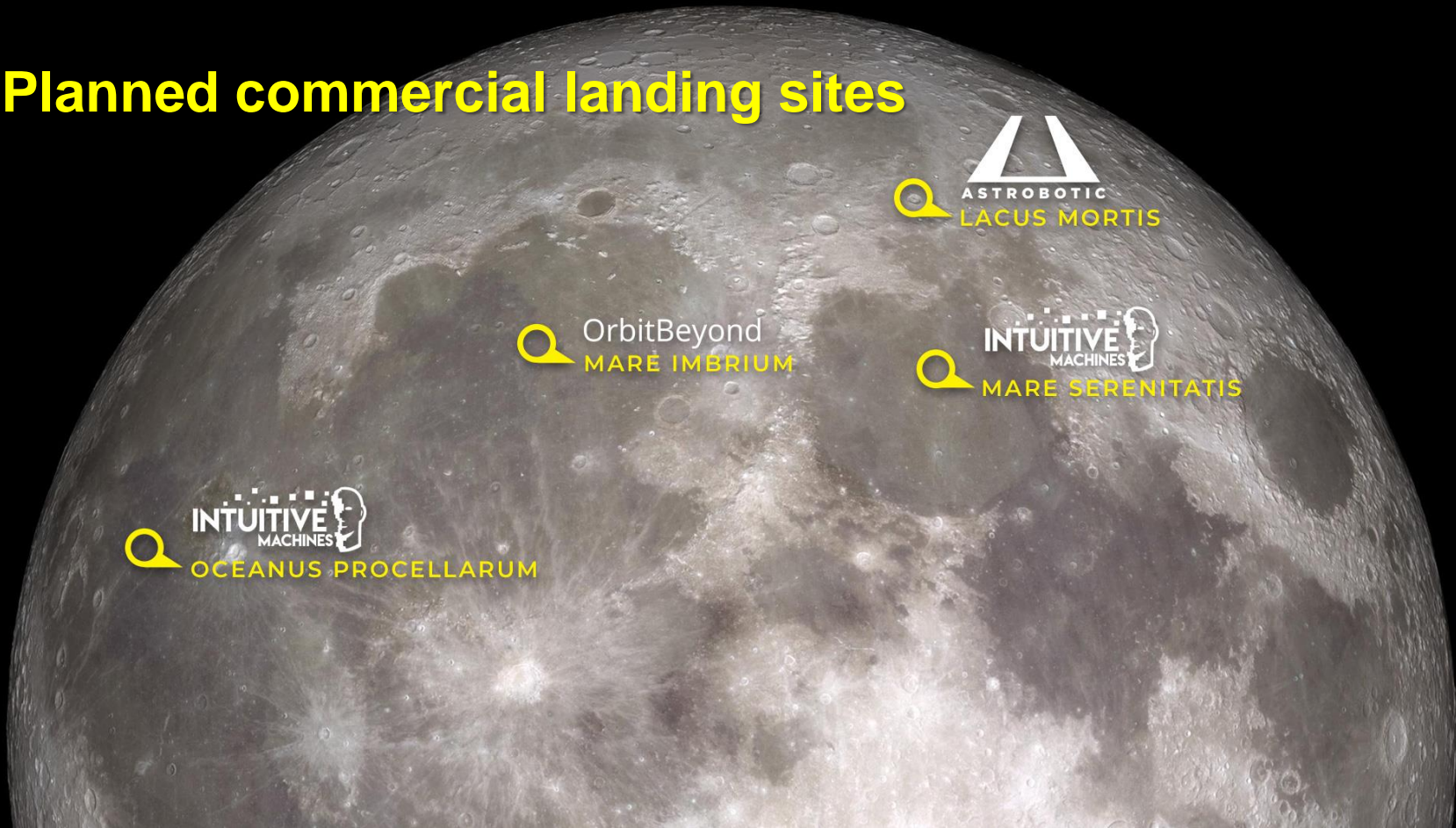
(ibid.)

Paranoia or fact?

5 Lagrange points around the Earth-Sun system. L2 is on the far side of the Moon.

What about for-profit moon landings?

Planned commercial landing sites



Watch the promo video:

<https://www.space.com/nasa-commercial-moon-landing-sites-target.html>

ESA announced partnerships with European space companies.

“Commercial partnership plays a growing role in the exciting ESA vision for space exploration,” commented David Parker, ESA Director of Human and Robotic Exploration.

“ESA intends to stimulate private sector engagement in space exploration and foster innovative and inspiring approaches for ISS services and utilisation and future ESA missions.”

[http://www.esa.int/About Us/Business with ESA/Business Opportunities/Partners for Space Exploration](http://www.esa.int/About_Us/Business_with_ESA/Business_Opportunities/Partners_for_Space_Exploration)

What will a Moon Village look like?

Separate nations with their own military protection?

What will it take for humanity to have a cooperative presence on the Moon?

Or will we bring our rivalry and hegemony to the Moon?

Who gets to live on the Moon?

Who does not have access to the Moon?



Discussion:

What do you think?

Refer to the REVISED document on Canvas.

1. Introduction - Why is the Moon important? – Scientifically, economically, politically? What are areas of interest on the Moon, and why are they of interest? (e.g., PSRs) **3 People**

2. A Brief History of Lunar Exploration – What are the highlights? What are the accomplishments? Don't just include NASA, but be sure to include the contributions of Russia, China, India, Israel, and Japan
3 People

3. Arriving and Surviving – How will we get the next crews to the Moon, and how will they survive the deadly environment? radiation, lack of air, lack of water, $1/6^{\text{th}}$ g, surviving the extremes of lunar days and nights. Don't go too heavily into technology, as the tech group will do that. Just mention the solutions being proposed to surviving. **3 People**

4. Powering Lunar Operations and Settlements – solar collectors, battery storage, directed energy, nuclear power – how will power be generated on the Moon, and how will it be distributed? **3 People**

5. Finding Water and other volatiles for surviving – where can water be found (ice) and how can it be extracted? **3 People**

6. Design a Lunar Colony – What are some ideas for developing a lunar colony in which people can survive? Consider all aspects of life. Be as creative as you wish, within the technology that is possible. What jobs will people on the Moon have? **3 People**

7. The Ethics of Colonizing the Moon – Start from Prof. Waltemathe’s talk (available on private YouTube channel – see link in Canvas announcement). Look at ESA’s Moon Village; look up other countries’ opinions about the ethics of colonizing the Moon. What is your opinion? Start with others’ opinions, and then make your own argument – for or against. **3 People**

8. The Politics of Going to the Moon – What will a Lunar Village be like? Will the UN Space Treaty govern a lunar colony, or will the international politics of Earth prevail, where countries have territories and borders on the Moon? Who will control the water, which is only found at the poles? Who will live underground, and who above ground? Who will go to the Moon to create a new race of Selenites, and who will be left on Earth? Consider the Earth (climate, distribution of wealth and resources, politics) today. Will a lunar colony be any different? **3 People**

Have fun with this!

Rules for the next four classes:

I will start with check-in, going all around the room.

You will have the rest of the time to work together.

Bring laptops. One group can work on the computer at the front of the room. One group may be able to work in the Geology Office.

Don't cut class! This is your research time!

Last 4 classes are colloquium – every one must be present for all the presentations.