Committee On Peaceful Uses of Outer Space (COPUOS)

The future of the ISS programme

Research Report

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"Out of this world"

Forum:	Committee On Peaceful Uses of Outer Space (COPUOS)
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Introduction

The International Space Station (short: ISS) represents the longest continuous human presence in space, a milestone in international cooperation and scientific research. Since 2000, over 280 individuals from more than 20 countries have contributed to this monumental project. The ISS programme stands as a testament to peaceful collaboration in scientific endeavours, providing invaluable insights into the effects of low gravity on physics.

Despite these successes, the ISS, initially planned to end in 2015, is nearing the end of its operational life. As a delegate, your task is to explore and decide on the future steps to be taken after the ISS is decommissioned.

You will engage in discussions with international partners in the COPUOS (Committee on the Peaceful Uses of Outer Space) committee, the only UN body dedicated to the civil use of Earth's orbit and outer Space. In the following pages, we will provide you with a brief overview on the issue at hand, as well as present you with some solutions you might pursue as a delegate.

We wish you the best of luck with your research!

Definition of Key Terms

International Space Station (ISS):

The ISS is a space station built and operated by a group consisting of several national and intergovernmental space agencies including NASA, CSA, ESA, JAXA and Roscosmos. Construction of the ISS began in 1998, even though the first plans were made as early as 1983.[1]

Orbit:

An orbit is the area around a celestial body in which another moves around it. For example, the moon orbits earth and earth orbits the sun. The ISS also orbits the earth. Orbits around earth are divided into several subcategories, the most important being Low Earth Orbit (LEO) and Geostationary Orbit (GEO). ISS orbits at an altitude of about 400 km in LEO.

Deorbiting:

Deorbiting describes the intentional process of destroying a spacecraft by letting it re-enter and burn up in earth's atmosphere.

[1] Website of DLR (German Space Agency). https://www.dlr.de/en/research-and-transfer/projects-and-missions/iss/the-story-of-the-iss (27.06.2024).

National Space Agency:

A national space agency is a domestic space agency operating in a single country, just like any other government office. Examples for this are NASA (USA), CSA (Canada), JAXA (Japan), Roscosmos (Russia), and DLR (Germany).

Intergovernmental Space Agency:

Contrary to national space agencies, intergovernmental space agencies do not operate in a single country, but in a wide variety of partner countries. Intergovernmental space agencies are not controlled by the government of a country but rather by a council consisting of representatives of each partner country. The most dominant example of such an agency is the European Space Agency (ESA) which combines a large number of European countries within one single space agency.

General Overview

In this section, we will provide you with a concise summary of the issue. You can find our sources for your own research at the end.

History of the ISS-Programme

The idea of space stations as permanent places for humans to stay in space was part of the space race between the USA and USSR. The first space station *Salyut 1* was launched by the USSR in 1971. As a reaction to this, the USA launched their own station *Skylab 1* in 1973. After initial talks between the USA and the future partners in the ISS-programme (Canada, Japan, and ESA) US-president Ronald Reagan tasked NASA with developing a plan for a larger and more long-term space station in 1984. In 1985 ESA confirmed its involvement in the project by commissioning the development of the *Columbus-module*. In 1988, with the *Intergovernmental Agreement on Space Station Cooperation (1988 IGA)*, there was a first legal groundwork for eventual international cooperation, not yet including Russia.[2] Nonetheless, the start of the ISS programme, initially prospected to be in 1992, had to be postponed due to a variety of reasons, including financial cutbacks for NASA, the 1986 Challenger Accident, and uncertainty about the function of such a station.[3] [4]

With the fall of the Iron Curtain, the Western partners invited Russia to join the ISS programme with its profound experience on the launch and operation of space stations and spacecraft in general. In 1998, Russia was then officially included with the *International Space Station Intergovernmental Agreement (1998 IGA)*.[5] [6]

On 20.11.1998 the first module for the future ISS was launched and with that

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[2] Uri, J., nasa.gov, January 2018. https://www.nasa.gov/history/20-years-ago-station-partners-sign-intergovernmental-agreement-iga/ (07.07.2024).
[3] Website of DLR (German Space Agency). https://www.dlr.de/en/research-and-transfer/projects-and-missions/iss/the-story-of-the-iss (27.06.2024).
[4] nasa.gov. https://www.nasa.gov/reference/international-space-station/ (27.06.2024).
[5] aerospace.org: Agreement [...] Concerning Cooperation on the Civil International Space Station). https://aerospace.org/sites/default/files/policy_archives/Space%20Station%20Intergovernmental%20Agreement%20Jan98.pdf (27.06.2024).
[6] Uri, J., nasa.gov, January 2018. https://www.nasa.gov/history/20-years-ago-station-partners-sign-intergovernmental-agreement-iga/ (07.07.2024).

construction officially started.[7] After large parts of ISS were already constructed, the first manned mission to live and work onboard ISS began on 20.11.2000, marking the start of uninterrupted human presence on the station to this day.[8]

End of the ISS-Programme – Current Problems

The ISS was originally designed and constructed for a service life of 15 years until the year 2015. This end of the programme was postponed several times to the current estimated end in 2030.[9] The ISS programme could theoretically be extended even more, however, this would come with a huge need for repair works to ensure safety of the station. The main structure of the ISS was worn down by radiation and constant docking and undocking over the years. Another huge factor contributing to wear on the ISS' structure is the constant changes in temperature. As ISS orbits Earth, it undergoes rapid temperature shifts from +120°C in the sunlight to -150°C in the shade.To ensure safe continuation of the mission beyond 2030, large parts of the trusses and thereby core structure of ISS would have to be replaced.

Furthermore, with an ageing station, maintenance and repair works are becoming increasingly expensive. These are the reasons why the partners decided to ultimately end the ISS programme and turn to alter native missions.[10] [11]

Major Parties Involved

NASA

NASA has been one of the most important partners in constructing and maintaining the ISS. It has largely taken on the construction by using its space shuttles to bring large parts of the station to orbit. After the end of the ISS, NASA wants to develop a station called "Lunar Gateway" in orbit around the moon with other international partners.[12]

ESA

ESA has also been a significant partner during the ISS programme. They contributed to the Columbus Research Module. After the programme, they will join NASA in constructing Lunar Gateway.

CSA

Canada contributed to the ISS with their Canadarm robotic arm. With this technology, they helped docking spacecraft but also helped with maintenance work. They will also be a partner in the Lunar Gateway project.

JAXA

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[7] Uri, J., nasa.gov, November 2018. https://www.nasa.gov/history/20-years-ago-space-station-construction-begins/ (09.07.2024)
[8] Uri, J., nasa.gov, January 2018. https://www.nasa.gov/history/20-years-ago-station-partners-sign-intergovern-mental-agreement-iga/ (07.07.2024).
[9] Fecht, S., Popular Science, November 2015. https://www.popsci.com/how-many-years-does-space-station-have-left/ (27.06.2024).
[10] O'Callaghan, J., BBC, May 2023. https://www.bbc.com/future/article/20230502-a-fiery-end-how-the-iss-will-end-its-life-in-orbit (27.06.2024).
[11] King, M., The Planetary Society, June 2022. https://www.planetary.org/articles/why-international-space-sta-tion-cant-operate-forever (27.06.2024).
[12] 12 NASA.gov. https://www.nasa.gov/mission/gateway/ (09.07.2024).

Japan also had its own module Kibo on the ISS. They will also join the other former partners of the ISS programme in Lunar Gateway.

Roscosmos

Russia is a vital international collaborator of the ISS programme. They contributed several core parts to the station and for years played a vital role in resupplying the station with material and personnel. After initial threats in 2022 to leave the programme by 2024, Russia has extended its commitment to the mission until at least 2028.[13] Unlike the other partners in the ISS programme, Russia is currently very unlikely to join the Lunar Gateway project. Russia is instead working on its own station for an orbit around earth called "ROSS" (Russian Orbital Service Station). The launch of this project is planned for no sooner than 2027.[14]

Private Companies

After the liberalisation of space flight in the previous decades and constantly decreasing launch costs, a wide variety of private companies with the objective of constructing commercial space stations in earth's orbit has emerged. The most prominent projects with this aim are *Axiom Space*, Blue Origin's *Orbital Reefe*, and Nanoracks *Starlab*.[15] [16] [17]

Timeline of Events

April 1977	USSR launches first ever space station: Salyut 1
May 1973	USA launches Skylab
January 1984	US-president Ronald Reagan tasks NASA with developing a plan for a long term space station in earth's orbit
1985	ESA confirms involvement with the start of the Columbus-programme
1988	Intergovernmental Agreement on Space Station Cooperation is signed (IGA 1988)
1993-94	The Russian Federation is invited to participate in the ISS-programme
1998	International Space Station Intergovernmental Agreement is signed (IGA 1998)[18]
20 Nov. 1998	Construction of the ISS officially begins

[13] Mike, W., space.com, April 2023. https://www.space.com/russia-stay-international-space-station-partner-2028
(09.07.2024).
[14] Howell, E., space.com, July 2022. https://www.space.com/russian-space-station-ross-2028-timeline (09.07.2024).
[15] axiomspace.com. https://www.axiomspace.com/ (09.07.2024).
[16] blueorigin.com. https://www.blueorigin.com/destinations (09.07.2024).
[17] Betchel, M., deloitte.com, September 2023. https://www2.deloitte.com/us/en/insights/focus/tech-trends/2024/future-space-commercialization.html (09.07.2024).
[18] aerospace.org: Agreement [...] Concerning Cooperation on the Civil International Space Station). https://aero-space.org/sites/default/files/policy_archives/Space%20Station%20Intergovernmental%20Agree-ment%20Jan98.pdf (27.06.2024).

2 Nov. 2000	The first manned mission arrives on the unfinished ISS. This marks the beginning of uninterrupted presence of humans on the ISS to this day.
Early 2000's	ISS has a prospected service life of 15 years until 2015
2010's	Life of ISS is extended to 2020 and later 2024
31 Dec. 2021	NASA announces its plans to discontinue the ISS programme from 2030 onwards.
2023	The other partner countries in the operation of the ISS reaffirm the discontinuation of the ISS programme scheduled for 2030

Possible Solutions

In the following, we will present to you different approaches to continue after the end of the ISS programme in 2030. Some of them are shared by more countries than others and most of them will likely happen in some combination. Please try to research your country's position on how they want to continue after the end of the ISS.

Building a new ISS

Even though this solution is not widely favoured, you might argue for constructing a second, better version of the ISS. This would enable further human presence in earth's orbit for decades to come and might assist in the development of technologies necessary for expanding human presence deeper into the solar system. One country aiming at constructing such a new governmental station is Russia with its ROSS station plan.

Commercial Stations in Earth's Orbit

This is the approach most partners of the ISS programme prefer after the end of the ISS. After the liberalisation of spaceflight and increasingly cheaper launch costs, a wide variety of private companies are working on providing commercial space stations for visits of well-paying customers. This shift will probably reduce manual scientific experiments in earth's orbit.

Focus on human exploration beyond LEO – Lunar Gateway

This goes alongside the previous solution. Most large space agencies are working towards the construction of an international station in an orbit around the moon. This station will help in further exploring the moon and building a permanent human presence on it. Lunar Gateway also has the potential to function as a staging post for future missions further into the solar system.

Focus on Robotic and Remote Exploration

There are also a number of countries wanting to focus on exploration by rovers, landers and orbiters while limiting the presence of humans in space.

Sources

ISS National Laboratory. https://www.issnationallab.org/about/iss-timeline/ (27.06.2024).

Website of DLR (German Space Agency). https://www.dlr.de/en/research-and-transfer/projects-and-missions/iss/the-story-of the-iss (27.06.2024).

aerospace.org: Agreement […] Concerning Cooperation on the Civil International Space Station). https://aerospace.org/sites/default/files/policy_archives/Space%20Station%20Intergovernmental%20Agreement%20Jan98.pdf (27.06.2024).

nasa.gov. https://www.nasa.gov/reference/international-space-station/ (27.06.2024).

Fecht, S., Popular Science, November 2015. https://www.popsci.com/how-many-years-does-space-station-have-left/ (27.06.2024).

O'Callaghan, J., BBC, May 2023. https://www.bbc.com/future/article/20230502-a-fiery-end-how-the-iss-will-end-its-life-in orbit (27.06.2024).

King, M., The Planetary Society, June 2022. https://www.planetary.org/articles/why-international-space-station-cant-operate forever (27.06.2024).

Foust, J., Spacenews, December 2021. https://spacenews.com/white-house-commits-to-iss-extension/ (07.07.2024).

Uri, J., nasa.gov, January 2018. https://www.nasa.gov/history/20-years-ago-station-partners-sign-intergovernmental-agree ment-iga/ (07.07.2024).

Foust, J., Spacenews, April 2023. https://spacenews.com/russia-commits-to-iss-extension-to-2028/ (07.07.2024).

NASA.gov. https://www.nasa.gov/mission/gateway/ (09.07.2024).

Howell, E., space.com, July 2022. https://www.space.com/russian-space-station-ross-2028-timeline (09.07.2024).

Mike, W., space.com, April 2023. https://www.space.com/russia-stay-international-space-station-partner-2028 (09.07.2024).

Uri, J., nasa.gov, November 2018. https://www.nasa.gov/history/20-years-ago-space-station-construction-begins/ (09.07.2024)

axiomspace.com. https://www.axiomspace.com/ (09.07.2024).

blueorigin.com. https://www.blueorigin.com/destinations (09.07.2024).

Betchel, M., deloitte.com, September 2023. https://www2.deloitte.com/us/en/insights/focus/tech-trends/2024/future-space commercialization.html (09.07.2024).