

EMPOWERING THE NEXT GENERATION: THE IMPACT OF THE POLSA STUDENT COUNCIL ON POLAND'S SPACE ACADEMIA ECOSYSTEM (2020–2025)

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Abstract

The Polish Space Agency (POLSA) is responsible for the development of the country's space sector, supporting both scientific institutions and companies operating in the industry. Although the Student Council is not an element of the structure designated by ministerial regulations, for the fifth consecutive year it is an opinion-making advisory body to the agency's president. It was established in 2020 to engage with and learn about the needs of young scientists, students and space enthusiasts. The goal of the Student Council is to integrate the academic community with companies and international institutions of the space sector, as well as to support young professionals in gaining experience and representing their needs on the national stage. In addition, the most important task of the organization is to increase public awareness of the existence of the Polish Space Agency and the development opportunities arising from future space exploration.

In this paper, an analysis of the five-year activities of the POLSA Student Council was performed, with a particular focus on its impact on the development of student sector involvement on the national stage. The organization's key achievements are outlined, including the organization of educational events and meetings and the holding of a conference designed for the student community. The Student Council has also played an important role in popularizing space issues in Poland, organizing student conferences, and science camps for students and co-organizing hackathons. The article also discusses the challenges and barriers the Council has faced during its activities.

The five-year activity of the Student Council under the President of the Polish Space Agency has shown how a non-university-based student organization can influence the perception of the space sector and the opportunities flowing from it in public space. The Student Council has become an important element in building a modern space ecosystem in Poland, inspiring younger generations of students to actively participate in space research and exploration. The continuation of this initiative and its further development can significantly influence the awareness of Polish society and the formation of future staff in the emerging Polish space sector, for which the younger generations are a significant group of stakeholders. Increasing this awareness, as well as an abundant staff of specialists in the national industry is an important element in the development of national exploration of the universe.

Keywords: Polish Space Agency, Polish Space Sector, Space education, Academia, Youth Engagement

Acronyms/Abbreviations

ERC	European Rover Challenge
ESA	European Space Agency
InOMN	International Observe the Moon Night
ISS	International Space Station
NASA	National Aeronautics and Space Administration
POLSA	Polish Space Agency
RS POLSA	Student Council to the President of the Polish Space Agency

1. POLSA Student Council – Introduction

The Student Council to the President of the Polish Space Agency (RS POLSA) is an interdisciplinary advisory body aimed at integrating the academic community with the space sector in Poland. It consists of students from universities whose interests are related to the broadly understood space industry. RS POLSA is an example of institutional involvement of young people in shaping the space sector. It provides a platform for dialogue, education, and cooperation between universities, the national space agency, and private entities in the sector. The Council was established

in 2020 on the initiative of Michał Szaniawski, then President of the Polish Space Agency. To date, this is the only student council in the world affiliated with a national space agency.

The Council's objectives include, in particular:

- 1) promoting involvement in projects related to space activities,
- 2) ensuring that Council members can participate in the Council's decision-making process,
- 3) integrating the Polish student community,
- 4) educating young people, especially in the context of the use of the space sector,
- 5) initiating projects aimed at students and pupils,
- 6) influencing the development of pro-entrepreneurial attitudes among students,
- 7) influencing the development of young talent,
- 8) popularizing knowledge in the field of space activities,
- 9) developing public interest in space activities,
- 10) organizing events related to space activities.

The Council pursues its objectives by:

- 1) issuing opinions and consulting on selected projects of the Polish Space Agency,
- 2) presenting recommendations concerning selected activities of the Agency,
- 3) submitting proposals and requests concerning educational activities of the Polish Space Agency,
- 4) undertaking activities aimed at cooperation between universities,
- 5) supporting and organizing educational and promotional activities for the European Space Agency (ESA) Education,
- 6) cooperating with university authorities to increase the number of projects from Poland within the framework of ESA Education and to increase employment in entities, including international organizations involved in the space sector,
- 7) providing ongoing information and promoting its activities using available and customary forms,
- 8) organizing scientific and educational events, i.e., seminars, meetings, debates, and scientific discussions,
- 9) organizing scientific conferences in areas consistent with the Council's objectives,
- 10) conducting promotional and informational activities, in particular through social media,
- 11) cooperating with other organizations of a similar nature, in particular with student organizations and scientific institutions,
- 12) organizing meetings with representatives of the scientific community, public administration, and other entities related to space activities,
- 13) organizing integration meetings.

The Council consists of maximum of 30 members (see Fig. 1) nominated by the President of the Polish Space Agency from among candidates selected

in an open recruitment process. Recruitment takes place annually. Members shall be students of Polish universities, who meet at least one of the following conditions: participation in space projects carried out in cooperation with the European Space Agency, publication of documented scientific works or presentations on the space industry, or involvement in a scientific club related to the space sector. Membership in the Council ceases upon voluntary resignation from the position or upon loss of student status.



Fig. 1 RS POLSA General Assembly during Up! Conference in 2024.

The first meeting of the Council of the new term elects a Chairperson and two Vice-Chairpersons from among its members. The Chairperson coordinates activities, convenes meetings, and is responsible for direct contact with the Polish Space Agency. Stationary meetings of the Council are held in various parts of Poland, on average, five times a year. During each meeting, workshops for members and meetings with companies and personalities from the space industry are organized, which allows for building relationships with private entrepreneurs.

2. First terms of the POLSA Student Council

The Student Council to the President of the Polish Space Agency (RS POLSA) was established in 2020 by then-President Michał Szaniawski. Since its creation, it has operated without interruption, renewing its membership annually with new representatives. Although in its earliest terms the Council did not yet possess the influence it holds today, those formative years laid the foundations for many of the initiatives that continue to shape its activities.

One of the first tasks assigned to the Council was to support the organization of the Student Space Conference. Although the event had to be held exclusively online due to the COVID-19 pandemic, it nevertheless reflected the Council's long-standing ambition to engage in event management. From the outset, the Council also emphasized outreach,

aiming to promote space-related topics among high school students and to engage younger peers in academic activities. Another aspiration of the early Council was to establish student internship opportunities at the National Aeronautics and Space Administration (NASA). While this initiative was never finalized, it illustrates the forward-looking ambitions of the group.

Equally significant was its advocacy for structural improvements in higher education. One of the most persistent challenges faced by student research clubs in Poland was the lack of recognition for extracurricular projects within formal curricula. Despite their advanced and often highly demanding nature, these projects rarely qualified for ECTS credit. Although some progress has been made in recent years, this issue remains unresolved at many universities.

From its inception, the Council has been inherently multidisciplinary, creating a unique platform for gathering grassroots perspectives from students across diverse academic backgrounds. This structure enabled Council members not only to articulate concerns but also to address selected challenges and facilitate student-led initiatives. Certain traditions, maintained since the first term, have also strengthened the Council's identity. These include the formal appointment of members by the President of the Agency and the practice of self-introduction during the inaugural meeting of each new term. Such rituals enhance the prestige of the Council and motivate new members by reinforcing their sense of belonging to a meaningful and influential community.

Since its earliest days, the Council has been involved in the European Rover Challenge (ERC), an annual competition held in Poland (see Fig. 2). Over time, its role has expanded, and the Council is now regarded as one of the key contributors to the Polish Space Agency's exhibition and organizational activities at the event. Other early initiatives included proposals such as the development of a mobile application with space-related quizzes, training workshops for presidents of student research clubs, and the creation of a subscription-based calendar of space-related events. In parallel, Council members began drafting recommendation documents for the Polish Space Agency and worked to strengthen integration and networking within the academic space community, allowing the Council to operate across multiple domains. Council members also supported, initially in an unofficial capacity, the organization of NASA's Observe the Moon initiative at their universities – an activity that has continued to grow in scope and importance over the years.



Fig. 2 Second term on the RS POLSA members attend at ERC at Kielce, Poland.

The third term of the Council marked a consolidation of priorities, with a renewed focus on three core areas: integrating Polish students active in the space sector, addressing the needs of research clubs and project teams, and improving the quality of education in space-related fields in Poland. These issues, present on the agenda since the Council's inception, continue to guide its work.

In its early years, the Council encountered numerous obstacles, as space-related studies were still in their infancy in Poland. The academic value of space exploration was often questioned, and the field was at times met with skepticism or even ridicule. Council members noted that many challenges identified during the first term persisted, and they worked systematically to overcome them. Today, these efforts can be regarded as successful: space-related topics, student research clubs, and even dedicated academic programs are now firmly established within the Polish academic landscape.

From the beginning, the Council aspired to organize its own flagship event – an ambition that has since been successfully realized. Another milestone was the establishment of a dedicated presence on social media, which has become the Council's primary platform for external communication. Although initially met with resistance and several refusals from the Polish Space Agency, this initiative was eventually implemented and has since become an essential tool for outreach.

Looking back on the Council's first terms, it is both gratifying and inspiring to observe that the majority of initiatives once advocated for by students have been realized by their successors. While every term of office has made valuable contributions, it was during the earliest ones that the Council succeeded in building its identity, defining long-term objectives, and implementing many of its initial plans – achievements made possible above all by perseverance and the passage of time. Over the past few years, we have witnessed a profound transformation not only in the academic environment but also in the broader perception of space exploration in Poland. The speed

of this change is striking, and it strengthens our resolve to look toward the future with even greater ambitions.

3. UP! Students Conference

Student Council to the President of the Polish Space Agency (RS POLSA), throughout its functioning, has undertaken numerous activities aimed at popularizing the space industry among the youth and children by organizing various workshops, presentations, and lectures. However, these activities should not overshadow its academic roots and its purpose of student development. To continue its role as an integration unit for space enthusiasts, the idea of organizing a fully-fledged scientific conference for other students arose.

The concept first emerged in the spring of 2023, during the fourth term. To improve the organizational process and expand brainstorming, the JoinThe.Space Association was invited to negotiate and collaborate. The Polish Space Agency approved the project and its budget, while the organization itself was entirely handled by the combined student forces. The preparation of an event able to accommodate over 200 guests proved to be a challenge requiring excellent management and planning, from general assumptions, such as the presentation format, to minor details, such as the number and value of gifts for participants. Every task was entrusted to approximately 40 people involved in the organization. The project was named the UP! Conference – an easy-to-remember name with positive associations with space travel, personal development, opportunities, and the popular Pixar animated movie (see Fig. 3).



Fig. 3 Up! Conference assembly in 2023.

The event was decided to last two days and stay closed to guests only. Speakers are selected and invited internally. The panel consists of distinguished and recognized scientific specialists from various fields of the space industry, such as satellites, aerospace, space law, investment and entrepreneurship, and mining. Each speaker is given 15-60 minutes for a speech or presentation. The audience consists of representatives

of various student research groups invited to participate from all around Poland. Part of the time was devoted to presentations of the companies and their projects, e.g., ICEYE Polska Sp. z o.o. or Creotech Instruments S.A. In addition to attending lectures, participants also have the opportunity to network in the catering hall. This creates a unique experience where science meets business, potentially opening up new opportunities for young and ambitious space adepts.

So far (September 2025), two editions of the conference have been held. The first took place in Warsaw, at the Leon Kozminski University, on November 24-25, 2023. Conference speakers included Tomasz Barciński, a science popularizer specializing in astrobotics; Tomasz Zajkowski, who gave a lecture on astrobiology; Teodor Buchner, who introduced the topic of quantum cryptography; and Piotr Kaczmarek-Kurczak, who engaged the participants to undertake space entrepreneurship.

The second conference took place a year later, on November 15-16, 2024, at the Lublin University of Technology. Among the speakers were: Maciej Myśliwiec, who described space technologies used in everyday life, Kamil Muzyka, who explained space mining and its legal background, and Kamil Golemo, who presented the history of the Sino-American space race.

Both editions of the UP! conference turned out to be a huge success, and the organizers hope to continue this project. The next edition is planned for November 2025, with the location yet to be announced. The authors believe that thanks to such a hardworking and committed group of organizers, bringing science and business closer together is easier than ever before. The UP! Conference is an excellent example of such efforts and one of the flagship projects of the RS POLSA.

4. Space Law Camp

In view of the dynamic development of the space sector and the growing importance of space law in regulating international and commercial activities in outer space, increasing attention is being paid to educating young professionals in this highly specialized field. In response to this need, the "Space Law Camp" workshop was organized and held on 15–17 March 2024 in Białka Tatrzańska, Poland. The event brought together thirteen law students from various academic institutions across Poland, selected through an open recruitment process (see Fig. 4). In the selection of participants, particular emphasis was placed on their passion and commitment to activities related to space law. The selected students demonstrated not only an interest in the legal aspects of outer space but also active participation in scientific and educational initiatives, confirming their motivation and substantive preparation.

The main objective of the workshop was to broaden the participants' knowledge of international space law, with particular focus on issues relevant to the preparation for the Manfred Lachs Space Law Moot Court Competition, a prestigious international legal contest.



Fig. 4 First edition Space Law Camp students.

This initiative was a response to a clearly identified gap in the Polish higher education system, where space law is often only marginally addressed. Space law, as a specialized branch of public international law, is rarely explored in depth during legal studies in Poland. In academic curricula, it is typically limited to brief mentions within general international law courses, without in-depth analysis or discussion of current challenges arising from the growing activity of states and private entities in outer space. Meanwhile, the rapid development of space technologies, the commercialization of outer space, and the increasing number of entities involved in extraterrestrial activities call for a new approach to training future lawyers. The "Space Law Camp" workshops aimed to fill this gap by offering participants both practical and theoretical perspectives on the legal challenges related to the exploration and use of outer space.

The training program was divided into four thematic blocks, each focusing on a distinct aspect of space law. The introductory lecture addressed the commercial aspects of space law, with a particular emphasis on securities and liability in space contracts. The second training block covered issues of sustainable development in space activities and liability for damages caused in outer space. The third block was dedicated to the procedure before the International Court of Justice (ICJ). The fourth and final block had a practical character and was prepared and conducted by members of the Student Council for the President of the Polish Space Agency (RS POLSA). The session took the form of a mock court simulation (mini moot court), during which participants applied the knowledge they had acquired, while simultaneously developing legal argumentation and public speaking skills.

The "Space Law Camp" workshops, organized in collaboration with experts and with the active participation of students, were a significant step in supporting the development and popularization of space law in Poland.

5. Numerous minor events and activities

One of the primary objectives of the Student Council to the President of the Polish Space Agency (RS POLSA) is the initiation and promotion of student-oriented projects that contribute to the growth of Poland's space education ecosystem. To achieve this, the Council actively seeks opportunities to collaborate on multiple local and international initiatives.

5.1 International Observe the Moon Night [1]



Fig. 5 RS POLSA member, Wiktoria Dziaduła, led the International Observe the Moon Night lecture event at Silesia University of Technology in 2022.

Among the Council's educational and outreach activities, one of the most visible is the International Observe the Moon Night (InOMN), an annual program embedded in the National Aeronautics and Space Administration (NASA) global educational portfolio (see Fig. 5). Conceived as a public engagement initiative, InOMN primary objective is to promote interest in lunar science and, more broadly, in space exploration and STEM education, engaging diverse audiences ranging from kindergarten to university communities and the general public. Since 2021, a series of events hosted by RS POLSA there could be led to four main takeaways that match with the NASA agenda, for anybody who would like to attend those events:

5.1.1 Mankind's history awareness

Raise awareness of lunar science and exploration programs, how they benefited mankind, our history, technology, and societies (see Fig. 6).



Fig. 6 Special Guest, John F. Hall Jr., gave during the International Observe the Moon Night lecture event at the Military University of Technology at Warsaw in 2021.

5.1.2 Space sciences include

By using Earth's Moon as an immediate and observable example, the program encourages participants of all ages to deepen their understanding of lunar science and space exploration, while fostering habits of continued observation of the sky and their surrounding environment (see Fig. 7).



Fig. 7 Sky observation part of the International Observe the Moon Night event organized in the city of Radlin, in 2021, by RS POLSA member Kaja Strójwąż.

5.1.3 Story sharing

Facilitate sharing of Moon-inspired stories, images, audio-visuais, artwork, and more (see Fig. 8).



Fig. 8 Documentary movie showing part of the International Observe the Moon Night event. Gdańsk 2022, by RS POLSA member Martyna Czudec.

5.1.4 Space is for everyone

A key element of the initiative is its inclusivity: it welcomes all individuals eager to expand their understanding of space sciences and provides a platform for meaningful interaction, where participants can share perspectives and experiences (see Fig. 9).



Fig. 9 Attendees of the International Observe the Moon Night event. Gdańsk 2022, by RS POLSA member Martyna Czudec.

5.2 Starachowice Perseids Night

On 12th August 2023, two members of the RS POLSA, Kamil Golemo and Sara Strączek, participated in the Perseid Night sky observation event organized in the city of Starachowice. As part of the program, the Council representatives delivered presentations about POLSA, the Polish space sector, and Perseids, followed by an expert lecture on satellite technologies used in everyday life, and touched on countries using China's activities in space, for a general public audience. The concept for the event

originated as a student project during Kamil Golemo's academic coursework and was subsequently adopted and implemented by the local Cultural Centre, Park Kultury in Starachowice city. This collaboration highlights the productive intersection between academic initiatives and community institutions in fostering public engagement with astronomy. The event concluded with an informal cultural component, combining stargazing with music and social interaction, which reinforced the outreach mission by making science accessible in an enjoyable and memorable format.

5.3 Hackathon challenges

In addition to organizing its own workshops, presentations, and lectures, the RS POLSA has been invited to contribute to various hackathon initiatives. Council members have served in multiple roles, including lecturers, mentors, facilitators, and jury members.

5.3.1 NASA Space Apps Challenge [2]

The NASA Space Apps Challenge Hackathon is an annual international event described as a marathon of creativity, aimed at makers, artists, programmers, scientists, designers, storytellers, builders, technologists, and innovators – in short, all open minds who wish to create and develop their projects on NASA-given challenges (see Fig. 10).



Fig. 10 NASA Space Apps Challenge, at Stalowa Wola 2023 edition.

On 7th and 8th October 2023, the RS POLSA was invited by the local organizers of the Stalowa Wola edition – the largest Space Apps Challenge event in Poland – to contribute to the program through two keynote presentations delivered to an audience of approximately 350 participants. The first lecture, presented by Council Chairperson Sara Strączek, addressed perspectives and career opportunities in the space sector. The second, delivered by Council member Karol Kołacz, explored the scientific concepts behind the movie *Interstellar* and their relevance to physics education. These contributions underscored the Council's role in connecting academic knowledge

with creative and popular culture, thereby enhancing the educational dimension of the hackathon.

5.3.2 AviaTech Challenge

AviaTech Challenge 2024 was the first Podkarpackie Voivodeship aviation hackathon, held on 18th and 19th of May. The council members were invited to participate actively. Councilor Karol Kołacz was a conference speaker, mentor, and helped organize the hackathon on-site. The council had the honor of holding a community partner for the event duration.

5.3.3 Spaceshield Hack

Another hackathon challenge our councilors took part in was the SpaceShield Hackathon, organized by the project Space 4 Talents. On the 24th and 25th of May 2025, three of the Council members, Chairperson Karol Kołacz, Kamil Golemo, and Maciej Piórkowski, as mentors, shared their knowledge with the participants and helped them to improve their own projects. In a break from the inspirational talks with the participants, Karol gave a presentation describing the activities of the Student Council, followed by Kamil, who gave a presentation on 'Technological progress and implications of the development of China's space program'.

6. Social aspect

As previously stated, one of the main goals of the Student Council to the President of the Polish Space Agency (RS POLSA) is to raise awareness regarding the space domain, gain the interest of young people, and encourage them to be a part of the Polish Space Sector. Therefore, one of the means of achieving such a task was (and still is) regular lessons with youth in primary school and high school (see Fig. 11). These events played a crucial role in engaging young people in the space sector by showing opportunities linked with space. During those meetings, we focus our attention on most of the prominent issues connected with space domain – its accessibility.



Fig. 11 RS POLSA's Chairperson, Karol Kołacz, conducting a lecture.

We have noticed two major obstacles for young people if they were to consider themselves in the space industry – education routes and career opportunities.

Despite Poland's first space mission being conducted in 1978, which resulted in the successful space flight of cosmonaut Mirosław Hermaszewski into orbit, Poland's space industry did not grow enough to be a main part of its culture, economy, and technological plan. Consequently, the path to space domain for students is not clear, and usually, the dream of participating in this great field of science and development ends because of not enough information on how to achieve such goals. Student Council combats that with lectures in schools showing different paths to the space sector. Starting from high school, through university, and ending at some of the best companies and space-related institutes in Poland. It is critical to raise the availability of the space sector by showing multiple ways into this sector.

Secondly, public knowledge considering the range of available fields of study in the space sector is drastically poor. The majority of society, when asked about space, connects it only with STEM study fields, which is incorrect. It is the result of social media presenting only selected topics, ignoring others. As a result, kids' perspectives are unintentionally, however, significantly narrowed down. This is why the Council's major objective, regarding meetings in schools, is also showing the whole scale of different career opportunities, fields of study, and professions waiting to be expanded in the space domain. It is worth noticing that the target audience is perfect for this kind of lectures, because of the diversity in interests in mainly primary but also in high school students. Ranging from architecture, law, PE, biology, medicine, chemistry, up to mechanical engineering, computer science, and aerospace engineering, every one of these subjects is utilized and benefited from in the space industry.

RS POLSA has conducted multiple visits in schools and institutions in Poland, spreading knowledge about space, inspiring, and helping students find their path to space.

Furthermore, the social activities of RS POLSA transcend lessons in schools. We emphasize the meaning of the sociological aspect by addressing the target audience via social media platforms, which are rapidly growing, such as Instagram and Facebook, actively providing our followers with space-related news in Poland, opportunities for their development, scientific contests, research grants, and conferences aimed at young professionals seeking their place in the space industry. The expansion of sociological activities is also fulfilled via active participation in multiple events organized by the Polish Space Agency aimed at young people and the general public. Such appearances help build public opinion regarding growing space capabilities of Polish companies and institutions, showing Polish-

built satellites, experiments, space tools, research programs, [1] and many more.

7. RS Statistics

7.1 Council Growth and Institutional Representation

The Student Council to the President of the Polish Space Agency (POLSA) brings together representatives from across the Polish higher education system. Council size rose from 22 members (2020/21) to 30 in 2025/26.

Institutional diversity remained robust throughout all terms, with 38 different universities represented cumulatively (see Fig. 12). The number of universities per term showed initial stability at 18 institutions through 2022/23, followed by a temporary decrease to 16 in 2023/24, and subsequent expansion to 21 in 2024/25 before settling at 19 in 2025/26.



Fig. 12 Diversity of academic cities among the RS POLSA members (2020-2025).

The institutional base encompasses both Poland's leading technical universities (Warsaw University of Technology, AGH University of Science and Technology Kraków, Gdańsk University of Technology, Wrocław University of Science and Technology) and specialized regional institutions (University of Zielona Góra, Nicolaus Copernicus University Toruń), demonstrating space-related education across the Polish academic landscape.

7.2 Geographical Distribution and Regional Clusters

The geographical analysis reveals a concentrated yet nationally distributed pattern of cities, with Warsaw and Kraków dominating representation (both 17 members), followed by Gdańsk (8 members, but together with Gdynia, 9 members), Wrocław (8 members),

and Metropolis GZM (6 members). This distribution correlates strongly with established research clusters and space industry presence (see Fig. 13).

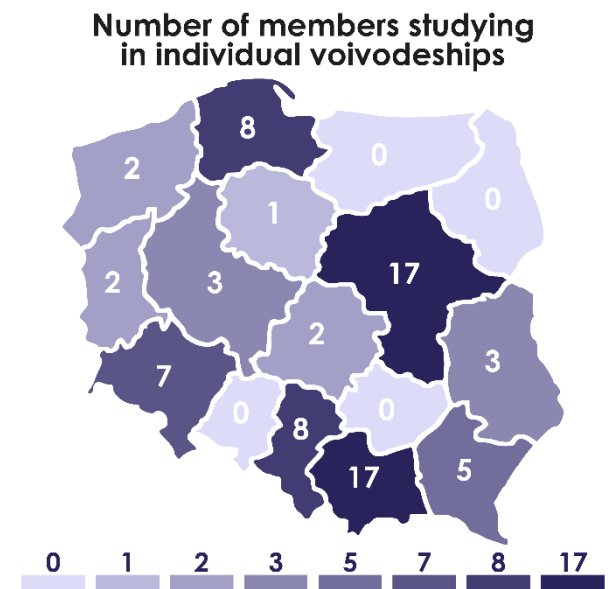


Fig. 13 Distribution of RS POLSA members among Polish voivodeships.

The regional concentration reflects Poland's space ecosystem development. The Kraków cluster, anchored by AGH University of Science and Technology and Jagiellonian University. Warsaw serves as the hub with POLSA headquarters, private space SMEs, Space Research Centre of the Polish Academy of Sciences, and the Łukasiewicz Research Network – Institute of Aviation. The northern maritime cluster of Gdańsk-Gdynia specializes in satellite engineering, rocket building (SpaceForest), and maritime applications, while Wrocław focuses on electronics and the CubeSat project.

7.3 Disciplinary Evolution and Diversification

The Council's disciplinary composition underwent significant evolution while maintaining its technical core. Engineering and technical disciplines consistently dominated 65.9% overall, while social sciences (management, economics, law, etc.) contributed 20.7%.

A detailed field-of-study analysis reveals the nuanced diversification pattern across terms (see Fig. 14). Technical disciplines maintained steady representation, growing from 14 members (66.7%) in 2020/21 to 18 members (60%) by 2025/26. Humanities showed the most expansion, increasing from 1 member (4.8%) to a peak of 5 members (16.1%) in 2023/24 and 2024/25. Natural sciences representation remained relatively stable at 3-5 members per term, while economics fluctuated between 0-3 members. Medical and health sciences emerged as a new category from 2021/22 onwards, reaching 2 members by 2024/25.

Social sciences appeared from 2022/23, growing to 2 members by 2023/24 and 2024/25. This evolution from near-exclusive STEM focus toward interdisciplinary representation mirrors the modern space sector's requirements for legal, economic, and policy expertise alongside traditional engineering competencies.

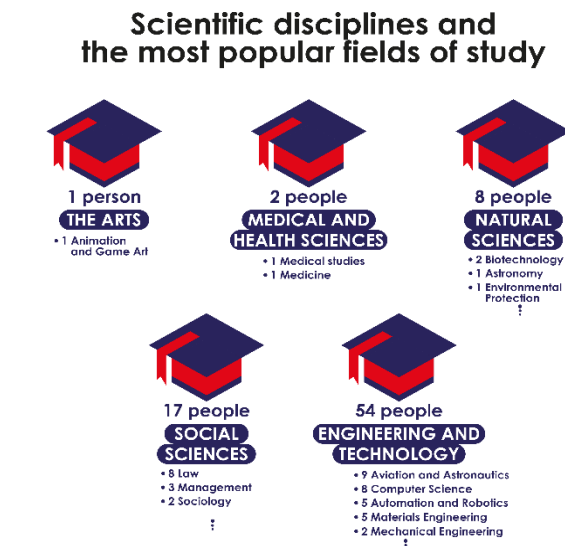


Fig. 14 RS POLSA members' university background.

Gender distribution maintained approximately a 60% male to 40% female ratio overall, with higher female participation in law and management programs compared to male-dominated engineering cohorts (see Fig. 15). Study level diversity includes substantial doctoral representation (8-10%). Another axis of diversity is study level: Bachelor's and Master's students form the majority, but there is a noticeable presence of early-stage PhD candidates. Doctoral representation (≈8–10%) is significant as it links the Council to the professional research environment and national laboratories.

Gender ratio in the Council (2020-2025)

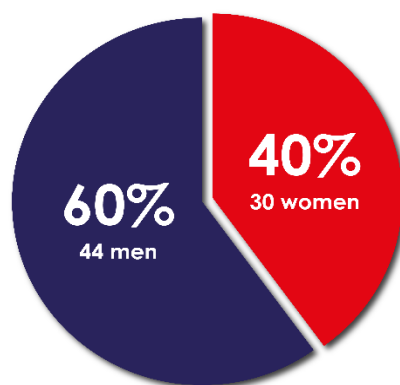


Fig. 15 Number of members studying in individual voivodeships.

Over the years, a tendency has emerged for fewer members to leave the council (in 2025, only 1/3). This indicates that an increasing number of members choose to remain active in the council and intend to continue their involvement in subsequent years. Another contributing factor is the relatively young age of the council members: as of August 2025, the average age is 23.7 years, while the average time they have spent studying so far is 4.4 years

8. Successes of the former Members

Student Council to the President of the Polish Space Agency (RS POLSA): Leaders Empowering the Future of Polish Space Science and Technology.

RS POLSA unites emerging leaders whose collective expertise is shaping the Polish and international space sector. Highlighted below are profiles of key Council members and their pivotal achievements.

8.1 Justyna Pelc



Fig. 17 RS POLSA former member, Justyna Pelc.

Justyna Pelc [3] is an engineer specializing in automation and robotics at Wrocław University of Science and Technology, Chairperson of Innospace, and an influential science communicator (see Fig. 17). She managed award-winning Mars and Moon base projects and has been extensively involved in fostering multidisciplinary talent and international collaborations – enhancing innovation and advocacy for youth in the Polish space ecosystem.

8.2 Wiktoria Dziaduła



Fig. 18 RS POLSA former member, Wiktoria Dziaduła.

Wiktoria Dziaduła [4] is a doctoral researcher in architecture at the Silesian University of Technology and CEO of Extremo Technologies (see Fig. 18). As Chairperson of the RS POLSA, she led biotechnology and architecture projects, including a Polish-led algal experiment on the ISS. Her work bridges research and business, advocating for sustainable space habitation.

8.3 Marcelina Stasik



Fig. 16 RS POLSA former member, Marcelina Stasik.

Marcelina Stasik [5], an MSc in Materials Engineering from AGH University of Science and Technology and Forbes 25under25 laureate, is distinguished by international fellowships (MIT, Kumamoto University) and vital contributions to material solutions for space technologies (see Fig. 16). Thanks to the Council, she built extensive networks with outstanding Polish scientists, engineers, and entrepreneurs. A collaborative patent with Prof. Teodor Buchner from Warsaw University of Technology resulted from these interactions, with promising multi-disciplinary applications. The Council experience provided deep insights into Polish space firms and market needs, directly supporting her successful application to the Space Fellowship Program and a 5-month internship at Astronika. There, she developed a European Space Agency (ESA) recognized innovation and managed a successful joint project between Astronika and the Łukasiewicz Institute. Currently, as an intern at ESA European Space Research and Technology Centre (ESTEC), she represents Poland, POLSA, and the Ministry, enjoying her most fulfilling professional role, publishing her first research paper, including International Space Station (ISS) experiments. The Council's active community also supports future initiatives and strengthens collaboration within the Polish space landscape.

8.4 Maciej Skorupski



Fig. 19 RS POLSA former member, Maciej Skorupski.

Maciej Skorupski [6], a materials science engineer from AGH University of Science and Technology, is a national trainee at the Polish Space Agency and currently serves as European Crew Operations Support at the ESA European Astronaut Centre (EAC) (see Fig. 19). His experience encompasses International Space Station (ISS) operations, ESA missions (IGINS, Ariel, COMET

Interceptor), and previous research at Kumamoto University. As a Council member, he led student research and fostered scientific networks. Noteworthy for his technical roles at Sener Aerospace & Defence, he contributed to Finite Element Analysis for ESA missions and collaborated on advanced material applications. A laureate of the Space Fellowship Program, his ESA ESTEC placement – representing Poland – marks a milestone in his career, where he has published ISS-related research and actively advances cross-sector scientific innovation.

Together, these alumni exemplify the Council's impact – integrating science, engineering, leadership, and entrepreneurial vision to propel Poland's presence in the global space sector.

9. Student Council to the President of the Polish Space Agency: Contribution to the IGNIS mission

9.1 The IGNIS Mission Context

IGNIS was the first Polish technological and scientific mission to the International Space Station (ISS). During a 14-day stay in orbit, European Space Agency (ESA) project astronaut Dr. Sławosz Uznański-Wiśniewski conducted 13 experiments prepared by Polish companies and research institutions, covering topics such as astronaut health, microbiome studies, new materials, artificial intelligence, and advanced space technologies. The mission also included a comprehensive nationwide educational program aimed at students and teachers at all levels of education.

IGNIS formed part of the Axiom Space Ax-4 mission, launched on 25 June 2025 from the National Aeronautics and Space Administration Kennedy Space Center aboard a SpaceX Falcon 9 rocket with the Dragon crew capsule. The Ax-4 crew consisted of Peggy Whitson (USA, commander), Sławosz Uznański (Poland/ESA, mission specialist), Shubhanshu Shukla (India, pilot), and Tibor Kapu (Hungary, mission specialist). Poland's participation was the result of a strategic agreement between the Ministry of Development and Technology and the European Space Agency, with the Polish Space Agency (POLSA) as the coordinating executive body.

The scientific component of IGNIS provided “flight heritage” for Polish technologies and generated knowledge that could not be obtained under terrestrial conditions. The educational component featured outreach activities, live in-flight calls with schools and universities, as well as teaching materials, competitions, and workshops. These efforts were carried out in collaboration with POLSA, ESA, the Ministry of Development and Technology, and partners such as ESERO Poland and the Space Research Centre of the Polish Academy of Sciences.

The symbolism of the IGNIS mission patch reflected national identity and aspiration: a white-and-red eagle

whose wings formed the outline of the Tatra Mountains, the flame-shaped tail referencing the mission's name (*ignis* – Latin term for fire), and the ISS embedded in the lettering. The constellation Scutum honored the Polish astronomer Johannes Hevelius, while the silver horizon line symbolized the dawn of a new era in Polish space exploration.

As the second Polish astronaut in history, Dr. Uznański's flight represented a milestone in the development of Poland's space sector. IGNIS demonstrated the country's readiness to contribute to international crewed missions, strengthened its industrial competitiveness, and inspired future generations to pursue careers in science, engineering, and exploration.

9.2 Educational Inflight Calls during the IGNIS Mission

A distinctive feature of the IGNIS mission was its educational element, which was implemented through a series of four in-flight calls connecting Polish students directly with Dr. Sławosz Uznański-Wiśniewski on board the International Space Station (ISS). These events, which were organized in collaboration with the Amateur Radio on the International Space Station (ARISS) program, the Polish Space Agency (POLSA), the Ministry of Development and Technology (MRiT), the Ministry of National Education (MEN), and the ESA. Each call was accompanied by a meeting with approximately 200 students. During the approximately eight-hour events, students participated in workshops and other educational activities. During the live calls from the ISS, they asked the astronaut questions that had been previously selected in the “Ask an Astronaut” contest. They were a significant achievement in promoting science and technology among young people in Poland.

9.3 Events in order of occurrence

9.3.1 Łódź (EC1, 2 July 2025)

The first live connection took place at EC1 Łódź. It included a direct Q&A session with Polish students and the execution of three experiments selected in the “Prosty eksperyment – kosmiczne odkrycie” competition organized by POLSA. This pioneering in-flight call inaugurated the nationwide educational program accompanying the mission.

9.3.2 Wrocław (University of Wrocław, 4 July 2025)

The second event was the first official connection under the ARISS framework. Students gathered at the University of Wrocław, asked questions selected in the “Zapytaj Astronautę” competition. Discussions focused on the everyday life of astronauts aboard the ISS, their routines, challenges, and personal reflections (see Fig. 20).

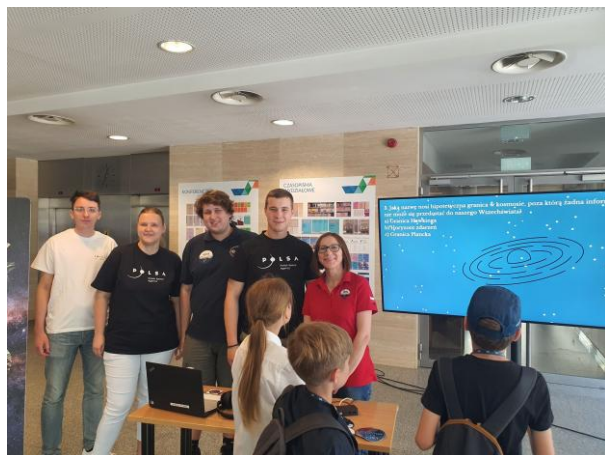


Fig. 20 From left: Maciej Kuczyński, Małgorzata Nowakowska (former employee POLSA), Armin Ernst, Filip Anduła, Anna Bukiewicz-Szul (POLSA employee).

9.3.3 Rzeszów (Rzeszów University of Technology, 6 July 2025)

The third in-flight call, hosted at the Rzeszów University of Technology, provided an opportunity for students to explore both technical and personal aspects of spaceflight (see Fig. 21, Fig. 22). Questions covered the astronaut's free-time activities, with Dr. Uznański emphasizing his fascination with observing Earth from the Cupola module.



Fig. 21 Rzeszów University of Technology.



Fig. 22 From left: Maciej Kuczyński, Marcin Jasiukowicz, Armin Ernst, Hanna Grechuta, Urszula Sibik, Karol Kołacz, Małgorzata Nowakowska (former employee POLSA).

9.3.4 Warsaw (Copernicus Science Centre, 10 July 2025)

The final event, held at the Copernicus Science Centre in Warsaw, concluded the series. Students engaged in a live conversation with the astronaut, asking questions about ISS systems, daily life, and the meaning of pursuing a career in space. Dr. Uznański also conducted three student-designed experiments. The event was accompanied by workshops, science demonstrations, and a public outreach fair involving educators and researchers (see Fig. 23).



Fig. 23 From left: Grzegorz Zych, Urszula Sibik, Hanna Grechuta, Oliwia Pająk, Wacław Woszczyk

9.4 RS POLSA Impact

RS POLSA demonstrated a high level of engagement in supporting the in-flight calls, with contributions made both before and during the events. In the preparatory phase, student representatives assisted in promotion and outreach, managing communication on social media, university networks, and academic platforms to maximize student participation and public visibility of the mission.

In addition to operational support, members of the Council participated actively in the delivery of workshops, acting as facilitators and peer mentors

for younger participants. Through the sharing of their academic and technical experience in areas such as radio communication, satellite technologies, and applied engineering, they contributed to the contextualization of the astronaut's responses and the enhancement of the educational value of the events.

This consistent involvement, which encompassed pre-event promotion, on-site assistance, and post-event dissemination of materials, ensured that the in-flight calls had a lasting educational impact. Furthermore, it served to consolidate the Council's function as an intermediary between institutional partners and the student community, while concurrently empowering its constituents to acquire practical experience in science communication, event organization, and public engagement within the context of an international mission framework.

9.5 IGNIS contribution conclusion

It is evident that the in-flight calls of the IGNIS mission were of both a symbolic and practical nature, contributing to the advancement of Poland's space education strategy. By establishing direct connections between educational facilities and academic institutions with the International Space Station (ISS), a sense of involvement in global space initiatives was cultivated. This initiative also served to showcase the integration of state-of-the-art communication technologies within educational methodologies, thereby inspiring a new generation of scientists and engineers to pursue the challenges posed by space exploration.

The Student Council to the President of the Polish Space Agency (RS POLSA) played a pivotal role in enhancing both the awareness and overall success of the mission. The Council's active involvement in the following activities ensured the successful dissemination of the mission and the fulfilment of its educational objectives, such as pre-event promotion, on-site support during in-flight calls facilitation of workshops

Their engagement helped raise the visibility of Poland's contribution to space research, strengthened the connection between students and professional space activities, and contributed to the smooth execution of live communications, thereby amplifying the educational and inspirational impact of the mission across the country.

10. Conclusion

Since its establishment in 2020, the Student Council to the President of the Polish Space Agency (RS POLSA) has served as a globally unique advisory body to the national space agency, connecting the academic community with the government agency and industry representatives. Over the course of its previous terms, RS POLSA has not only developed its own organizational identity but has also gained a real impact

on the development and popularization of the Polish space sector.

The Council's most important achievements include educational, scientific, and promotional initiatives. One of its most recognizable projects is the UP! Students Conference, which has created a framework for the exchange of experiences between ambitious students from multidisciplinary backgrounds and representatives of the Polish space industry. It was complemented by specialist projects, such as Space Law Camp, responding to the growing importance of space law, or a series of events as part of International Observe the Moon Night, Hackathons, and local initiatives promoting science. As a result, the Council has built a network of activities covering the entire spectrum – from primary and secondary schools, through universities, to the private sector.

The social aspect of the Council's activities also remains extremely important. Regular lessons in schools and meetings with young people have highlighted the main barriers to accessing the space sector: a lack of information about educational pathways and limited awareness of career opportunities. The Council has effectively overcome these limitations by showing that the space industry is not limited to engineering fields, but also includes law, medicine, economics, architecture, and social sciences. The interdisciplinary nature of the Council is a perfect example of how to overcome this barrier.

The activities of RS POLSA were also reflected in the IGNIS mission, the first Polish scientific and technological project on the International Space Station. The Council supported the educational and communication activities of the mission, becoming a bridge between institutions and the younger generation. This experience showed that student involvement can bring real results on a national scale.

The individual successes of former Council members, from award-winning scientific projects, through activities at ESA, to cooperation with Polish space companies, are the best proof that involvement in RS POLSA builds the skills and contacts necessary for a career in the sector. The Council has become an incubator for future leaders, combining elements of science, entrepreneurship, and space diplomacy.

In summary, the Student Council to the President of the Polish Space Agency is an example of how young people, acting together and systematically, can have a lasting impact on the development of the space sector and shape public awareness. Continuing this initiative is not only desirable but necessary if Poland is to build a modern space sector capable of competing and cooperating on the international stage. The Student Council has proven that the involvement of the younger generation is fundamental to the future of Poland's presence in space.

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