

Krakow has cosmic potential

A city traditionally associated with history and culture is also consistently strengthening its economic position and is now a significant business centre. Krakow is committed to development based on creativity and intellectual capital, which stems from the city's strategic goals, among which is the "development of a knowledge-based economy".



Photo by Krakowski Park Technologiczny

The power of modern technology, innovation and advanced processes is created by ambitious, creative and hard-working people – and there is no shortage of these in Krakow. The city's universities and research facilities, access to highly qualified staff and a mature business environment are also important assets. **The foundation for this potential is cross-sectoral cooperation between science, business and public administration,** consistently implemented as part of urban development policy. In this context, it is clear that the knowledge economy also includes industries related to the space sector – all the more so as the technologies developed for space exploration and the use of satellite tools find **numerous applications. An extensive R&D ecosystem** is already in place in the city at the foot of Wawel Castle, so Krakow is a great location for a European Space Agency (ESA) centre.

Science and research

One of the city's key strengths is its unique academic and scientific facilities in the area of space technology, based on the strong duo of the AGH University of Science and Technology and the Jagiellonian University. As **Łukasz Wilczyński, President of the European Space Foundation**, points out *“It is this side of Krakow's potential that can be an important argument in choosing a location for further space investment development. **AGH has a Faculty of Space Technology (one of the few of its kind in Central Europe) and a Space Technology Centre**; students and researchers here have constructed, among other things, the KRAKsat **satellite and the ultraminiature PocketQube satellite – HYPE**. The Jagiellonian University, in turn, brings strong facilities in physics, astronomy, applied computer science and high-energy astrophysics. Of particular importance is the Faculty of Physics, Astronomy and Applied Computer Science, together with the Nicolaus Copernicus Astronomical Observatory, which **conducts research in, among other fields, astrophysics, radio astronomy and space physics**, supporting the development of expertise in the areas of sensors, materials, data processing, instrumentation and remote sensing for space missions”*. In addition, the Jagiellonian University contributes to the HematopoiesisISS experiment carried out on the International Space Station; **another recognisable project of the university is the HYADES initiative**, involving work on a **space telescope in the form of a scientific satellite**. The Cracow University of Technology is also active **in the space sector**, using engineering competences: computer science, telecommunications, mechanics, materials and chemical engineering, e.g. **in the area of suborbital systems and rocket technology**. The University of Agriculture, meanwhile, is developing competence in the segment of Earth observation for agriculture and forestry, using satellite data, photogrammetry and **research into remote sensing applications**.

Innovation and talent

A critical mass of talent is provided by **Krakow's 18 universities**, which have around **137,800 students, including around 9,600 international students**. Every year, **several thousand graduates in technical subjects** leave the universities, adding to the pool of highly qualified staff. Krakow offers a wide choice of studies in English, including technical and engineering subjects, e.g. Computer Science, Electronics and Telecommunications, Mechanical Engineering, Materials Science, Automatic Control and Robotics. **Through AGH, it is also possible to receive English-language training in key areas for the space sector**, such as sensorics, remote sensing, artificial intelligence, mechatronics and materials engineering – **a profile that is particularly attractive from the perspective of international recruitment for the ESA**

centre with security and dual-use components. The city's scientific and business potential, supported by business environment institutions, serves to develop companies, start-ups and technology projects for research, testing and commercialisation of solutions.

"A good example is the activities of the Krakow Technology Park, which include support for the commercialisation of space technologies, digital innovations and dual-use solutions. The hub4industry, which acts as the European Digital Innovation Hub (EDIH) for industrial transformation, operates here. Companies carrying out projects for ESA include 6ROADS, Orbify and Creotech Instruments, which recently opened an office at KPT. FORT Kraków, a centre run by the Krakow Technology Park and the AGH University of Science and Technology, is being developed in Krakow to support defence innovation and dual-use technologies. Under the aegis of FORT Krakow, Poland's only NATO accelerator, DIANA (Defence Innovation Accelerator for the North Atlantic), operates. It is also worth mentioning such real instruments for business as tax exemptions within the Polish Investment Zone, investment funds and infrastructure for developing projects," **notes Mateusz Zurzycki, Vice President of the Management Board of the Krakow Technology Park.**

The city's strength is also its high patent and implementation culture: **AGH is among the Polish leaders in patent applications**, including to the European Patent Office. Complementing the technological facilities is the Lukasiewicz Research Network. Its affiliated **Krakow Institute of Technology** works in the fields of design, manufacturing and materials research, with projects also underway for ultralight magnesium alloy components for the aerospace industry, **including components for suborbital systems.** Support for innovative activities is provided by an advanced research infrastructure, including supercomputers at ACK Cyfronet AGH, the SOLARIS Synchrotron and the Analog Astronaut Training Centre (AATC). Cyfronet remains one of the key national centres for high-performance computing (HPC) and artificial intelligence, a leader of the PLGrid consortium and **an important participant in European EuroHPC initiatives.** In this context, an ESA centre could serve not only an administrative function, but also as a **competence accelerator for the space sector.**

Investment and infrastructure

It can be assumed that in scientific and technological terms Krakow is a high-ranking location for ESA, but there are additional infrastructural and logistical arguments. Situated in the heart of Europe, the city benefits from access to a network of motorways and railways, and is also served by **Poland's largest regional airport.** After a record-breaking **13.2 million passengers in 2025**, Krakow Airport, implementing expansion and modernisation plans, is preparing to handle **around 19-20 million passengers**

a year in the coming years. The city is developing public transport and **plans to build a metro system** that will become the new transport spine of the metropolis. In parallel, smart city solutions are being implemented to improve the quality of urban services and spaces, e.g. intelligent management systems for water supply networks, public transport, open city data, monitoring, e-government. Krakow's investment readiness and the quality of its offer for modern industry and advanced technologies is illustrated by the "Krakow – Nowa Huta Przyszłości" project, which is being implemented by a municipal company. It concerns an extensive, developed and partly commercialised post-industrial area, prepared for research and development and high-tech industry, with the possibility of a phased campus expansion.

Krakow ranks very high in the analysis of the location of the ESA's Space Systems Security-oriented Research and Development Centre. This is due to a uniquely favourable combination of technological and analytical competencies and a strong service and manufacturing base, including a start-up environment in the areas of satellite data processing, biotechnology and life science.

An additional advantage of Krakow is its location. The city is particularly well placed to act as the core of a wider ecosystem covering southern and south-eastern Poland. Within its catchment area is the strong production and technological base of the Aviation Valley, bringing together the aerospace potential of the Podkarpackie, Lubelskie, Małopolskie and Śląskie voivodships. The proximity to the Upper Silesian and Zagłębie Metropolitan Area further strengthens this arrangement, especially in the areas of artificial intelligence, cyber security and advanced materials.

"The selection of Krakow above all means the choice of one of the strongest functional systems in Poland for an ESA centre oriented towards the safety of space systems, also in the context of dual-use applications. Krakow is the location that can, on the one hand, involve the widest possible number of different types of stakeholders, on the other hand provide the greatest added value, and thirdly to the greatest extent close the multiplier effects of its activities in the broader region of south-eastern Poland," emphasises Dr. Agnieszka Sobala-Gwosdz, chief expert on the economy and labour market at the IRMiR's Urban and Regional Policy Observatory.

A good place to live

Krakow's global brand recognition stems from its cultural and business assets, but the quality of life also determines the attractiveness of the location. Krakow remains a city where **people want to live, study and work**, which is conducive to attracting international talent. The high quality of the cultural offer, public spaces, green spaces, health services, sports

infrastructure and safety reinforce the city's attractiveness for high-tech professionals. A stable and secure environment is crucial for strategic institutions such as ESA. Krakow provides a high level of public safety and well-developed crisis management procedures; **indicators of residents' sense of security have remained high for many years**. Urban studies also point to quality of life as one of the key factors in locating businesses in knowledge-based sectors, which is why the message "This is where I want to live" contained in the title of Krakow's development strategy is an expression of the conviction of more than a million residents of the Krakow agglomeration. This is confirmed by the city's high position in international rankings, e.g. **fDi European Cities and Regions of the Future 2025**, where Krakow came top in the categories "human capital and lifestyle" and "business friendliness". **The city is also among the wage leaders in Poland in the modern services and technology sectors**, and the population of the agglomeration is growing steadily, including **the number of foreign residents, which exceeds 100,000**.

Success for Krakow – success for Poland

Krakow combines unique scientific competences in the field of space technology, investment readiness, international accessibility and high attractiveness for global human resources, **exactly matching the profile of the planned European Space Agency centre**. The presence of such a centre near Wawel Castle would fit in with the long-term development strategy of the city and the region, which involves creating a technology hub with European reach and building a strong space technology centre. ESA's investment would also be of great importance for the development of entrepreneurship and technology transfer, giving Krakow a real chance to build a strong, innovative space ecosystem, increasing the competitiveness of the region and the entire Polish economy.

This diagnosis is confirmed by **Aleksander Miszalski, Mayor of the City of Krakow**: *"Our economy – like the global economy – is currently undergoing a profound transformation. Technology is accelerating, production and service models are changing and artificial intelligence, cyber security and automation are beginning to play a key role. Krakow's response to these changes is to invest in the people and competences of the future. That is why the city administration, universities and business are working together more closely today than ever before. It is this cooperation that builds the competitiveness of our city and allows Krakow to develop modern sectors of the economy, including space technology, which is becoming a symbol of our ambitions and of Krakow's 'space success'"*.