

Poland in ESA: What Next?



Polish Economy Ministry

The moment the accession treaty was signed on 13 September 2012



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Joining the European Space Agency (ESA) will make it possible for Polish institutes and companies to participate in European space research and industrial projects

ESA is Europe's answer to NASA, and is one of the leading space agencies in the world. It was founded in 1975, its annual budget is approximately four billion euro, and it employs around 2200 people including scientists, engineers, and IT specialists. Its headquarters are in Paris, and it has major centers in the Netherlands, Germany, Italy, Spain, and French Guiana. Until recently, it had 19 member states: Austria,

Belgium, the Czech Republic, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxemburg, the Netherlands, Norway, Portugal, Romania, Spain, Switzerland, Sweden, and the UK. Under a cooperation agreement, ESA's board also includes a representative from Canada. Hungary, Estonia, and Slovenia work with ESA on the basis of the Cooperating States Agreement. Poland has been operating as part of the same agreement since 2007.

The concept of Poland becoming an ESA member was first raised several years ago. Accession negotiations were commenced in 2011, and finalized in April 2012. Last September, Poland's Deputy Prime Minister Waldemar Pawlak and ESA's Director General Jean-Jacques Dordain exchanged the documents; and the lower house of Polish parliament, the Sejm, unanimously ratified the deal on 24 October, a decision further endorsed by the Senate on 9 November. The ratification process was concluded with Poland's President Bronisław Komorowski signing the agreement on 13 November. As a result, on 19 November Poland officially became the 20th full ESA member.

Two sides of ESA

ESA focuses on basic research, providing means for launching satellites into orbit, developing navigation systems using satellite technology, and satellite telecommunications.

The organization conducts two types of programs: mandatory, financed by the member states proportionally to their national income (Poland's contribution has been set at 19 million euro per year), and optional, financed only by the countries that participate in them. Negotiations regarding Poland's participation in optional programs are ongoing. It is assumed that following the example of other member states, we will start our participation in optional programs at the same level as the obligatory contribution, then increase it gradually.

Optional programs constitute almost 80% of ESA's activities. This is due to two factors. First, each country negotiates its participation on a project-by-project basis, making it possible to adapt each project to the requirements of the specific member state. Second, ESA programs with the greatest market potential, involving practical applications of space technologies (in telecommunications, observations of the Earth, navigation) or serving the development of automation and robotics, are optional.

In contrast to EU policies, ESA's industrial policy is based on geographical return, under which approx. 90% of a country's contribution gets returned to it as contracts awarded to its industry and R&D institutions, while the remainder is used for the Agency's everyday activities and development. Such full return will not come immediately for Poland, and there is likely to be a transitional period of a few years; however, at the same time actions will be put in place making it possible for Polish companies to gain preferential contracts.

ESA implements many EU space projects, which Poland also contributes to as one of the member states. The funding involved is significant: between 2014-2020, the EU aims to spend a total of 15,474 billion euro on its space effort (mainly the Galileo and GMES programs), with Poland's contribution estimated to be around 70 million euro per year. Yet because Poland was not yet a member of ESA, the participation of Polish industry in these projects was extremely difficult, essentially ruling out the chance of our contribution being recovered in the form of contracts.

Harnessing the potential...

Is Poland's industry able to make the most of this opportunity? Will it be possible to convert the contribution into real contracts? These were key questions posed during the discussions on Poland's membership in ESA, and it is worth asking them again here.

Polish companies are currently practically non-existent in the European space industry. There are a handful



Infrared detectors made by the Polish company VIGO Systems, taken to Mars on the Curiosity mission

of companies offering products in terrestrial infrastructure and services based on satellite technologies; however, such projects are just a minor part of ESA's activities. Still, there are many reasons why the situation could change in the next few years.

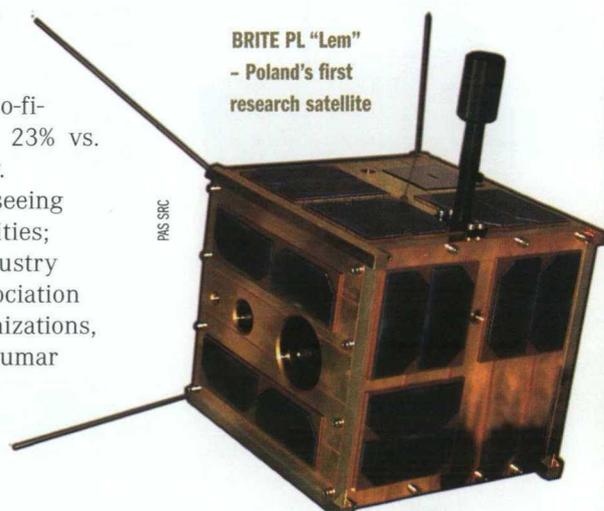
An analysis of the Polish space sector, conducted in 2004 on behalf of ESA, revealed that many Polish companies that are not currently involved in such activity nevertheless do have a huge potential of knowledge, experience, and organizational culture. The evaluation of Poland's future space sector conducted by the Polish Economy Ministry and ESA included over 100 entities, over 50 of which are commercial. Products made by a few of them have a high chance of finding applications in the field, such as IR detectors made by Vigo System SA and microwave elements manufactured by BUMAR Elektronika.

The ESA policy of supporting Poland's space sector has had some tangible results: European companies have begun to seek out Polish partners for future ESA contracts.

The scientific and technological potential of our companies has also been confirmed by the results of the Plan for European Cooperating States (PECS) Agreement. Three competitions for PECS projects conducted so far have received over 135 entries. The total budgets of projects assessed positively by ESA as part of two PECS competitions came to approx. 11 million euro, which was more than double the minimum compulsory contribution to PECS over five years.

According to statistical data gathered by the National Contact Point for EU Research Projects falling under the "space" priority, Polish organizations attain a success rate twice as high as the Polish average for the entire program: the success factor of participation is 32% versus the average of 16% for FP7 (7th Framework Programme for the funding of research and technological development in Europe, 2007-2013), while the success rate for co-financing reaches 23% vs. 12%, respectively.

We are also seeing bottom-up activities; the Space Industry Employers' Association includes 20 organizations, including the Bumar Group, the PAS Space Research



BRITE PL "Lem" - Poland's first research satellite

Poland's membership in the European Space Agency

Centre, the Industrial Research Institute for Automation and Measurements (PIAP), the Aviation Institute, and Polish subsidiaries of the major European corporations EADS Astrium, GMV, and Sener.

Organizations building their position in the space sector will not need to acquire knowledge from scratch. Poland has a wealth of experience centered at research and development institutions which have been pursuing space-related studies for many years. The PAS Space Research Centre employs over 100 specialists with many years of space research experience, as well as having good technological infrastructure. Over the course of 30 years, it has launched over 60 instruments and satellite subsystems into orbit. The Centre has supplied scientific equipment to many key ESA research missions; five of these instruments are still operating (the Integral, Rosetta, Mars Express, Venus Express and Herschel missions), while work is ongoing on the next three (ASIM, BepiColombo, and Solar Orbiter).

...and new technologies

ESA programs should support Polish companies introducing high technology products into the market, but can they also help propel the development of Polish scientific research? That is a valid question, since ESA does not generally fund the delivery of scientific instruments (payloads) for its scientific and technological missions. It initiates and conducts research programs as part of the mandatory projects, although their financing is limited to the common segment (preparing the mission, building, integrating and testing satellites, and launching hardware into orbit) and the terrestrial segment (mission control and preliminary analysis of measurements). Individual instruments dedicated for the mission are constructed using national resources.

There can be no doubt that ESA membership should enable us to have an impact on the organization's scientific program. Polish scientists working in astronomy and space research are well known in international circles, and we hope this position can be converted into decision-making in the future.

As part of the selected missions, we can put forward our own instruments, while Polish researchers have the opportunity to compete for the "Primary Investigator" status, highly sought-after in space research circles.

The creation of a space industry in Poland should also make it easier to secure nation-



Block of the LO/HIFI instrument controller in the Herschel mission



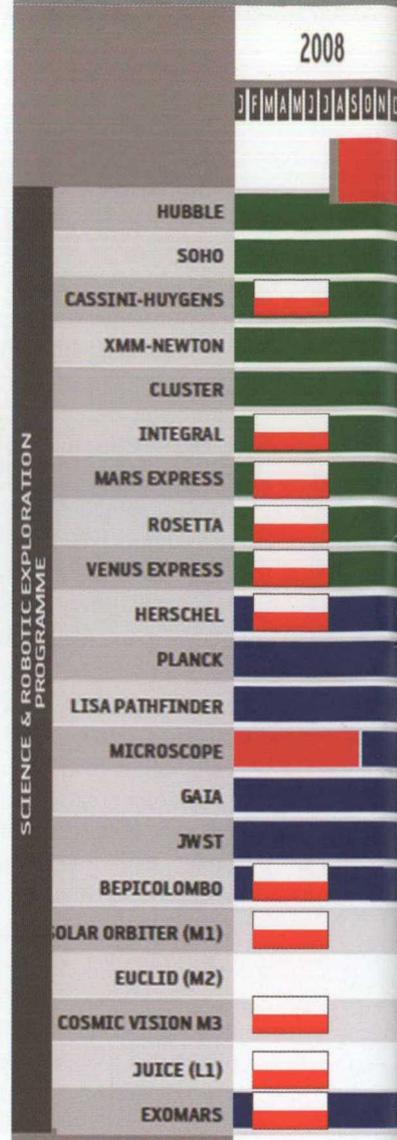
MUPUS Penetrator device, constructed at the PAS Space Research Centre for the Rosetta mission

al resources necessary for conducting scientific research. In other countries, in the majority of cases national funds are awarded for space research under the condition of using the country's industrial potential in the construction of essential equipment.

Cooperation between industry and research goes both ways; many research centers perform projects for space industry. ESA programs in the development of new technologies can be conducted at research centers or by research and industry consortia. ESA membership will allow Poland to broadly participate in these programs. As a new member, we will set up a new Task Force (jointly with ESA), whose aim over the coming years will be to allocate a part of Poland's mandatory contribution to projects executed exclusively in Poland.

The next concession for a country building its space industry from scratch will be the option to directly finance the construction of scientific hardware as part of the PRODEX program (suggested as part of the optional contribution to ESA) over the course of a few years.

The Cosmic Vision 2015-2025 program calls for the launch of a number of missions over the coming decade,



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SCIENCE & ROBOTIC EXPLORATION PROGRAMME

