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Reaching for the impossible is a Polish characteristic and this holds true for the nation's space projects, where many 'impossible' concepts have already become fully operational. Undertaking space in a country where there is no space law, no space ports and limited financial resource, and where a space agency has been operating for just three years, sounds like an impossible mission. And maybe that is the main reason why it is actually happening.

Poland's space adventure began when the country's first research device was sent into orbit onboard the satellite Kopernik-500 (Interkosmos-9) in 1973 as part of the Interkosmos programme, in collaboration with the Soviet Union.

The oldest and most notable Polish space institution is the Space Research Centre (SRC) of the Polish Academy of Sciences, founded in 1977, whose activity has been fully dedicated to research into terrestrial space, the solar system and Earth using space technology and satellites. Research and engineering groups of the SRC have set up over 60 instruments and participated in experiments on more than 50 international space missions.

Polish diplomat and lawyer, Prof Manfred Lachs, played an important role in setting out the foundations of international space law by the United Nations. The space law pioneer was the first chairman of the COPUOS Legal Subcommittee of UNOOSA and his words on space discoveries: "is it not true that we face here fascinating issues of law, a new world or worlds far beyond anything man has ever reached for?" have become something of a proverb for contemporary space lawyers.

Mars explorers

Polish engineers have also become experts on pioneering projects related to the exploration of Mars. For the ExoMars mission, the design and construction of the umbilical release mechanism

(URM) for the rover vehicle has been entrusted to Sener Polska, and the Colour and Stereo Surface Imaging System (CaSSIS), part of the instrument payload on the ExoMars Trace Gas Orbiter, has been produced by a start-up founded by Polish scientists, Creotech Instruments.

The Curiosity Mars Rover is fitted with infrared detectors manufactured by Poland's VIGO System, and the Mars Express mission has been equipped with a power system and scanner for the Fourier's Planetary Spectrometer to analyse the spectrum of reflected radiation emitted by the surface and atmosphere of Mars.

Government awakening

The real kick-off for Poland's space sector came in 2012 when the nation joined ESA as a full member and a financial contribution of about EUR 31.5 million. Though joining ESA was a significant boost of Polish space projects, it is also true that the space industry itself has now become more accessible for smaller players.

The number of Polish companies active in the sector is growing rapidly – at present some 300 firms form a consistent, consolidated group of large, medium and small enterprises.

The industry is dynamic and well-organised and the immediate response to Poland joining ESA was to set up the Polish Space Industry Association (SPACE PL), with the aim of creating favourable conditions for a strong Polish space industry that would be able to successfully compete in the European market.

Self-organisation is not nearly enough for the young space sector to compete in the global space market and, unquestionably, the weak factor so far has been the government's approach, treating its space industry akin to extravagant expenditure, reflected in the past, reflected by the minimum financing even of state academic research centres. Fortunately, at least in terms of political declaration, that attitude is changing.

Prime Minister, Mateusz Morawiecki, recently confirmed his plan to "saturate the Polish economy with outer space elements". This sits alongside the Polish Space Strategy (PSS) 2017-2030 which is aimed at public funding of an industry that will result in the growth of the domestic space sector and acceleration of projects of national satellite infrastructure in accordance with national security and defence needs.

Benchmark

The PSS presents an ambitious vision to make the space sector an important element of

Poland's economy, relying on knowledge and innovation as well as its connections to other economic sectors. Among the goals set is the benchmark of achieving three percent of total turnover of the European space market, proportionate to Polish economic potential in general. It also suggests that it is possible to become a manufacturer of the increasingly popular small satellites (mass of 10-150 kg).

The PSS assumes also that satellite data will be acquired both from the European space infrastructure (e.g. Galileo and Copernicus) and from national resources. One such resource should be a national Earth observation system, capable of conducting both visible and infrared and radar observations.

The National Space Programme (NSP), performed in the execution of the PSS, will be a sectoral programme financed from a special separate fund of the national budget, allocated directly to the Polish Space Agency (POLSA), which was established in 2014. POLSA has estimated that the budget for activities carried out during the first eight years of the NSP is PLN 1.429 billion. [Polish Zloty or PLN is Poland's currency]. According to the declarations of the Ministry of Development, PLN 25 million has already been planned in the national budget for 2018.

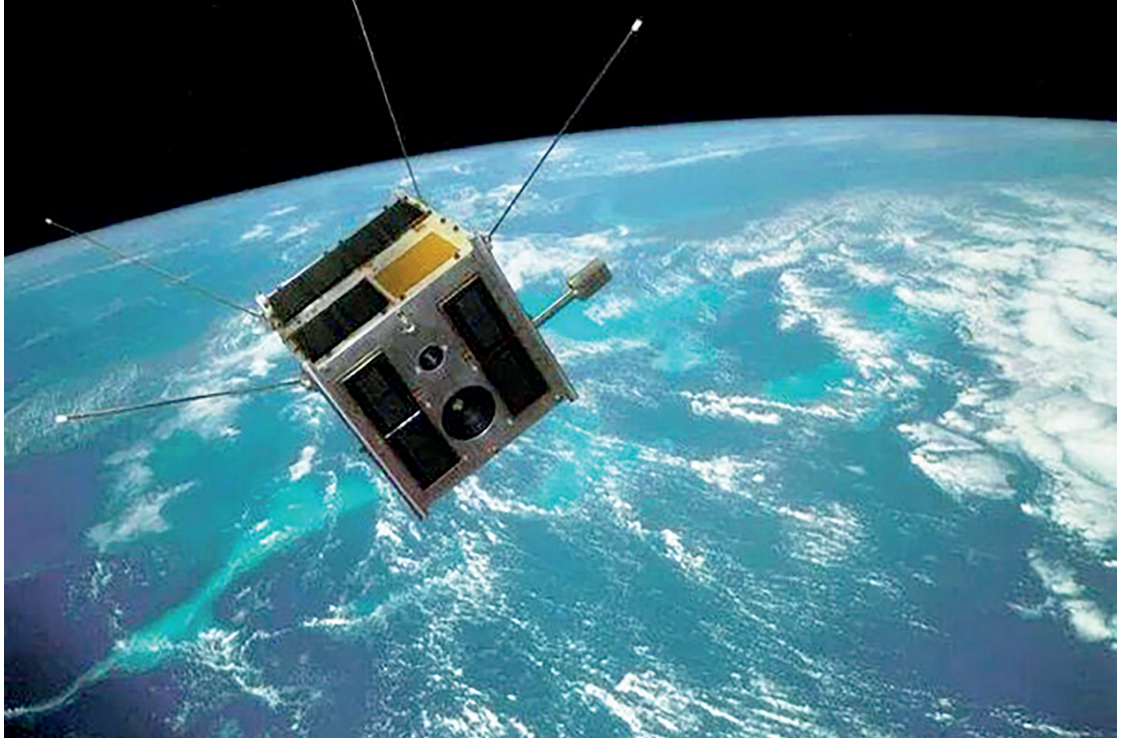
It is hard to say whether the government opened up towards the space sector because of external



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◀ Prof Manfred Lachs, the first chairman of the COPUOS Legal Subcommittee of UNOOSA.

► Polish smallsat concept.



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factors, such as ESA membership, or because it recognised the potential for Polish space enterprises to pursue space projects with foreign partners without substantial support from their own government.

In either case, it seems that the Polish government has finally woken up to taking the necessary supportive role. The first signs of this have been participation not only in ESA basic programmes, but also in optional ones, which provide opportunities to benefit from the principle of geographical return applied by ESA in its projects.

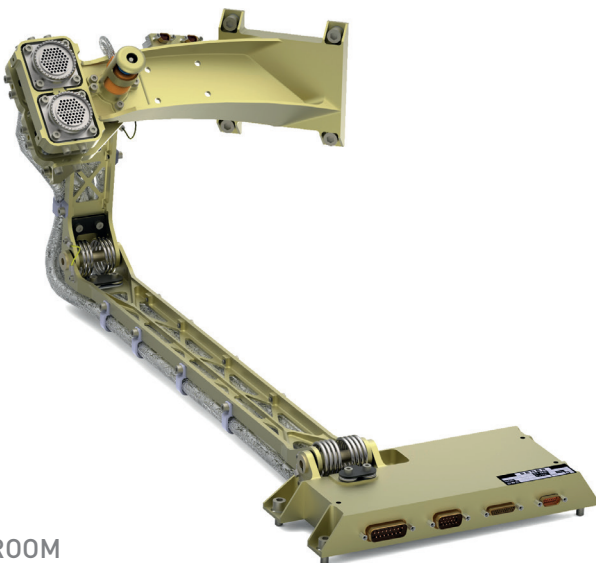
We have not had to wait long for the first results. Since 2012, tens of Polish companies

have started working and investing in both downstream and upstream sectors. Most Polish projects carried out in collaboration with ESA are now industrial and commercial, whereas most of the earlier activities were performed by research and development institutions.

In December 2017, a consortium led by Creotech Instruments, was awarded an ESA contract worth EUR 15 million to build one of the five Copernicus Data and Information Access Services (DIAS) platforms. The consortium, which also includes Polish cloud provider CloudFerro and the Wrocław Institute of Spatial Information and Artificial Intelligence, is among four contract recipients, each of which will build a separate DIAS platform. The other three contracts went to consortia led by Serco, ATOS Integration and Airbus, removing any doubts as to whether Polish companies are able to compete with the biggest.

We have to appreciate however, that there is still a great deal to be done. Poland faces a challenge on how to change the ratio of the types of projects in which companies participate from data processing only to include projects for the upstream sector, i.e. to increase participation in satellite manufacturing. Needless to say, such steps have already been taken by Polish companies without waiting for the implementation of the government strategy.

▼ The umbilical release mechanism (URM) for the ExoMars rover provides an electrical connection between the Rover and the Lander Platform during the launch, cruise, entry, descent and landing phases of the mission



Sener Group



◀ ESA, acting on behalf of the European Commission, signed contracts with four consortia, including Poland's Creotech Instruments, to build Copernicus Data and Information Access Services (DIAS) platforms in December 2017.

Among the most ambitious, are SatRevolution, which intends to build a small satellite factory, and Creotech Instruments which is at the advanced stage of completing a clean-room facility. Once the latter receives ESA certificates in space-qualified electronics assembly, it will become a unique facility of this kind in Central-Eastern Europe, and in Europe in general.

Law and industry risk allocation

Last but not least are the regulatory challenges. Poland still has not adopted comprehensive space legislation although in July 2017 a draft law on space activity and the national space objects register was published by the government. While enacting a space law is undoubtedly an obligation for Poland as a state party to the Outer Space Treaty, more important is that the legal regulations are a significant factor in the risk management process, both for the State and for the national space industry as a whole.

Enacting a good space law could help Polish enterprises pursue the fascinating journey into outer space. One condition for that, however, is identifying the most precise way possible of imposing obligations within the field of risk management, together with a sense of flexibility so as not to impose too burdensome impediments for the emerging industry.

The Polish draft, in the shape presented so far, seems to be quite minimalistic, not properly

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considering the fact that the Polish space sector consists of manufacturers and not launch operators. Liability rules could take this into account, reducing the risk of potential liability and thus enhancing the industry from a legal point of view.

It would be a pity if the potential represented by Polish technical abilities is handicapped by formalities. It is not 'rocket science' to suggest that, in this case, the law should not indicate the path to be taken but should rather follow the one already being taken by technology and the industry itself. ■

About the author

Katarzyna Malinowska PhD is an Assistant Professor at Kozminski University, Warsaw. An expert in insurance and space law, she holds an honours degree from the Faculty of Law and Administration at Warsaw University and post-graduate degrees in Poland and overseas. She has published and co-authored several books including *Space insurance: International Legal Aspects* (Kluwer International, 2017) and numerous articles on insurance and space law and practice. Katarzyna is attorney-at-law and a partner in BMSP Legal Advisors law office in Warsaw, as well as Chairperson of the Polish section of AIDA (Association Internationale de Droit des Assurances).