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# Central European Rotation Group Space Regulation and Activities

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Representative of Poland on the ICAO Council

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- **About CERG**
- **States Agencies and their activities:**
  - Bulgaria
  - Czech Republic
  - Greece
  - Hungary
  - Lithuania
  - Romania
  - Slovakia
  - Slovenia
  - Poland
- **Conclusion**

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- **About the Central European Rotation Group (CERG)**

- The Central Rotation Group was first created in 2002 between four States, Czech Republic, Hungary, Romania, and the Slovak Republic.
- CERG Objective is to cooperate closely to enhance the respective member states representation on ICAO Council, as well as other ICAO bodies.
- The representing State is elected for a period of three years correlating with the Assembly triennial.
- Since 2002, more states have joined, with Poland joining in 2009. And Greece and Lithuania joining in 2014.
- Currently the Group membership is made up of nine (9) States.





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# BULGARIA

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- **In 1972, after the launch of first Bulgarian equipment P-1, Bulgaria became the 18th space-faring nation**
- **The Space Research and Technology Institute at the Bulgarian Academy of Sciences (SRTI-BAS),**
  - Bulgarian Aerospace Agency (BASA) known as the Space Research Institute or SRI, founded in 1969, is one of the oldest space agencies in the world.
  - Formally established on 1 March 1987 (Resolution Nr-21/03.03.1987 of the Council of Ministers) based on the Group of Space Physics at the Presidium of the BAS (1969),
    - later evolved into the Central Laboratory for Space Research (1975).
  - **SRI-BAS contributes to the development of:**
    - hardware and software products for scientific equipment on board rockets, satellites, planetary probes and manned space flights.
    - data and image processing and interpretation, as well as in modelling of physical ionosphere-magnetosphere processes.
    - Aerospace control systems; Biotechnologies; Onboard optic range systems; Antifriction materials and covers.
    - Design of aviation and space materials and technologies and their transfer;
    - Nanotechnologies etc



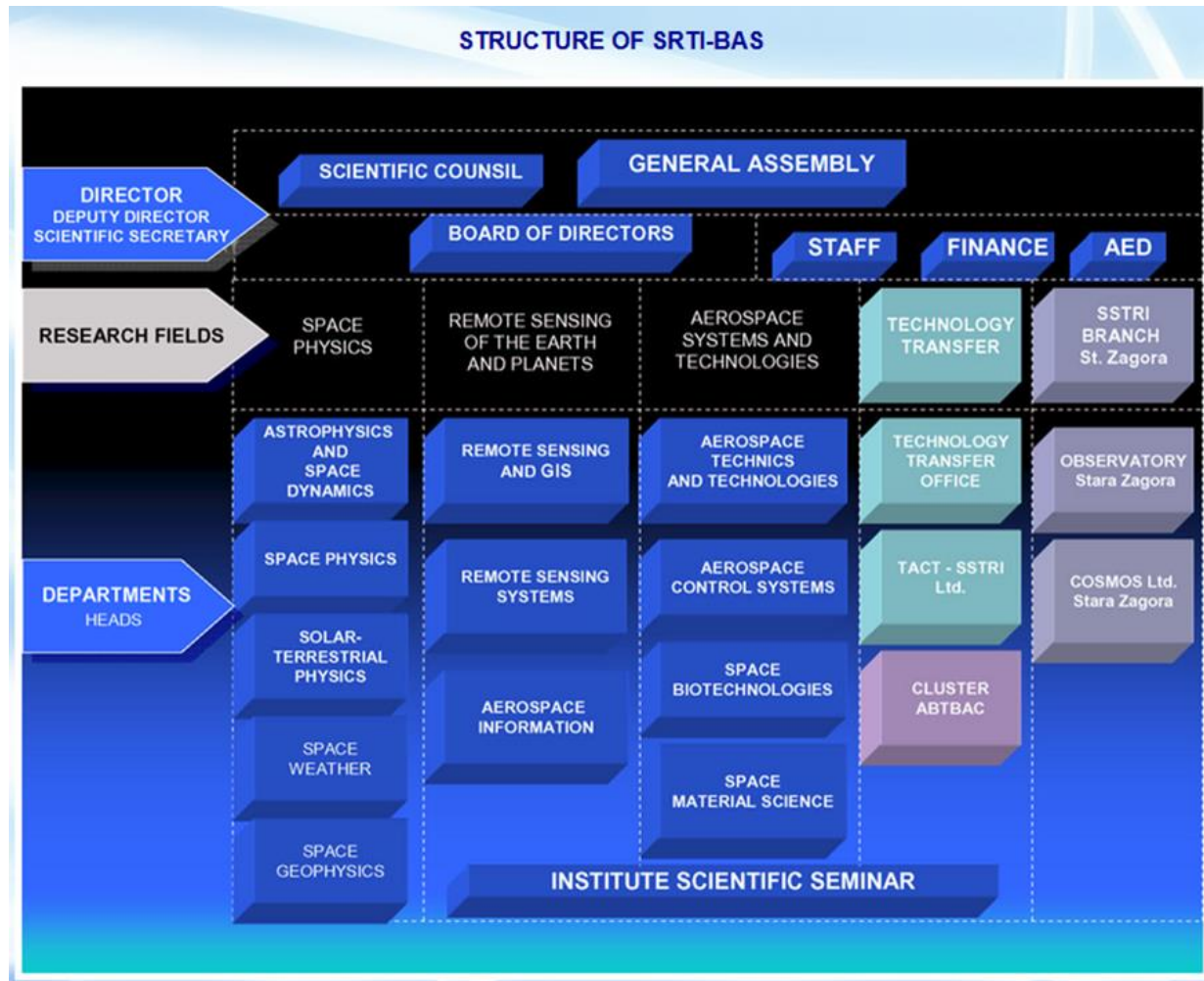
BULGARIAN ACADEMY OF SCIENCES

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- SRTI-BAS was awarded a grant to carry out a project on “Information Complex for Aerospace Monitoring of the Environment” (ICASME).
  - ICASME is implemented with the financial support of the Operational Programme Development of the Competitiveness of the Bulgarian Economy 2007-2013, co-financed by the European Regional Development Fund and the national budget of the Republic of Bulgaria
- ICASME consists of three major structural units, encompassing three major activities:
  - Activity 1 - delivery, installation, and commissioning of Field Measurement Complex (FMC);
  - Activity 2 - delivery, installation, and commissioning of Data Processing and Analysis Laboratory (DPAL);
  - Activity 3 - delivery, installation, and commissioning of Laboratory of Selection, Training, and Control for Operators of Unmanned Aerial Vehicles (LSTC\_OUAV).



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- The Bulgarian Aerospace Agency has also managed to send a man into space, becoming the sixth nation in the world to have achieved this goal, in 1979
- SRTI-BAS is also involved in a multinational project called "OBSTANOVKA", in which six countries participated: United Kingdom, Bulgaria, Poland, Russia, Ukraine, and Czech Republic.
- This project is part of the global programme "Space Weather", for investigation of the influence of solar radiation on humans and technology. It consists of eleven scientific devices, four of which are built at the Space Research and Technology Institute - Bulgarian Academy of Sciences (SRTI-BAS).
- On 12.02.2013 at 00:40 the transport spacecraft "Progress M18M" docked with the International Space Station (ISS), supplying scientific equipment, experiments, and materials to support the astronauts.

- <http://www.space.bas.bg/Eng/Eng.html>





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# CZECH REPUBLIC

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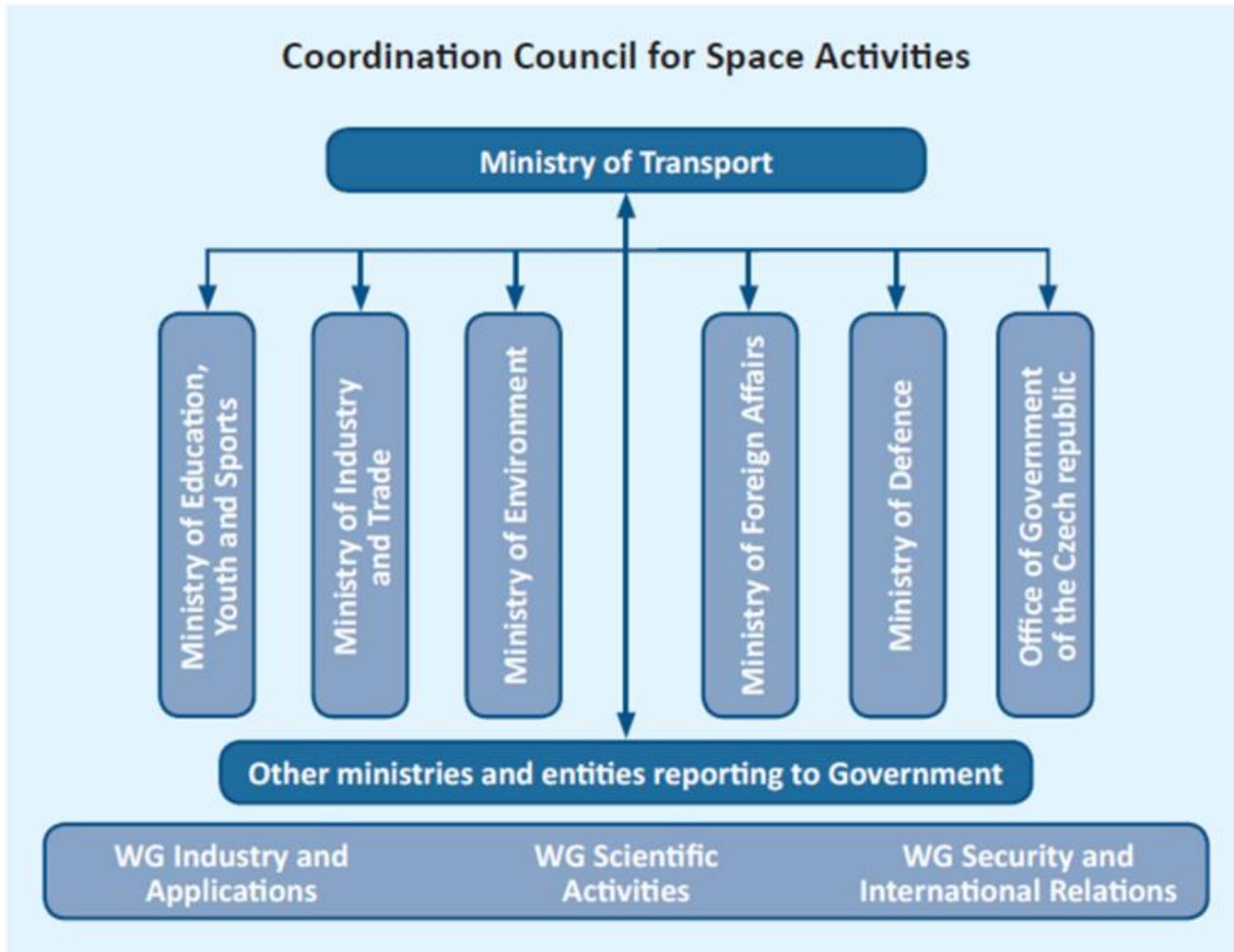
- (Czechoslovakia) – Vladimir REMEK –went into space on the Soyuz 28 on 2-10 March 1978
  - first astronaut from the Central European region and third after RUS and USA
- In recent years, as a result of Czechs accession to the ESA in 2008, a special ESA transitional programme was implemented to create necessary capabilities in the Republic for successful participation in the ESA space activities.
- The Government of the Czech Republic approved on a National Space Plan for 2010-2016. Czech Republic met all evaluation criteria of the NSP 2010 already in 2013, i.e. more than three years before the original deadline.
- The government then on October 27, 2014 approved the National Space Plan for the period 2014 – 2019 (NSP 2014).
  - The NSP 2014, identified long-term vision and mid-term objectives to be implemented by 2016.
- The main objective of the NSP 2014 is to increase the international competitiveness and the technological and innovative level of the Czech Republic.
- The NSP 2014 represents the strategy of the Czech Republic in further development of capacities and capabilities of its industry and academia and in maximising the return of the public investment in space activities.
  
- <http://www.czechspaceportal.cz/en>

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- Before the NSP space activities were unsystematically coordinated by the private non-profit Czech Space Office without clear mandate from the government.
- To achieve tasks created in the NSP, the government entrusted the Ministry of Transport to coordinate all space activities.
- The Ministry then created the Coordination Council of Space Activities and Working Groups
  - This formulated as a step towards forming a national agency.



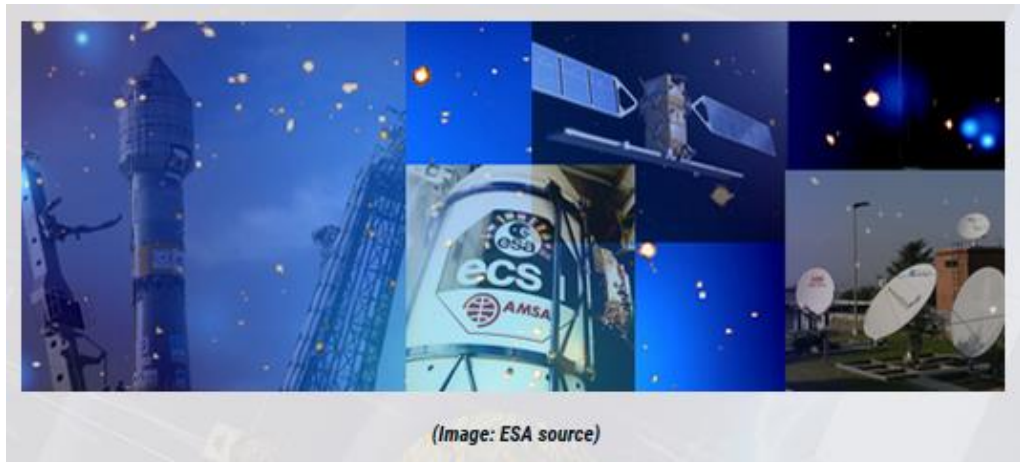
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- The Czech Republic considers space activities as an opportunity for the growth of the national economy. For a long time space activities are not only a scientific discipline but in particular an economic discipline with enormous political, strategic and security potential.
- Already Czech efforts have resulted in:
  - The development of several scientific payloads, sensors as well as scientific satellites.
  - Cooperation with, aside from ESA, Brazil, U.S.A, Canada, and Japan Space agency.
- Czech Republic participates as a Member State in space activities of ESA, EU and EUMETSAT, together with Poland.

– <http://www.czechspaceportal.cz/en>







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# GREECE

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- Greece's national space sector is new, but developing
- Greece does have a National Space Strategic (Greek only)
- Most public space-related efforts in Greece are run through GSRT (Greek General Secretariat for Research and Technology)
- The General Secretariat for Research & Technology (GSRT) is the government agency responsible for strategy and policy making in the space sector, and for funding, coordinating and monitoring all activities related to Greece's space activities and its participation in the European Space Agency (ESA).
- The Greek government's vision is to radically restructure the country's development model by placing emphasis on Education, Research & Innovation and linking research with entrepreneurship



- <http://www.gsrt.gr/central.aspx?slid=11914281108913231488743>



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- The National Council for Research and Technology (NCRT) is the supreme advisory body of the State for the formulation and implementation of the national policy for Research, Technology and Innovation.
  - The Council was established in May 2010 (article 46, Law 3848/2010\*)
- The Council is appointed by and reports directly to the Minister of Education and Religious Affairs.
- The Council's secretariat is provided by the General Secretariat for Research and Technology.
  - The Chairman, vice-Chairman and members of the current Council were appointed by the Minister of Education and Religious Affairs in February 2014.

## National Council for Research and Technology

- <http://www.esek.org.gr/central.aspx?sld=1091344199413231447300&lang=en>

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- **Hellenic Association of Space Industry (HASI) is a non-profit organization**
  - was established in 2008
  - a representative organisation, acting as an intermediary and interface with the public administration, national and international organizations in all matters relating to the Hellenic space industry



- **The Hellenic Space Technologies and Applications Cluster (si-Cluster)**
  - Established in late 2012, as the first-ever cluster of Greek space sector enterprises
  - consists of more than 20 industrial members -including both large businesses and SMEs

- <http://www.si-cluster.gr/en/about-si-cluster/1395-industry-association-hasi.html>





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# HUNGARY

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- The Government of Hungary established the Hungarian Space Office in January 1992:
  - The Hungarian Space Office (HSO) manages, coordinates and represents the Hungarian space activities.
- The Hungarian Space Board (HSB), helps the work of the Minister in strategic cases.
- In 2010 the Hungarian Space Office – keeping its name, image and independence in external relations – was administratively integrated into the body of the Ministry of National Development.
- The research and application activities have been carried out in about 25 scientific institutes and university departments.
- Their personnel, involved in space related work consists of more than 250 scientists and engineers
- Hungary becomes full member of the European Space Agency in the second half of 2015

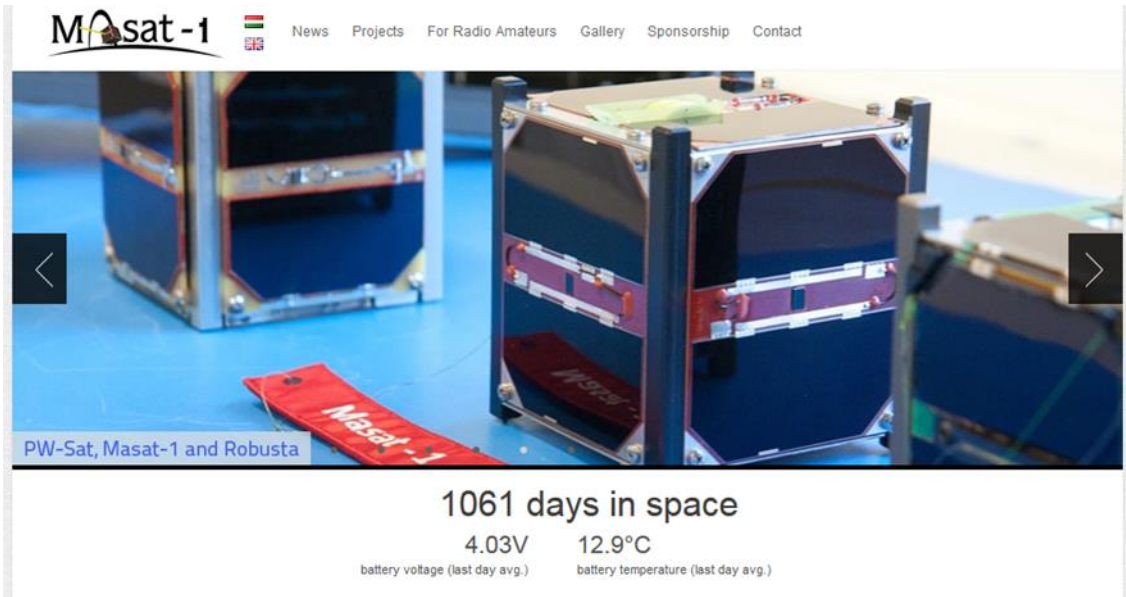
- <http://spacegeneration.org/sgac-regions/europe/hungary.html>






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- The first satellite of the country, the cubesat Masat-1 was constructed by students and young researchers at the Budapest University of Technology and Economy.
  - Hungary's cubesat was successfully launched on 13 February 2012.
  - Its mission was terminated on 10 January 2015 by its return to the atmosphere.
  - as of our knowledge, this is the first cubesat with such long lifetime and continuous operation



The screenshot shows the website for Masat-1, featuring a navigation menu with links for News, Projects, For Radio Amateurs, Gallery, Sponsorship, and Contact. The main content area displays a photograph of the satellite, a red ribbon with the name 'Masat-1', and a status summary:

**Masat-1**  [News](#) [Projects](#) [For Radio Amateurs](#) [Gallery](#) [Sponsorship](#) [Contact](#)

PW-Sat, Masat-1 and Robusta

**1061 days in space**

<b>4.03V</b>	<b>12.9°C</b>
<small>battery voltage (last day avg.)</small>	<small>battery temperature (last day avg.)</small>

- <http://spacegeneration.org/sgac-regions/europe/hungary.html>



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**LITHUANIA**

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- **Space Activities back ground**

- 1753 – one of the oldest astronomical observatories in Europe was founded at Vilnius University.
- George Sabler and Matvei Gusev pioneered astrophysics research (1861) at the Vilnius observatory and installed the world's first photographic solar patrol (1868–1876).
- 1950s–1980s – Lithuanian scientists and engineers widely participated in Soviet space and military industry programmes.
- Lithuanian astronomers resumed activity at the Astronomical Observatory of Vilnius University and actively participated in the satellite observation programme (1957–1964). 1969 – the Molėtai Astronomical Observatory was founded (main instrument—165 cm reflector).

- <http://space-lt.eu/en/>



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- Space Policy of Lithuania are numerous and constantly being updated as the activities increase and the space technological needs change.
  - Lithuania is also part of ESA therefore abiding to EU Space regulations.
  - Government of the Republic of Lithuania in 2010. 12 May. Approved the Resolution No. 567 on research, technology and innovation in the field of space development
- **R&D and Innovation Policy of Lithuania**
    - The implementation of the National Lisbon Strategy Programme in Lithuania is carried out in the field of R&D and innovation by the Ministry of Education and Science and the Ministry of Economy.
      - EU structural support implemented through the Framework National Research and Science and Business Cooperation Programme (FNRSBCP),
      - Researchers' Career Programme (RCP), and
      - Framework National Integrated Programme amounts to 587 million euro for the period of 2007–2013



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- **Lithuanian Space Association**

- Lithuania government also carries out space activities by funding or supporting efforts of non profit organizations, academic institutions and more.
- Since 2009, the Lithuanian Space Association (LSA) connects business organizations, academic and research institutions.

- **The main objectives and tasks are:**

- Fully promote and support the Lithuanian education, research and innovation as well as other socially beneficial activities in space;
- Coordinate National space technology platform and the National space technology cluster activities and develop, consolidate the Lithuanian science and business sectors in space;
- International integration facilities, joining the European space activities, to achieve favorable conditions for the competitiveness of the sector in Europe and in the world.

- <http://space-lt.eu/en/>



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- Since its inception, the Association has become the Lithuanian space sector consolidator and the overall coordinating structure, affecting public policy in this field and promoting a fully-fledged space industry.
- In late 2013, the first Lithuanian satellites Lithuania SAT-1 and LitSat-1 was to be launched into space.
  - The satellite “LitSat-1” was created by the Space Science and Technology Institute established by the Lithuanian Space Association (LSA) and KTU.
  - The project “LituanicaSAT-1” is a nano satellite driven by the efforts of young space entrepreneurs



- <http://space-lt.eu/en/>





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**ROMANIA**

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- Romania's Goliat Satellite was launched on the inaugural flight of the ESA VEGA launcher in February 2012
- The Romanian Space Agency (ROSA) is the coordinator of Romania's national and international space activities.
- ROSA was established in 1991 and reorganized by Government Decision in 1995 as a public institution entirely independently funded, under the authority of the Ministry of Research and Technology (now the Ministry of National Education).
- Romanian Space Agency has four major objectives:
  1. to coordinate national space research and applications programs
  2. to promote space development in Romania
  3. to represent the Romanian Government in international space cooperation programmes
  4. to research space related issues at the ROSA Research Center



- <http://www.rosa.ro/index.php/en/rosa-home>

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- As a coordinator of national space research and applications programme, ROSA designs and coordinates the implementation of the National Space Programme.
  - Following its objectives, the Agency is authorised to establish research and development centers.
- As the representative of the Government, ROSA established cooperation agreements with international organisations such as the European Space Agency (ESA) or the Committee on Space Research (COSPAR), as well as bilateral cooperation agreements at governmental level.
- Together with the Ministry of External Affairs, ROSA represents Romania at the sessions of the United Nations Committee on the Peaceful Use of Outer Space — COPUOUS and its sub-committees.



- <http://www.rosa.ro/index.php/en/rosa-home>

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- **Space Subcommittee on the Romanian Parliament**
  - Romania approved Law no. 262/2011 – a legal tool which provides national support for implementing the Agreement between Romania and the European Space Agency (ESA) on Romania's accession to the ESA Convention.
  - After, Romania created the Space Subcommittee on the Romanian Parliament in 2005.
  - The objective of the Space Subcommittee is to harmonize the space national legislation with the European one.
  - In addition, the role of the Subcommittee is to represent the Romanian Parliament in the space group of the European Parliament, attending meetings and conferences in this field.



PARLAMENTUL ROMÂNIEI



- <http://www.rosa.ro/index.php/en/rosa-home>



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**SLOVAKIA**



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- **Slovakia**

- A cooperating State agreement between ESA and Ministry of Education, Science, Research and Sport of the Slovak Republic was signed in February 2015.
- Slovakia is involved in ESA activities through other ESA Member States' participation.
  - The Slovak Institute of Experimental Physics (an institute of The Slovak Academy of Sciences), has worked on Rosetta, BepiColombo, Venus Express and Double Star with the National University of Ireland.
- The Slovak Academy of Sciences is participating in the IMPRESS project. This activity has been co-funded by the EC and ESA.
- Slovak Organisation for Space Activities is a non-governmental organization which popularizes space research in the Slovak Republic with projects such as:
  - skCube – first Slovak satellite, planned to be launched in 2016
  - skRocket - suborbital rocket



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# SLOVENIA





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- **Slovenia**

- Has a longstanding involvement in astronomy and space science.

- Herman Potočnik, pseudonym Hermann Noordung (1892–1929) was a Slovene rocket engineer and pioneer of astronautics (detailed design of space station)

- During the coming years, Slovenia will define with ESA the specific areas and projects for cooperation, and the budget for the next five years.

- Its major participation will be in ESA's Science and Robotic Exploration programme

- **The Slovenian Centre of Excellence for Space Sciences and Technologies, SPACE-SI**

- established by a consortium of academic institutions, high-tech SMEs and large industrial and insurance companies in order to take advantage of the benefits of small satellite technologies and applications in Earth observation, meteorology and astrophysics. The RTD activities of SPACE-SI are focused on high resolution interactive remote sensing and formation flying missions.



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**POLAND**



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- **History**

- Polish interest in space reaches back to the turn of the 15th and 16th centuries. The most prominent scientific figure of that time was Polish astronomer Mikołaj Kopernik (1473-1543), whose work “On the Revolutions of the Heavenly Spheres” depicted the heliocentric model of our planetary system in great detail. It began one of the greatest scientific revolutions in the world - the Copernican Revolution.
- A century later the astronomer, mathematician and constructor of astronomic instruments, Jan Heweliusz (1611-1687), lived and worked in Gdańsk. His regular observations of the sky resulted in a series of landmark astronomical studies. The same period saw Kazimierz Siemienowicz (1600-1651), an engineer and artillery theoretician, develop the basis for multistage rocket construction.

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- **20TH AND 21ST CENTURIES**

- The beginning of Polish engagement in space flights was related to the participation in the international programme Interkosmos, based on collaboration with the Soviet Union. The first Polish research device, whose task was to measure solar radiation, was sent into orbit on board the satellite Kopernik-500 (Interkosmos-9) in 1973.
- Three years later the Space Research Centre of the Polish Academy of Sciences was established as a research entity focused entirely on exploring space and developing space technologies. In 1978, the first and to date the only Polish astronaut, Mirosław Hermaszewski, travelled into space on board the spaceship Soyuz-30. The aim of this 8-day mission was to carry out experiments in the Soviet space station Salut-6. It was also in the 1970s that practical use of satellite imagery and satellite communication was initiated in Poland for the first time.





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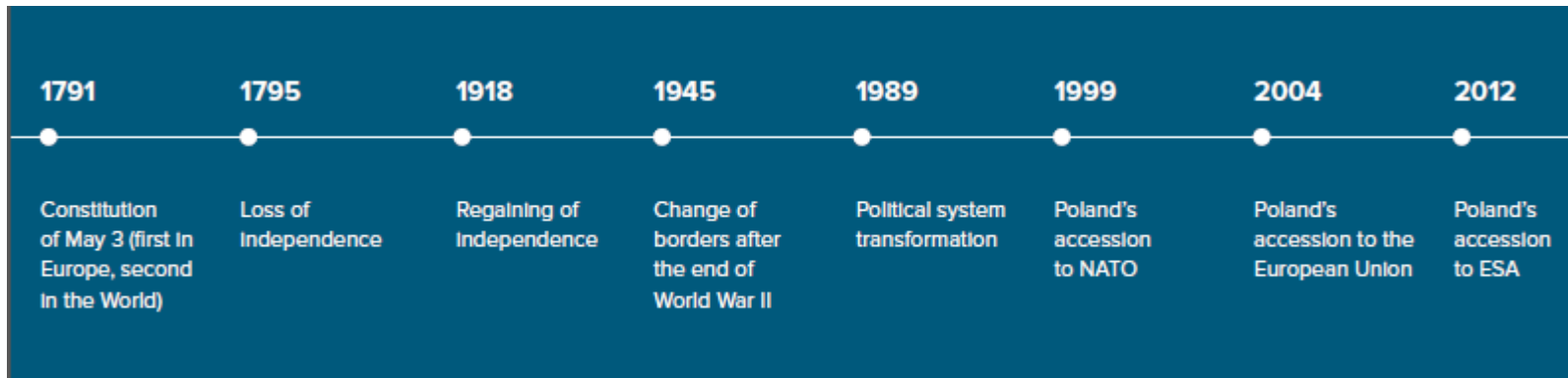
- **20TH AND 21ST CENTURIES**

- Geopolitical and political changes after 1989 enabled Poland to collaborate with countries from outside the former Eastern Bloc. In 1994, Poland signed a cooperation agreement with the European Space Agency covering exploration and use of outer space for peaceful purposes; the agreement was later extended in 2002. This agreement allowed Poland to participate in the ESA's scientific programmes, which resulted in the presence of Polish instruments on the majority of the Agency's research missions – Cassini-Huygens, Integral, Mars Express, Rosetta, Venus Express and Herschel. Meanwhile, the first private Polish companies offering services based on satellite technologies emerged.
- The beginning of the 21st century witnessed even closer collaboration between Poland and ESA. In 2007, the Plan for European Cooperating States (PECS) was signed. Thanks to PECS Agreement, 45 projects were financed for the total amount of 11.5 million euro. They were implemented by Polish companies, scientific and research entities and higher education institutions in cooperation with ESA. At the same time the number, quality and advancement of products and services based on satellite technologies, made available on the market by Polish companies, increased significantly.

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- **20TH AND 21ST CENTURIES**

- In November 2012, Poland became the 20<sup>th</sup> member state of the European Space Agency, contributing about 30 million euro annually. This paved the way for Polish companies and research institutions to faster develop space and satellite technologies by providing them with the possibility of full participation in most of the Agency's programmes.



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- Space sector has developed within the last 20-30 years, gaining a lot of experience.
- Entities in Poland participating in space include:
  - numerous research centers,
  - several research groups at universities, and
  - dozens of small and medium-sized enterprises.
- These entities, in turn, take the projects related to the techniques of satellite or space technology, to progress Poland's space activities.
- On 22 June 2012, the Polish Council of Ministers adopted the "Action Programme for the development of space technologies and the use of satellite systems in Poland"
  - prepared by the Interdepartmental Working Team under the leadership of the Ministry of Economy.



MINISTERSTWO  
GOSPODARKI







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- **The seven(7) Ministries involved are:**
  1. Ministry of Economy - is the leading resort in the implementation of the policy Polish space, represents Poland in the European Space Agency and forums devoted to space policy in the European Union,
  2. Ministry of Science and Higher Education - responsible for research (including the 7th Framework Programme, Copernicus program (formerly GMES - Global Monitoring for Environment and Security)),
  3. Ministry of Administration and Digitization - responsible for the Galileo program
  4. Ministry of Interior - responsible for one component Galileo, ie. The service PRS (Public Regulated Services) and The Governance aspects of the crisis,
  5. Ministry of Defense - responsible for the military
  6. Ministry of Foreign Affairs,
  7. Ministry of Environment, Ministry of Infrastructure and Development and the Ministry of Agriculture and Rural Development.

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- The Space Programme is still in the making, to be used as a guide towards supporting the development of the space sector in Poland (both industry and research units) by 2020 upon its completion. In particular to:
  - increase Poland's participation in programs and projects by the European Union and the European Space Agency
  - to enable networking and cooperation with foreign partners,
  - To facilitate technology transfer within Poland and internationally, and
  - the development and implementation in the economy and public administration of new and innovative solutions based on satellite techniques.



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- The Polish Space Act is also being developed. Governmental Legislation Body created by the Prime Minister is in process to consult the terms among ministries and involved entities.
- This Polish Space Act would be the first of its kind in Polish history
- **Reasons for Space Act**
  - to implement the international treaties into Polish legislation
  - increase the number of Polish activities in the field of use of airspace
  - Establish the Polish Space Agency
  - Establish a registry of space objects
  - To resolve issues of liability



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- The objectives will be implemented through the main operational objectives, which are:
  1. Development of Polish cooperation with the European Space Agency,
    - in particular the Poland is a full membership in ESA.
  2. Polish participation in EU programs, including in the projects of the European Defence Agency.
  3. The establishment of a coordinating organizational structure Polish space activities.
  4. Develop and implement a national program for the space sector.
- In order to coordinate Polish space activities with ESA the Prime Minister issued Order No. 102 of 16 November 2012 (MP of 16 November 2012) establishing a subsidiary body - the Interdepartmental Group on Space Policy (IGSP) in Poland.
- The Interdepartmental Group on Space Policy is made up of secretaries and undersecretaries of State of the seven (7) ministries involved in space activities.
- IGSP is the most important governing body responsible for the development of space policy in Poland, and also:
  - coordinates the actions of governmental administration in the field of space activities and makes key decisions, including those of a financial nature.



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- **The Act aims at helping to develop the Polish space sector**
  - First part of the Regulation (Act) would have definitions of the following issues: object, launching state, registration state, registers, public and private entities
  - The Act determines the body responsible for internal registry of space object- Polish Space Agency (PSA)
  - PSA would be responsible for:
    - Administration and granting the authorization of launching objects
    - Registration of objects
    - Notifying the Secretary General of the UN of launched objects
  - Poland's liability and jurisdiction laws would be as according to the international law on the activities in outer space over.



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- **Liability**

- The special convened Commission would examine the damaged done by Polish space object to Polish and foreign property.
  - This commission would examine the case (with analogy to the commission examining aviation accidents according to the in Aviation Act) , without prejudice, concerning guilt and liability.
- The Act will encompass the sanctions and penalties in situations of breaking national and international law
- The rules and procedures of this commission would be executed by the President of the Polish Space Agency.
- The regulation would state the structure of the Commission and its activities and cooperation with experts.

- **Regulations on insurance**

- Obligatory for private entities regardless of whether activity is carried out for private or government purposes.
- The details (with analogue to the Polish Aviation Law) concerning the liability and sum of compensation would be contained in a separate regulation with more details.
- In cases when the activity would serve the public (researches, education etc) the entity is exempted from obtaining insurance, while the full obligation would be the responsibility of the government.



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- **Poland Space Agency (2014):**
  - Fosters the development of entrepreneurship in the space sector,
  - Promotes Polish companies and Polish technologies,
  - Serves as a point of contact for entrepreneurs interested in space activities in Poland.
  - Composition is as follows:
    - One president and two vice-presidents (one of them will be responsible for science the second for defence)
    - Council (governing and consulting body for the President)
      - consists of representatives of ministries, science and industry.
      - The Act provides in detail the procedure of electing and managing, financing etc.





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- **Poland Space Agency objective are:**
  - Develop and further Polish research on space technology for civil and military purposes, science, economic reasons
  - Initiate and follow direction on space programs and developments of crucial interest for public
  - Create a Space Policy in accordance with International and European Law and Policies
  - Cooperate with European Space Agency, European Defense Agency, and EUMETSAT
  - Represent Poland on international Space fora
  - Inform the public (education role) on space
  - Regulate space activities with other government bodies
  - Prepare analyses and opinions on commercial use of airspace and for military purposes
  - Provide and monitor the Polish registry on space objects
  - Undertake the promoting of the activities of the Polish space sector and science abroad
  - Undertake activities relating to the security of the country in the defense sector, by using satellite to monitor and carry out surveillance,

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- **To assist Poland in meeting its duties in the agreements with EU and EU based organization, Poland created the Polish Task Force (Task Force).**
  - This Task Force works with the ESA-Task Force,
  - Particularly in the area of work on the procedures and monitoring disbursement of funds by ESA contracts with Polish entrepreneurs and organizing activities aimed at promoting the Polish space sector by attracting industrial research projects in order to ensure the optimal spending of Polish mandatory contributions.
  - Team's tasks include the evaluation of proposals to support the Polish entities.



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- **Polish invention and space achievements**
  - As part of the Polish-Canadian-Austrian program, Bright Target Explorer (BRITE) created the first two Polish scientific satellites.
    - The two satellites, Lem (launched in 2013) and Heweliusz are nano type satellites, weighing less than 10 kg.
    - Their task is to study the biggest and brightest stars in our galaxy in order to better understand their internal structure
  - Company Creotech Instruments has developed for the project -gamma-ray bursts "Pi of the Sky," series of CCD cameras allowing fast processing and analysis of data.
    - The network of robotic telescopes enables the observation of a large area of the sky, and can also be used for detection and monitoring of space debris.
  - Company Piktime Systems designs and builds precision time receivers that allow you to compare the signals of GPS satellites, and then designate the difference between indications of their clocks.
    - The solutions Piktime Systems laboratory uses time control ground station main European satellite navigation system Galileo in Italy (Galileo Control Centre, Precise Time Facility).



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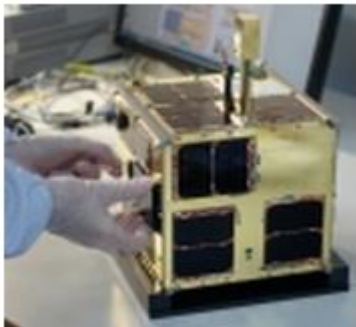
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- Polish companies offer a wide range of services based on an analysis of satellite images. Products available include.
  - analyze the development of urban areas for planning,
  - analysis of changes in the environment
  - variety of maps to support forestry management
- Poland is beginning to use satellite images to assess the risks, planning activities, and evaluating surface damage.
  - In Poland, the Crisis Information Centre was established, which provides operational support to the emergency services and disaster management institutions in the use of satellite technology.
  - An example is the action of surveillance and helping areas recover the effects of the floods in 2010.
- Polish Automap satellite navigation system has gained popularity due to the integration of different satellite techniques. The system uses maps, which are regularly updated by the discovery of new buildings in satellite images.
- Polish companies offer services in the field of precision agriculture, providing solutions to assess local growing conditions and tools for their optimization..

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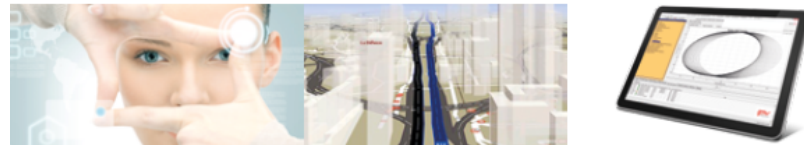
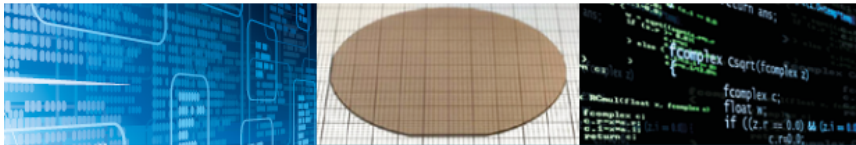
- **Ongoing Space Projects**

- “Drives plasma TV” is a jet engine that would be developed to ensure the stabilization of satellites enabling mobility and modification.
  - change the orientation in space, and
  - in the case of long-range space probes to ensure the required speed gain (DV) in a cost-effective manner possible
- The Institute of Plasma Physics and Laser Micro in Warsaw KLIMT project
  - March 2013, the project received funding from KLIMT ESA,
  - aims to produce satellite plasma engine power not exceeding 0.5 kW, optimized to work with krypton.



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## Polish Companies with Space elements



### ADAPTRONICA

The company conducts research and provides services and products in intelligent technologies.

Its offer includes technical condition monitoring systems, piezoelectric actuators, calculations using MES software, consultancy regarding technical diagnostics of machines and devices. The company operates in the safety engineering sector. The company's research sectors include intelligent sensors and actuators, adaptive impact energy diffusion and construction vibration attenuation. One of the company's activity areas is development of technologies for improving small aviation safety.

Since 2008, it has operated as a spin-out company, originating from the Institute of Fundamental Technological Research of the Polish Academy of Sciences.

**SME**

www.adaptronica.pl  
ul. Szpitalna 32  
05-092 Lomianki

### AMMONO

The largest producer of gallium nitride (GaN) in Europe.

The company specialises in semiconductors. Based on its own patented technology, the company develops the production of gallium nitride substrates and exports them abroad. The materials produced are characterised by the highest quality worldwide. The main applications of gallium nitride are in high-power and high-frequency transistors, lasers and light emitting diodes (LED).

Polish company established in 1999.

**SME**

www.ammono.com  
ul. Strużañska 8  
05-126 Stanisławów Pierwszy

### ASSECO POLAND

The largest IT company in Poland, listed on the Warsaw Stock Exchange. The parent company of international group Asseco has associated IT companies operating in Europe, Russia, Israel, the United States, Canada, Japan, Georgia and South Africa.

Asseco specialises in software production and development. It provides and implements integrated, comprehensive solutions for the banking sector, insurance companies, energy sector, telecommunications, health care, local governments, agriculture and uniformed services.

In 2012, the Asseco group was ranked in the top ten of the "TOP 100 European Software Vendors".

**LARGE COMPANY**

www.asseco.pl  
ul. Olchowa 14  
35-322 Rzeszów

### CUBE.ITG

IT firm creating and implementing the most effective and innovative solutions in their class.

CUBE.ITG works closely with universities and research institutes in order to compose its own products and services for the space sector, which are to become the basis for the development of future space programmes. Based on constantly developing experience, the company aspires to become the leading provider of services in BigData management, robotics and efficient data processing and analysis.

**LARGE COMPANY**

www.cubeitg.pl  
ul. Wołowska 6  
51-116 Wrocław

### GEOSYSTEMS POLSKA

The company specialises in spatial information, technologies for its acquisition, processing, analysis and presentation.

Research and development activity of the company focuses on finding new applications for satellite tele-detection and photogrammetry, multi-source data fusion and development of spatial information systems. GEOSYSTEMS Polska has the largest and most up-to-date spatial data for the country.

The company is a co-producer of the most popular car navigation system in Poland, Automapa, and map portal Targeo.pl, which allows the user to observe current road traffic congestion.

The company was established in 1995. It operates in the area of geoinformation technology and satellite tele-detection.

**SME**

www.geosystems.pl  
ul. Smolna 38/5  
00-375 Warszawa

### GMV INNOVATING SOLUTIONS

The company provides innovative IT solutions for the space sector in the upstream and downstream segments.

GMV offers solutions in the areas of: systems and applications based on global satellite navigation, flight dynamics systems, satellite real time supervision and control systems, space mission analysis and planning systems. GMV provides software for managing on-board systems and payload data, creates attitude and orbital control systems (AOCS), guidance, navigation and control systems (GNC) and IT systems for research operations centres. The company offers a wide spectrum of IT solutions in the area of satellite communication, mission simulation and test station software.

**EUROPEAN INVESTMENT IN POLAND**

www.gmv.com  
ul. Hrubieszowska 2  
01-209 Warszawa



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## ASTRI POLSKA

Joint-venture company, established jointly by European concern EADS Astrium and the Space Research Centre of the Polish Academy of Sciences.

It specialises in electronics, optoelectronics and projects in the areas of: GNSS, satellite observations, telecommunications and robotics. It offers integrated satellite applications combining localisation, observation and telecommunication technologies.

Applications provided by Astri Polska are used in crisis management, spatial planning, environmental protection and precise agriculture. The company has implemented the space technology transfer programme in Poland and participates in eight research projects of FP7 and a number of ESA projects.

EUROPEAN INVESTMENT IN POLAND

www.astripolska.pl  
ul. Tamka 3  
00-349 Warszawa

## ASTRONIKA

The company specialises in constructing space mechanisms and structures.

The products offer includes Lock&Release devices, an ultralight extended antenna systems and innovative solutions for mechanisms for the exploration of other planets. The company designs, constructs, integrates and tests space mechanisms. It also constructs satellite devices from prototype to flight models.

Astronika is a spin-out company established by engineers with extensive experience in the construction of innovative research instruments for the purposes of international space missions.

SME

www.astronika.pl  
ul. Bartycka 18A  
00-716 Warszawa

## BCM LOGIC SOLUTIONS

The company specialises in providing support tools to large, medium and small businesses, facilitating Business Continuity Management of their organisations in real time.

Its products aim to improve business-IT cooperation in a company as well as project portfolio management.

The company, established in 2011, operates in the IT and consultancy sector.

SME

www.bcmllogic.com  
ul. Grzybowska 80/82  
00-844 Warszawa

## CREOTECH INSTRUMENTS

The company designs and provides complete products in the following areas: time synchronisation systems, M2M systems, digital camera systems, measurement systems and power supply systems.

Creotech is currently undertaking a contract for the installation of a power supply unit in an instrument to be installed on the International Space Station. In the near future, the company will focus on the further development of specialised digital cameras and new generation computers for space missions.

The company was established in 2008 by three former employees of CERN, the European Organization for Nuclear Research.

SME

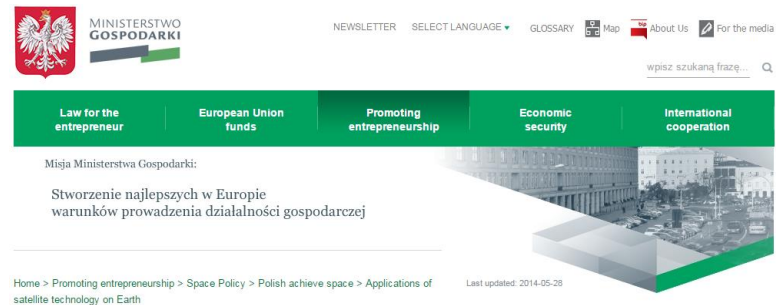
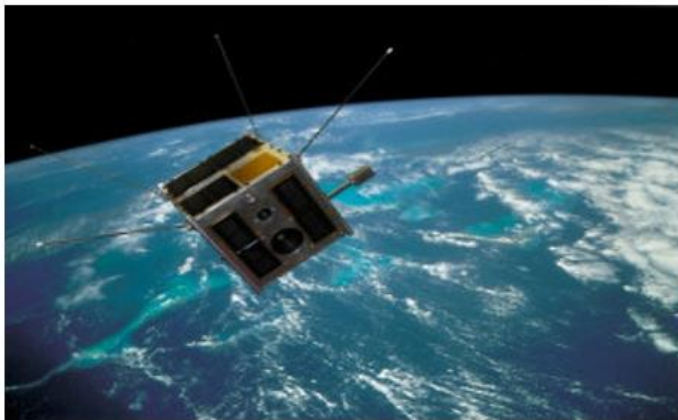
www.creotech.pl  
ul. Gen. L. Okulickiego 7/9  
05-500 Piasieczno



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## For more information regarding Poland's space activities visit:

<http://www.mg.gov.pl/>





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# THANK YOU

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