Working together—
New Perspectives for Industry Co-Operation

French - Czech Space Industry Day
Paris, 12th June 2015

In collaboration with

Ambassade de la République tchèque à Paris
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Czech Rep. – Companies Profiles
5M s.r.o.

<table>
<thead>
<tr>
<th>Company Name:</th>
<th>5M s.r.o.</th>
<th>Dimension:</th>
<th>200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact person:</td>
<td>Richard Pavlica</td>
<td>Turnover (in Millions of Euros)</td>
<td>9.7 M€</td>
</tr>
<tr>
<td>E-mail:</td>
<td><a href="mailto:richard.pavlica@5m.cz">richard.pavlica@5m.cz</a></td>
<td>Member of a Trade Association</td>
<td>Czech Space Alliance</td>
</tr>
<tr>
<td>Mobile:</td>
<td>+420 731616350</td>
<td>Tel. office:</td>
<td>+420572433711</td>
</tr>
<tr>
<td>Website:</td>
<td><a href="http://www.5m.eu">www.5m.eu</a></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Company Profile:
5M s.r.o. is Czech owned company, which was founded in the year 1992. 5M specializes in customer tailored applications with application of technologies used for modern composite part production (e.g. pultrusion, RTM, out-of-autoclave processes). 5M has 200 employees and distributors in many European and Asian countries. Quality assurance is managed by Integrated system of quality management, which include certification of ISO 9001:2009, DIN6707 and POA. The customers for the products of the 5M company are manufacturers of:

- aircrafts (interior panels and structural joints)
- rail vehicles and their accessories
- road vehicles (buses, transport and passenger vehicles)
- electrical equipment and components
- textile and printing machines
- sporting goods (skis, hockey sticks, kayaks, paddles, masts for boats)
- model airplanes
- trolley lines
- construction companies (reinforcing structures)
- realization of scientific projects and their transfer to manufacturing processes (ESA projects, optics for radiotelescopes, composites with piezo-ceramic, thermal expansion casting systems for space)

Practically all products of 5M are based on our own research and development department, to which company invests about eight per cent of its annual turnover. The R&D department is involved in particular in the development of new types of epoxy adhesives, laminating systems, pultrusion composite profiles, RTM composite parts and sandwich-bonded structures. 5M has a wide experience with project management of different project types - EU 7FP projects, ESA projects, national grants or commercially-based projects, for example:

**5M Composite Technology Evaluation**
Project supported by ESA with TAS France in prime contractor role, 2013-2015.

**Technology Development of Flexible Tape Spring Boom for Large Appendages Deployment**
Project supported by ESA with EADS Astrium as sub-contractor in frame of AO7397 Czech industry incentive scheme, 2013-2015.

**Generic Adhesive for Space Application**
Project supported by ESA with EADS Astrium as sub-contractor in frame of AO7397 Czech industry incentive scheme, 2013-2015.

**Adhesive Bonding of Thermoplastic Composites**
Project supported by ESA with EireComposite in prime contractor role, 2013-2015.

**Design, Manufacturing and Qualification of Mechanical Elements for EUCLID**
Project supported by ESA with TAS Italy and VZLU Prague as sub-contractors, 2014-2016.

**Qualification of Shielding Applied to Structural Panel for JUICE**
Project supported by ESA with VZLU Prague and TTS Prague as sub-contractors, 2014-2016.
<table>
<thead>
<tr>
<th>Design and Qualification of Mag Boom for Juice Magnetometr Experiment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project supported by ESA with Frentech s.r.o. in prime contractor role, 2015-2016.</td>
</tr>
</tbody>
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## CSRC, spol. s r.o.

<table>
<thead>
<tr>
<th><strong>Company Name:</strong></th>
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</thead>
<tbody>
<tr>
<td><strong>Dimension:</strong></td>
<td>SME</td>
</tr>
<tr>
<td><strong>Contact Person:</strong></td>
<td>Marek Šimčák</td>
</tr>
<tr>
<td><strong>E-mail:</strong></td>
<td><a href="mailto:marek.simcak@csrc.cz">marek.simcak@csrc.cz</a></td>
</tr>
<tr>
<td><strong>Mobile:</strong></td>
<td>+420 736 759 933</td>
</tr>
<tr>
<td><strong>Website:</strong></td>
<td><a href="http://www.csric.cz">www.csric.cz</a></td>
</tr>
</tbody>
</table>

| **Turnover (M EUR):** | 0,7 |
| **Member of a Trade Association:** | Czech Space Alliance (CSA) |

### Company Profile

CSRC is a privately owned SME / Ltd. Company situated in Brno and founded in 1994 to develop space technology and standards in the Czech Republic. CSRC main domain of activity is the complex realization of space electronics projects based on electronics design, embedded software and cleanroom manufacturing. CSRC main power consists in the long lasting practice and high technical level of the designers of electronic systems for space purposes proven by a series of successfully operating instruments in many satellites. CSRC scientific and research partner is the Faculty of Electrical Engineering and Communication, Brno University of Technology, with its broad technical background proven by long-term collaborations in many international research projects. CSRC has implemented the ESA ECSS standards related to the electronics design and cleanroom manufacturing activities including the certified system of quality assurance corresponding to ISO 9001:2000 standard. CSRC has been audited by ESA and is an attractive business partner for the aerospace industry.

### Competences & Capabilities

Complex Realization of Space Electronics Projects including **Electronic & Mechanical Design and MAIT**.

### Major Space Projects & References

- Satellite INTEGRAL, PSAC Project (launched)
- Satellite SMART-1, EPDP Project (launched)
- Satellite DEMETER, I/V Converter Project (launched)
- Satellite PROBA 2, DSLP&TPMU Project (launched)
- Satellites SWARM/TEASER, Microaccelerometer (launched)
- Satellites PROBA V, SATRAM (launched)
- SMT Assembly Verification Programme According to ECSS-Q-ST-70-38
- ISS / ACES / European Laser Timing (ELT) Instrument, Design & Manufacturing
- Solar Orbiter – The RPW & STIX Instruments, Manufacturing - Phase C/D
- Space Based ADS-B Payload Development for Air Traffic Surveillance, MAIT Activities
- Space Application of Timepix-Based Radiation Monitor, Design & Manufacturing
- Evaluation of Supercapacitors and Impacts at System Level, Design & Manufacturing
- ELISA – Laser Head - Power Supply and Modulator Driver, Design & Manufacturing
- Retraction System PN312619A, Mechanical Manufacturing
- High Density Connectors Suitability to Space Application, Design & Manufacturing
- Satellite EUCLID, Design of the Euclid SVM Electrical Simulator, EGSE Engineering Study
- ACES ELT Ground Station Calibration, Manufacturing & Project Management

### Other Projects Participation:

ACES ELT, XMM Satellite - EPIC Experiment, TARANIS Satellite, AGILE, MALST, SMART FUEL, METOP, SATELCOM, NODE 3, GOME 2, CLUSTER II, PCDF-CCD H EAD, MONSTER and others...
Space Related Equipment, Labs & Certificates

- Validated Cleanroom (class 100 000), 40m²
- Industry electronics assembly premises, 150 m²
- ECSS Certified Cleanroom Staff according to ECSS-Q-ST-70-08, -70-38, -70-26, -70-28
- ESA SMT Verification Programme according to ECSS-Q-ST-70-038
- ESA Industrial Rates Audit passed in 2010 and in April 2014
**Company Name:** evolving systems consulting s.r.o., an esc Aerospace company (ESC)  
**Dimension:** SME  
**Contact person:** Richard Sysala  
Managing Director (esc Prague)  
**Turnover (in Millions of Euros):** EUR 13M5 (2013, esc Group)  
**E-mail:** richard.sysala@evolvsys.cz  
**Member of a Trade Association:** AFCEA, AIAA, DTIHK, Czech Space Alliance, Czech ICT Alliance, ITS&S  
**Mobile:** +420 604 347 014  
**Website:** www.esc-aerospace.com  
**Tel. office:** +420 284 683 784

### General description

ESC is a leader in the field of on-board software in the Czech Republic and one of the leading Czech SMEs in innovative R&D projects with a focus on aerospace. ESC is experienced also in other areas like custom embedded systems for industrial automation, PLC technology, data transmission and microwave high frequency applications.

### Competences & Capabilities

Space qualified on-board software for various satellites  
• On-board instruments  
• Software quality  
• Embedded software  
• Real-time software  
• Control systems  
• Navigation  
• RPAS/UAS manufacture  
• UAV/RPAS on-board systems incl. telemetry avionics  
• Software references architecture  
• Hardware design  
• HW/SW development  
• EGSE/SCOE  
• OBCP Buildings Blocks  
• Modeling & Analysis payloads  
• Data processing software  
• Embedded microcontrollers  
• Data transmission  
• Microwave high frequency applications  
• Electrical engineering  
• Performance simulations & Load emulators  
• EO/IR payloads  
• Relay & S&A systems  
• Ionizing radiation hardened detector payloads
**Frentech Aerospace, s.r.o.**

<table>
<thead>
<tr>
<th>Company Name:</th>
<th>Frentech Aerospace s.r.o.</th>
<th>Dimension:</th>
</tr>
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<tbody>
<tr>
<td>Contact person:</td>
<td>Pavel Sobotka Managing director</td>
<td>Turnover (in Millions of Euros)</td>
</tr>
<tr>
<td>E-mail:</td>
<td><a href="mailto:pavel.sobotka@frentech.eu">pavel.sobotka@frentech.eu</a></td>
<td>Member of a Trade Association</td>
</tr>
<tr>
<td>Mobile:</td>
<td>+420 602 790 335</td>
<td>Tel. office:</td>
</tr>
<tr>
<td>Website:</td>
<td><a href="http://www.frentech.eu">www.frentech.eu</a></td>
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</table>

**Company Profile:**

Frentech Aerospace s.r.o. is a producer in the field of precision mechanics in Czech Republic and also in EU. The company takes part in aerospace business from 1997 with deliveries for Airbus aircrafts. Currently parts for all Airbus aircrafts as well as for Boeing 787 and Embraer are produced.

During 2010 and 2011, the company produced and delivered 70 Mirror Assemblies for the project ALMA (ESO) in Chile which works in the range of 110 GHz.

Thanks to acquired know-how and experience gained during production of parts for aircrafts, company started to produce parts for space. In these days we deliver approx. 2000 - 5000 parts for telecommunication satellites (Tesat SpaceCom) per year.

In 2011 Frentech together with Thales Alenia Space realized project “SOLAR ARRAY DEPLOYMENT MECHANISM INDUSTRIALIZATION”, that should verify skills of Czech industry to produce and deliver in series mechanisms for satellites. Final test showed readiness of Frentech Aerospace s.r.o. to deliver such mechanisms.

In April 2012 the company signed contract for delivery of SOLAR ARRAY DEPLOYMENT MECHANISM for the IRIDIUM NEXT project.

In June 2013 the company signed contract for delivery of CRYOSTAT STRUTURE FCI & IRS (MTG)

In January 2015 the company signed contract for DESIGN AND QUALIFICATION OF MAG BOOM FOR JUICE MAGNETOMETR EXPERIMENT.
**Iguassu Software Systems**

<table>
<thead>
<tr>
<th><strong>Company Name:</strong></th>
<th>Iguassu Software Systems</th>
<th><strong>Dimension:</strong></th>
<th>SME, 11 staff</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Contact person:</strong></td>
<td>Petr Bares</td>
<td><strong>Turnover (in Millions of Euros):</strong></td>
<td>0.4</td>
</tr>
<tr>
<td><strong>E-mail:</strong></td>
<td><a href="mailto:petr@iguassu.eu">petr@iguassu.eu</a></td>
<td><strong>Member of a Trade Association:</strong></td>
<td>Czech Space Alliance, Czech ICT Alliance, Canadian Chamber of Commerce in CZ, Oregin</td>
</tr>
<tr>
<td><strong>Mobile:</strong></td>
<td>+420603854477</td>
<td><strong>Tel. office:</strong></td>
<td>+420 2 3535 1000</td>
</tr>
<tr>
<td><strong>Website:</strong></td>
<td><a href="http://www.iguassu.eu">www.iguassu.eu</a> (in reconstruction)</td>
<td><strong>Website:</strong></td>
<td>2 3535 1000</td>
</tr>
</tbody>
</table>

**Company Profile:**

- **The first Czech company to succeed in a tender for Galileo**
  (2005, with INDRA Spain, to develop the Search & Rescue system for GJU)
- **The first Czech contract through ESA international tender**
  (2007 with ACS Italy) and
- **The largest number of wins in international ESA and Galileo tenders of any Czech owned company.**

ISS was established in 1994, and working in space since then, originally through the parent company SciSys. Since 2005 focused on ESA project, with the deepest experience in satnav development, especially SBAS performance, interference and educational tools.

ISS also carried out projects in SSA (robotic telescope testbed), EGSE (Euclid SVME simulator), satcom (Antares/IRIS), EO tools (e.g. scalable catalogue)

Space technologies clients and partners of ISS include ESOC, ESRIN, ESTEC, Airbus Defence and Space - D, TAS – I, TAS – F, Indra, ISDEFE, GMV, ACS, Siemens, EOX.
G.L.Electronic Ltd.

Company Name: G.L.Electronic Ltd.
Dimension: SME

Contact person: Ludek Graclík
Managing Director

Turnover (in Millions of Euros) 2013: 549,000€

E-mail: ludek.graclik@glelectronic.cz

Member of a Trade Association: None

Mobile: +420 737 634 553

Tel. office: +420 511 205 246

Website: www.glelectronic.cz

Short Description of the company/institution:

General information

G.L.Electronic Ltd. (cat. - SMEs) its czech company established in 2003. We draw on many years’ professional experience gained in foreign companies engaged mainly in production and application for Space and Ground technologies. G.L. Electronic has been a qualified company since 2008, which means we have over 6 years experience with providing technical support on the international projects.

ESA bidder code - 58067

Location:

Our company is located in Brno. The capital City of the South Moravian Region in Czech Republic. This city was chosen for very good possibility to closer cooperation with many institutions across scientific field and its strategic geographic position within Central Europe with excellent transport accessibility, including an international airport of Brno and other nearby airports.

- 134km to Vienna airport / 142km to Bratislava airport / 225km to Prague airport

Product and Activities:

We focus on the following main assignments:

HW Design: Design of electronic systems. Hardware design (analogue and digital systems). Software design (data processing) – at the moment provided only by external partners - Academy of Sciences UFA, and with Flextronixs Design Brno

Production: Space hi-rel manufacturing activities especially hand soldering of flight level pcb, complete implementation of bonding and conformal coating, electronic assembly, crimping and final integrations of the external harness .

Measurement & Testing: Rating of the Boards & Final Units, Test Results Reporting. Testing of HW and SW of PCB´s according to the customer’s requirements, including final unit tests.

HI-REL electronic manufacturing for Space activities are performed by ESA certified operators in the 100.000-class cleanroom with the continuous measurement of temperature and humidity - specification (22 °C ±3 °C / 55 % ±15 %).

Quality system:

The company has introduced the quality control system according to the process identification document (PID) & verification plan document (VPD) but also the internal document for the Product/Quality/Assurance PA/QA and Safety plan of the space activities.

Certifications:
Today the team of the company G.L. Electronic consists of professionally qualified ESA trained and certified technicians.

<table>
<thead>
<tr>
<th>Competence in Manufacturing, Services and Measurement &amp; Testing domain</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Capabilities:</strong></td>
</tr>
<tr>
<td><strong>Space segment</strong></td>
</tr>
<tr>
<td>G.L. Electronic is focused mainly in the production of: HI-REL electronics systems for space projects – manufacturing, rework and modifications on the PCB (level EM, EQM, FM) in conformity with the ESA ECSS, both internal cabling and external harness, complete implementation of bonding and conformal coating, quality control-visual inspection, treatment pre MIP boards and pre MIP units.</td>
</tr>
<tr>
<td><strong>Ground Segment</strong></td>
</tr>
<tr>
<td>The team consists of experienced technicians. We are focused primarily on technical support for the complete electrical installation (telephone, audio and video signal, safety (gas leak) and other special applications and individual measurements) and integration of Rack boxes.</td>
</tr>
</tbody>
</table>

**Space relevant projects:**

Cooperation and Activities:

G.L.Electronic has participated in several international projects, mainly with CGS-OHB, THALES ALENA SPACE ITALIA, SITEL, BLU ELECTRONIC, TEMIS, SAB AEROSPACE, LUXSPACE, AGROTEC, CNES, IRAP and ESA.

In Czech Rep. has established cooperation with academic sphere in Prag with Academy of Sciences of the Czech Republic (AV-UFA), Charles University Prague (UK-MFF) department of Surface and Plasma Science/Faculty of Mathematics and Physics and in Brno with Brno University of Technology and Central European Institute of Technology (CEITEC).

**Space segment:**

Manufacturing activities on the following projects:

ASIM, HEXAPOD, EXOMARS, RPDA-EDRMK2, S-GEO, SENTINEL 1, PRISMA, O3B, Globalstar2, BepiColombo-Serena, TARANIS, SOLAR ORBITER, IRIDIUM-Next, EMAP, AMS-PDS 02, SENTINEL 1, 4M, ISSPRESSO.

HI-REL manufacturing, assembly, rework and modifications on the PCB according to the customer’s requirements, complete implementation of bonding and quality inspections.

Globalstar 2 (GPS), EMAP, S-GEO, HEXAPOD, RPDA-EDRMK2

**Measurement & Testing:** of HW and SW of PCB’s according to the customer’s requirements. Rating of the electronic boards including final integration unit test; all performed tests are analyzed and the results are recorded in the test reports.

Procedures for thermal vacuum and mechanical vibrations tests are considered as a standard part of the design verification process.

**S-GEO - cables for thermal vacuum unit test (EGSE)**

Manufacturing of the cables, according to technical specification and temperature ranges.
Specified for test unit in the thermal vacuum chamber.

**CNES – Solar Orbiter (electronic instruments TDS and SWA-PAS)**

verification process of SMD hand soldering of flight level printed circuit boards manufactured

**AO7397 - call for proposals to Czech industry**

ESA verification process of SMD hand soldering of flight level printed circuit boards manufactured

**AGILE – start 4/2007 (India)**

Technical support of assembly and final integration of the completed FM of external harness and final integration of satellite (integration in Italy)

**Vessel Sat - starts FM1 6/2011(India), FM2 1/2012(China)**

Technical support for design, and assembly, manufacturing and testing of five sets of harnesses (2 sets of FM1, FM2 and 2 sets of coax cables FM) manufacturing in Czech Rep

**LARES - start 2/2012**

Technical support of manufacturing, elect testing and final integration of the completed FM of external harness and final integration of satellite and P-POD for CUBESAT in CSG-French Guiana cooperations with Temis end CGS.

**SSIS – VERTA / VESPA – harness integration start 4/2013**

Manufacturing of the harness for Space vehicle separation system (satellite Proba V), final integrations. Manufacturing of the cables - 2pcs, specified for monitoring satellite during the flight (final integrations in CSG-French Guiana) cooperations with Sab Aerospace end CGS

**4M-(Manfred Memorial Moon Mission)**

Manufacturing of the cables for 4M has been successfully launched on-board a Long March 3 from the Xichang Satellite Launch Centre, China. cooperations with LuxSpace

**Ground Segment:**

*Cooperation on the following projects in Kourou, French Guiana (period 2007-2012)*

**Mangousta - security camera system**

**Vega & Soyuz – Participating in building of launch facilities**

G.L.Electronic provides the company Carlo Gavazzi Space with Telematic Solution with technical support by installations and measuring, control and telecommunication distribution system on the launching pads

More information on website: [http://www.glelectronic.cz](http://www.glelectronic.cz)

**My cooperation interest is particularly on:**

- In the fields focused on activities, in which we already have practical and also international experiences as Subcontractors.
- Design and production of complete electronic devices and cable harnesses
- Service in the area of ground segment of installation integration and service meintance
- Measurement in the area of space and also ground segment
- We would like to be actively involved in the projects for which it is also possible drawdown within
- the scope of geo-return CZ (e.g. EUCLID, JUICE, MetOP-SG, etc.).
# LENAM, s.r.o.

<table>
<thead>
<tr>
<th>Company Name:</th>
<th>LENAM, s.r.o.</th>
<th>Dimension:</th>
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<tr>
<td>Contact person:</td>
<td>Marek Babuska</td>
<td>Turnover (in Millions of Euros):</td>
<td>1</td>
</tr>
<tr>
<td>E-mail:</td>
<td><a href="mailto:lenam@lenam.cz">lenam@lenam.cz</a></td>
<td>Member of a Trade Association:</td>
<td>Automotive Industry Association - AIA CR The Confederation of Industry of the Czech republic</td>
</tr>
<tr>
<td>Mobile:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Website:</td>
<td><a href="http://www.lenam.cz">www.lenam.cz</a></td>
<td>Tel. office:</td>
<td>+420 485 246 900</td>
</tr>
</tbody>
</table>

## Company Profile:

**20 YEARS OF SERVICES FOR INDUSTRIAL TECHNICAL DEVELOPMENT**

Considering that the company LENAM as an engineering company employs entirely graduates, it is capable of solving complex and special problems, especially in the field of:

- Simulations: non-linear materials, composites, multi-physical problems (non-linear material properties, CFD, thermal transmittance, transient phenomena)
- Testing: development of new methods and equipment (machinery)
- Material models: identification of material parameters for FEM software
- Design

## Capabilities:

- Development and design of single-purpose machines, tooling and parts (CAD systems CATIA V5, Creo Elements and SolidWorks)
- Analyses and elimination of design and process defects
- Development and optimisation of subassemblies, machines and processes
- Multi-physical analyses (mechanics/ thermodynamics/ fluids)
- Dynamical simulations of mechanisms (MSC.ADAMS)
- Simulations of tests of crew and pedestrian safety
- Crash analyses (PAM-CRASH, MSC.Dytran)
- Simulations and measurements of gas and liquid flow, CFD analyses
- Development and realisation of special experiments and technical measurements
- Identification of material properties

## Our cooperation interest is particularly on providing:

- Simulations as a support of development – structural dynamics, thermal simulations, fluid dynamics etc.
- Multi-body simulations – influence of clearances, resonances, interaction of the mechanical system with the control system
- Identification of material parameters for FEM softwares (plastics, composites)
- Design and delivery of mechanical parts and assemblies
# L.K. Engineering, s.r.o.

<table>
<thead>
<tr>
<th><strong>Company Name:</strong></th>
<th>L.K. Engineering, s.r.o</th>
<th><strong>Dimension:</strong></th>
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<tbody>
<tr>
<td><strong>Contact person:</strong></td>
<td>Martin Komarek</td>
<td><strong>Turnover (in Millions of Euros):</strong></td>
<td>0.8</td>
</tr>
<tr>
<td><strong>E-mail:</strong></td>
<td><a href="mailto:komarek@lke.cz">komarek@lke.cz</a></td>
<td><strong>Member of a Trade Association:</strong></td>
<td>Czech Space Alliance</td>
</tr>
<tr>
<td><strong>Mobile:</strong></td>
<td>+420 605 282 593</td>
<td><strong>Tel. office:</strong></td>
<td>+420 543 215 681</td>
</tr>
<tr>
<td><strong>Website:</strong></td>
<td><a href="http://www.lke.cz">www.lke.cz</a></td>
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</table>

## Company Profile:

**Short Description of the company/institution:**

LKE has been providing design and detailed analysis in mechanical area for wide range of industrial disciplines for more than 14 years. Providing thermal analysis is a core business in LKE almost every project contain thermal analysis hence experience in heat transfer and thermal analysis is significant in LKE. Since 2006 LKE started to work in space segment working on structural and thermal analysis of micro-accelerometer for SWARM mission. Since that time LKE is involved in space projects regularly in area of thermal and structural design and analysis working with major European space players and CR space industry.

## Capabilities:

- Design of mechanical structure with respect to mechanical, thermal and fluid dynamic environment
- Structural, thermal analysis
- Design of components for Additive manufacturing, ALM
- Design of test rigs
  - development of specialized numerical tools
- Multidisciplinary analysis (FSI)

## Seeking

- Partners for mechanical ITTs
- Additive manufacturing application
SERENUM, a.s.

<table>
<thead>
<tr>
<th>Company Name:</th>
<th>SERENUM, a.s.</th>
<th>Dimension:</th>
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<tbody>
<tr>
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<td>Roman Rybecky</td>
<td>Turnover (in Millions of Euros)</td>
<td>0,8</td>
</tr>
<tr>
<td></td>
<td>Managing Director</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E-mail:</td>
<td><a href="mailto:info@serenum.cz">info@serenum.cz</a></td>
<td>Member of a Trade Association</td>
<td>Association Of The Aerospace Manufacturers</td>
</tr>
<tr>
<td>Mobile:</td>
<td>+420 724391922</td>
<td>Tel. office:</td>
<td>+420 225 115 107</td>
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<td><a href="http://www.serenum.cz">http://www.serenum.cz</a></td>
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</table>

Company Profile: SERENUM, joint-stock company is concentrating on the design, development, testing and production of electronic and mechanic equipment, services for space and terrestrial applications.

**Electronics:**

1. **Inertial & measurement systems:** Capacitive microaccelerometer, Inductive microaccelerometer, Optimal estimator (Kalman filters) design for IMU
2. **Time & frequency control:** Time-to-digit converter, Programmable delay controller, Direct RF signal generation DSP cores, Optimal clock ensembling algorithms, Single-photon counting detectors and timing
3. **Custom electronics design**

**Mechanics:**

1. **Design**
   - Mechanisms a.) Experiences with space applications (Locking mechanisms, HDRM, Front door of coronagraph...) b.) Expert material selection c.) Variant solution in case of complex assemblies
2. **Calculations**
   - Design verification, Composites, Buckling, Dynamics: MBS, Explicit
3. **Tests**
   - Clean room, TV chamber, Vibration, shock devices NDT, Stress/strain measurement, Material
4. **Manufacturing + measurement**

SERENUM cooperation interest is particularly on long terms R & D partnerships, common ESA technology program activities, Horison 2020, Eurostar etc. partners in the following topics: 1.) Design mechanisms 2.) Composites design 3.) Vibration test and calculation 4.) Capacitive / inductive microaccelerometer 5.) Custom design of electronics, digital signal processing (DSP), data acquisition systems, and real-time process control 6.) Analysis, calculation and implementation of controllers, algorithms and estimators in Xilinx and MicroSemi FPGAs or MCU (LEON, ARM) 7.) Precision time metrology, time and clock management, optical time transfer and communication terminal.

**Chosen projects & references:**

- MAG BOOM for JUICE (2015-now): Design and Qualification of a MAG BOOM for JUICE Magnetometer Experiment: HDRM & E-GSE & Engineering
- EGEP-ID89 (2014-now) – Comparison of optical time-transfer links for GNSS. Development of optical time transfer link models, demonstrator and measurement campaign for ESA.
- Qualification of shielding applied to structural panel for JUICE (ITT/AO/1-7809) (2014-now): Vibration and thermal analyses, vibration tests supply
• Design, Manufacturing and Qualification of Mechanical Elements for EUCLID (ITT/AO/1-7628) (2014-now): Vibrational analyses and tests supply
• HPTFL (2014-now): Member of consortium developing high performance time and frequency microwave link for ESA. Serenum contributes with the development of digital electronic based on anti-fuse FPGAs.
• OCEARI (2014-now) – Optimal clock ensembling algorithms with robust implementation for ESA.
• TT III-TX (2014-now): Serenum is currently developing a digital version, both transmit and receive, of TT modem for ranging and time transfer
• PROBA 3 (2012-now): Front door assembly design of Optical Objective Assembly for ASPICS coronagraph.
• FLUTTER (2011-2012): Using flutter calculations and wind tunnel experiments on aerelastic models for flutter correlation on full scale part.
• SWARM (2005-2011): Three flight units of capacitive microaccelerometer including ground segment equipment were developed and delivered for three satellites of SWARM mission.
Siemens Convergence Creators, s.r.o.

Company Name: Siemens Convergence Creators, s.r.o.  
Dimension: SME (130 employees)

Contact person: Helena Kalenska  
Turnover (in Millions of Euros)

E-mail: helena.kalenska@siemens.com  
Member of a Trade Association

Mobile: +420 734 424 818  
Tel. office:

Website: www.convergencecreators.cz

Company Profile:
Short Description of the company/institution:

Siemens Convergence Creators, s.r.o. was established in October 2012 by means of transfer of the Siemens Communication, Media and Technology (CMT) division from the former company ANF DATA spol. s r.o.

The Space department in the Czech Republic was established in 1998. It is now part of the Industry organizational unit within the global Siemens Convergence Creators company. Since its inception the Czech Space department group has cooperated with the Siemens Aerospace department in Austria on the development of various software and hardware solutions for ESA, German National Space Agency (DLR), and leading satellite operators.

Capabilities:

- Development of Electrical Ground Support Equipment (EGSE)
- Software development for ESA Ground Stations and Mission Control Systems (MCS)
- Software development for Earth Observation Services Infrastructure
- Development of the Siemens Carrier Monitoring System - SIECAMS

EGSE DEVELOPMENT, INTEGRATION, TESTS, VERIFICATION & VALIDATION

Software development, integration, tests, verification & validation:

- Sentinel-4 UVN Data Evaluation EGSE  
  Design, implementation & testing of all S4 UDEE application software
- Meteosat Third Generation Data Handling SCOE  
  Design, implementation & testing of all MTG specific software
- Advanced Integration and Test Services  
  Development of the EGSE software building blocks, led by Astrium ST
- Solar Orbiter Power SCOE  
  Power SCOE software development and hardware procurement
- European Ground System Common Core Technologies Proof of Concept  
  Evaluation of preselected EGS-CC technologies, led by CS France
- Galileo Payload Test System
Test procedures, automatic tests, system validation, and on-site support

**Hardware manufacturing, assembly, integration & testing**

- Meteosat Third Generation Payload Data Distribution SCOE
  - Manufacturing, assembly, tests and integration of the RF-Switching & Matching unit
- Galileo FOC and Galileo IOV TT&C SCOE
  - Manufacturing, assembly, tests and integration of the SCOE systems

**MISSION CONTROL SYSTEMS AND GROUND STATION SOFTWARE DEVELOPMENT**

*Development for SCOS-2000 based Mission Control Systems*

- **DLR SCOS-2000 MCS maintenance**
  - Long term contribution to Siemens Austria in maintenance and evolution of SCOS-2000 for DLR
- **Study of SCOS-2000 deployment over WAN for a concept of CMCP**
  - Optimization of client-server communication over WAN
- **Advanced Monitoring for a Modern Generic Mission Control System**
  - CORBA based Telemetry Packet Distribution Prototype
  - Command Supervisor - integrated into to S2K 5.x and DLR MCS
  - EGOS Data Transfer & Management Libraries (DTL/DML)
- **The DTL/DML based MCS Demonstrator**
  - SCOS-2000 telemetry distribution prototype reusing the DTL/DML

*Ground Station software development and technology studies:*

- **Ground Station Automation and Off-line Operations**
  - Analysis and prototyping of GS automation & offline operations concept
- **Transient Objects for M&C in GSSC/GMMI**
  - Enhancements of GSSC/GMMI software deployed on ESA Ground Stations
- **Monitoring & Control Module for ESTRACK Ground Stations**
  - Contribution to development of the system responsible for monitoring and control of equipment on the Ground Stations

*Performance and data analysis:*

- **Parallel computing for fast Telemetry processing during short passes**
  - Study on processing of telemetry data at a significantly higher speed than the current SCOS-2000 TM model
- **Operational Data Off-line Analysis Correlation and Reporting System**
  - Development of Analysis and Reporting System on top of the EDDS
- **Galileo Space Craft Control Facility - Performance Evaluation and Analysis**
  - Development of the Client/Server IF and Database handler for the PEA system

**EARTH OBSERVATION SOFTWARE DEVELOPMENT**

- **Decision Support and Real Time EO Data Management system**
  - Development of technologies for controlled Web-based access to geospatial data archives
- **Open Standard Online Service**
  - Implementation & validation of the OGC Web Coverage Service standards
- **Spatial Observation Services and Infrastructure in Czech Republic**
A network of cooperating Land Cover / Land Use data WEB servers for distributed EO data access

**SIEMENS CARRIER MONITORING SYSTEM - SIECAMS**

The Siemens SIECAMS family is a highly sophisticated automated RF and content monitoring platform for the continuous monitoring of satellite signals and for ensuring high quality standards in uplink procedures and satellite transmission links. Seamlessly integrated Interference Localization System provides not only geo-location but also advanced interference detection and classification functionality.

SIECAMS is installed on many ground stations distributed all over the world and monitors the downlink traffic of 28 satellites.
<table>
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<tr>
<th><strong>Company Name</strong></th>
<th>Synpo a.s.</th>
<th><strong>Dimension:</strong></th>
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<tbody>
<tr>
<td><strong>Contact person:</strong></td>
<td>Martin Kaška</td>
<td><strong>Turnover (in Millions of Euros):</strong></td>
<td>4,61</td>
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<tr>
<td><strong>E-mail:</strong></td>
<td><a href="mailto:martin.kaska@synpo.cz">martin.kaska@synpo.cz</a></td>
<td><strong>Member of a Trade Association:</strong></td>
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<tr>
<td><strong>Mobile:</strong></td>
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<td><strong>Tel. office:</strong></td>
<td>+420466067187</td>
</tr>
<tr>
<td><strong>Website:</strong></td>
<td><a href="http://www.synpo.cz">www.synpo.cz</a></td>
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**Company Profile:**

Synpo is a research and manufacturing company with more than 60 years tradition in R&D of polymeric materials. Several research teams are working on synthesis of polyesters, polyurethanes, epoxies and acrylates and also on formulation of paints, composites and adhesives. One of our major research areas is development of nanostructured and hybrid polymers and polymers based on recyclable and renewable raw materials. Analysis, evaluation and testing are carried out in accredited laboratories. Synpo has extensive experience in technology transfer; from laboratory through pilot plant to a full commercial scale manufacturing. Synpo complies with ISO 9001: 2008

Synpo closely collaborates with Czech industry and companies in the European Union, USA, and Japan.
TOSEDA, s.r.o.

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<tr>
<td>Contact person:</td>
<td>Tomas Vlcek</td>
<td>Turnover (in Millions of Euros)</td>
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</tr>
<tr>
<td>E-mail:</td>
<td><a href="mailto:tomas.vlcek@toseda.cz">tomas.vlcek@toseda.cz</a></td>
<td>Member of a Trade Association</td>
<td>Czech Space Alliance, Graphene FlagShip</td>
</tr>
<tr>
<td>Mobile:</td>
<td>+420 721 967 071</td>
<td>Tel. office:</td>
<td>+420 466 734 122</td>
</tr>
<tr>
<td>Website:</td>
<td><a href="http://www.toseda.cz">www.toseda.cz</a></td>
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</table>

Company Profile:

General description
TOSEDA s.r.o. is an SME providing contract research and development, small scale production, consultation services and training courses for students in the field of polymer chemistry and nanotechnologies. TOSEDA closely collaborates with the major EU space industry partners and European Space Agency. Since 2013 a member of the Czech Space Alliance. The main mission of TOSEDA is to fill the gap on the market with specialties that are usually commercially unavailable or produced out of the EU region.

Competences & Capabilities
Main areas of TOSEDA’s activity include custom design and commercialization of novel polymeric and nanocomposite materials for hi-tech applications targeted especially for space applications.

- Development of hi-tech polymeric materials (composites, adhesives, elastomers, coatings, foams etc.) modified by tailor designed nanostructures (organic, inorganic, hybrid) targeted for space, aerospace, military, construction, electronic and medicine industries.
- Small scale production of specialties such as masterbatches (dispersions of nanostructures in selected environment), pre-pregs etc.

Major Space Projects & References

- ESA projects
  - Development of Epoxy Based Syntactic Foam Encapsulant: 3rd Call for Outline Proposals under the Czech Industry Incentive Scheme
  - Resin Development for Cryogenic Applications: FLPP3 program
  - Nano-Hybrid Transparent Materials: TRP program
  - Thermal Joint: NEOSAT program
  - Design of Inner Wetted Thermal System for LH2 Metallic Tank: FLPP3 program

- Other activities foreseen for space industry:
  - Thermally and Electrically Conductive Polymeric Systems
  - Polymeric Structured Foams (High Strength and Low Density Materials)
  - Composite Tanks for Liquid Propellants (Lightweight CFRP and Polymeric Barrier Layers)
  - Thermally Protective System (Reflection, Absorption, Emitting)
  - Cryogenic Materials (Polymeric Foams and Polymeric Aerogels)
TOSEDA, s.r.o.

- Hybrid Composite Materials (High Strength and Resistance Aggressive Environment, Low Internal Stress)
- Elastomers (Low Gas Permeability and Excellent Thermo-mechanical Properties)
- High Temperature Resistant Coatings (Over 300 °C)
- High LEO ATOX Resistant Polymeric Layers-Coatings
- Stress Sensitive Coatings (Pressure and Deformation Sensors)
- Adhesives (High Shear and Peel Strength, Encapsulated Chemical Compounds)
- Polymeric Binders for Solid propellants

Space Related Equipment, Labs & Certificates

- R&D laboratories
  - Three roll mill
- Analytical and testing laboratories
  - AFM (Atomic Force Microscopy)
  - Rheometry
  - DSC (Differential Scanning Calorimetry)
  - TGA (Thermo Gravimetric Analysis)
  - Pull-off test
  - Wet Analytical Techniques (Hydroxyl Number, Acid Value, Water Content...)

Company Name: Unico Europe s.r.o.  
Dimension: 20 people

Contact person: Petr Sluka
E-mail: sluka@unicoeurope.com  
Member of a Trade Association

Mobile: +420608028626  
Tel. office: +42023405 41 43
Website: www.unicoeurope.com

Company Profile:
The company Unico Europe deals with the development of automatized solution for control of virtual server in the cloud and custom software development. We provide consulting and training for Open Stack and artificial intelligence.

Unico Europe supplies OpenSource solutions for cost-saving and consolidation of computing infrastructure.

Unico Europe is a private company that has experience in software development across multiple industries from Aerospace to Energy.

Unico Europe uses method for Scrum for rapid development of software development. We fully focus on HW SW modelling and programs simulation. Data mining, creating of hardware clusters for processing big data in the real time. Unico Europe owns Data Center in the Czech Republic.

Capacities:
Software development (C #, C ++, IEC61131-3, MATLAB, PHP, SQL, etc.); PikeOS etc.
Development of Artificial Intelligence (use evolutionary matrix, neural networks)

Skills:
The team - senior developers with experience in software development more than 10 years.

Selected reference:
MSAW for Pragues Airport
Czech Rep. – Industrial Association Profile
<table>
<thead>
<tr>
<th><strong>CZECH SPACE ALLIANCE</strong></th>
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<tr>
<td><strong>Website:</strong></td>
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<td><strong>Member of Trade</strong></td>
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<td><strong>Association/Organization:</strong></td>
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<td><strong>Number of employees:</strong></td>
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**Short Description of the company/institution:**
The Czech Space Alliance (CSA) is an industrial association of, and for, the Czech space industry, with proven skills and track record in aerospace business and with broad international client base. The alliance was established in 2006 under the auspices of CzechTrade, the export promotion agency of the Ministry of Industry and Trade. During the process leading to the Czech accession to the ESA convention in 2008, it formalised its statutes and became registered as a legal entity. Its focus is on fostering successful participation of the members in competitive international space tenders, with major emphasis on ESA. The alliance comprises 14 companies from a spectrum of technology disciplines and some 300 man years of experience in space projects.

**Among the main goals are:**

**Internally** — represent and promote the interests of the space industry to the national decision makers, the media and other relevant associations or entities; co-operate with the ministries and all other official entities supporting space activities in the formulation of space policy and creation of suitable conditions for the growth of the space industry.

**Externally** — present the skills of its members at international events and establish dialogue and relationship with similar associations and space agencies, be they in Europe or beyond; help its members to develop business relationship with potential partners in other European Space Agency members states and beyond.

More information on website: [http://www.czechspace.eu](http://www.czechspace.eu)
France – Companies Profiles

TBA