Czech industry in space R&D

In the context of the symposium „Role of Industry in Space Exploration“

COPUOS
Scientific & Technical Subcommittee
53rd session

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Prague, Czech Republic

GSA HQ since 2012

Full member since 2008

Since 2004
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Czech personalities in OOSA and COPUOS

- Dr. Kopal had been the world authority on space law
  - Chairman of COPUOS Legal Subcommittee 1999-2003 and 2008-2009
- Dr. Perek (now 97 years old), astronomer
  - General Secretary of IAU 1967-1970
  - Chief, Outer Space Affairs Division, New York 1975-1980
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History

- Prague had been the centre of space research and learning since Tycho de Brahe and Kepler worked for the Bohemian King & Roman Emperor Rudolf II
- Czech scientist & engineers contributed key subsystems to all Intersputnik missions, e.g. the stabilised platform for the Vega mission to Venus
- Czech was the third national to fly to space after the Russians and the Americans

BUT in the modern times we needed to get away from,
- pure science, party politics, propaganda goals
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Change from science and party politics driven R&D, to practical, sustainable & commercially viable R&D

- After gaining independence from the Soviet Union in 1989, most of space R&D went into low gear, only science goals

- **CHANGE ➔ 2005 start of PECS programme**, as transition to ESA membership, brought **substantial change of approach** - and partially painful

- Czech Republic raised to the challenge & was by far the fastest graduate of the PECS programme from all new EU member states – whilst the minimum period was 5 years, we were ready for accession to the ESA convention after mere 3 years
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Czech industry associated in the Czech Space Alliance

- the change led to development of space industry
- Czech Space Alliance established in 2006
- 16 SMEs and associated larger companies
- **Internal goals** – lobbies for interests of members with respect to the government stakeholders; contributes to the National Space Plan
- **External goals** – presents the skills of Czech space abroad, develops contacts with industry and agencies worldwide
- Publishes catalogues through Ministry of Transport, CzechTrade, and in the European Space Directory
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Czech Space Alliance with other trade associations

- **2007** CSA co-founded the pan-European association of national SME associations **SME4space**
- Through SME4space it has communication channels to Eurospace and in its turn to ESA industrial policy
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CSA in the ESA transition programme PECS (2005-2008)

- satellite Navigation EGNOS & SISNeT
- GRID technology in EO/SAR
- set up & operation of the 1st CEE EGNOS monitoring station
- ESA study of space SME needs in PECS countries
- navigation Educational Tools for ESA GNSS
- spatial Observation Services & Infrastructure in CZ (SOSI-CZ)
- Image Info. Mining in Time Series (1st int’l. competitive tender)
- development of novel X-ray optical subsystems
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Some CSA successes in ESA’s int’l. tenders

- **1st win** - EO - AO5119 “Image Information Mining in Time Series” with ACS Italy
- GNSS - AO6149 “Interference Monitoring for GNSS Reference stations” with Astrium Germany
- AO10125 MTG Data Collection System & GEOSAR
- SSA/GSTP - AO6767 “Test-Bed of an Autonomous Follow-Up Telescope”; ISDEFE Spain
- AO70154 Solar Orbiter Power SCOE
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Other sample projects not under direct ESA contract

- Galileo search & rescue, Indra consortium for GJU
- ESA SWARM mission μ-accelerometer: experiment flight software & electronics including CSA members CSRC and Evolvesys
- IRIS / Antares – EU satellite communications system for civilian air-traffic, subcontracted to Thales/INDRA, including CSA – Evolvesys, Iguassu Software Systems
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CSA successes in commercial project

IRIDIUM NEXT

“Solar Panel Deployment Mechanism”
Frentech through TAS France

TAS France  SBAS Real-time Monitoring System
product EVORA, Iguassu

TAS France  Several projects for Composite tape
spring development – 5M
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**ESA advises industry to develop space business globally**

CSA is most active in developing relationship in:

**ESA member states** - e.g. A, F, D, I, NL, ES, UK, Poland, Estonia, Hungary...

**ESA candidate member states** – Latvia, Slovakia

**Overseas** – Brazil AEB/INPE, Japan JAXA/SJAC/Jaspa, Argentina CONAE, Chile, Mexico, GISTDA Thailand, UAE,...
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International agreements

• “Letter of intent” with the Brazilian Space Agency
• drafted and negotiated by the CSA
• signed by Brazilian Space Agency (AEB) President and the Czech Minister of Transport
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LOI with the Brazilian space agency

After the LOI signature, Czechinvest & CSA organised “Czech Brazilian Space Industry Days”
with presentations for:
AEB in Brasilia,
INPE in S. J. Dos Campos,
CTA in S. J. Dos Campos
Air-force in Alcantara launch base
2013 & 2015 – Space Technology Mission
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Outside of ESA

• co-operation MOU between CSA and the association of Japanese SMEs JASPA/Manten

• signed 2010 at the Czechinvest event “Czech Japan Technology Day”

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Japan

• Meetings with the JAXA presidents Mr. Tachikawa and now Mr. Okumura
• MOU recently drafted by the Czech Ministry of Transport
• Good rapport with space industry including NEC Space, MELCO,.. and, of course, SJAC
• In Oct. 2016 a Czech stand at the Japan Aerospace exhibition
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Japan
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CSA members - potential areas of cooperation (1)

- **AVX** - world's No. 1 tantalum and niobium capacitor manufacturer (Japanese parent KYOCERA 日本)
- **BBT** – crystal optics for infrared region, polarizers, scramblers, acousto-optics, hyper-spectral imaging
- **CSRC** – space electronics including h/w & s/w design, clean room manufacturing, ESA certification
- **EGGO Space** – passive electronic components test facility
- **Evolvsys** – flight s/w for payloads & data processing
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CSA members - potential areas of cooperation (2)

- **Frentech** – precision mechanical assemblies manufacture (space mechanism and subsystems) for satellites and thermal testing
- **Iguassu Software Systems** – satellite navigation, SBAS, EO processing, EGSE, satcom, studies, SSA
- **LK Engineering** – industrial engineering, consulting, advanced computational technologies
- **RIGAKU** – R&D, world class precision X-ray optics
- **Siemens** – software: EGSE, S2K MCS, GS, satcom, EO data management.
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CSA members (3)

- **SYNPO** – advanced material R&D, e.g. ESA epoxy core development
- **TOSEDA** – nanocomposite materials R&D and production
- **5M** – development & production of composite materials and adhesives
- **Sobriety** – Computational Fluid Dynamics, computer vision applications, design of Self-deployable Habitat for Extreme Environments
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CSA members (4)

- **Chipinvest** – diagnostics & microsystems
- **BD Sensors** – electronic pressure sensors, transmitters and switches technologies
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Summary of principal CSA competences

- Precise mechanical subassemblies
- Space qualified electronic subsystems
- Engineering consultancy
- Passive electronics
- Advanced materials development
- Software systems, especially
  - Satellite positioning (GNSS/SBAS/EGNOS)
  - Mission and control systems
  - Real-time on-board and ground segment software
  - Earth observation
  - EGSE
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Space Coordination Council of the Minister of Transport

- In 2010 the council was appointed by the government to develop and implement the Czech space policy, to represent the Czech Republic in ESA and other international bodies such as EU
- There is currently **NO national space agency nor any official national “space office”!**
- The space policy is being defined in strategic documents, drafted in collaboration with all space stakeholders, including the Czech Space Alliance
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National Space Plan 2010

• Prepared by ministries, Czech Space Office, industry, ESA
• 6 measurable goals to be fulfilled by 2016
• ALL FULFILLED by 2014 😊

National Space Plan 2014 - 2019

• Prepared by ministries, industry, ESA
• More ambitious goals
• Justification for ESA budget increase for the next period
Conclusion


- measurable goals for the original National Space Plan have all been fulfilled
- new goals set out in the 2014 – 2019 Space Plan

The Czech industry association [www.czechspace.EU](http://www.czechspace.EU)

- won over scores of space projects since 2005 incl. Galileo and other international tenders, and developed partnership with major European space companies
Thank you for your attention

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