

Czech Space Activities and the Czech Space Office

Presentation for ISRO
during the Czech Presidential Visit



Czech President's visit to ISRO 10/11/2005
Iguassu Software Systems



Prague – Praha



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Overview

- Czech Republic basic facts
- some historical & recent space achievements
- relationship with ESA & PECS
- ESA Audit of Czech space capabilities
- political and executive space framework
- Czech space board and Czech Space Office
- summary of current status
- co-operation interests
- contacts



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Where are we?

Czech Republic is in the heart of Europe



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Key national dates

- 1918 Czechoslovakia founded
- 1947 as India gained its independence, we lost it
- 1989 velvet revolution
- 1992 velvet “divorce” from Slovakia
- 1999 member of NATO
- 2004 joined EU
- 2005 started participating in ESA



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Czech Republic basic figures

- 10.4 million inhabitants
- GDP per capita 2004 (ROM)
 - \$ 20,000 at exchange rate
- Foreign Direct Investment into Czech R.
(or how do foreign investors see our strengths)
 - automotive industry – 50%
 - IT and Electronics – 20% (2nd largest)



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Czechs new to space science & technology?

Charles University founded in Prague in 1348

Kepler (1600)

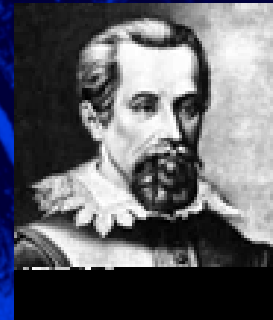
- two of his laws invented in Prague

Doppler (1840's)

Einstein (1912)

& many others...

all worked in Prague



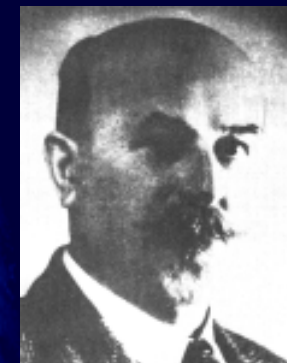
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Some further historical achievements

.. launcher technologies

- 1931 Očenášek reached 1,5 km with solid fuel rockets and envisaged “Pegasus like” aerial launches
- 50’s development of 2-stage sounding rockets at Military Academy Brno, stopped for political reasons
- more historical details in the paper “Czechs in Space” presented at the IAF Rio 2000 publ. Acta Astronautica, Vol. 48, No. 5-12, 2001



...third country to have a man in earth orbit

- 1978 Vladimir Remek transferred by Sojuz 28 to Saljut 6
- 7 days on board Saljut space station



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Czechs & Slovaks in Intercosmos

Czech payloads flew since 1969 - Examples :

- 1982 Saljut 7, low-cost X-ray telescope
- Czechoslovak equipment was included on 23 out of 25 Interkosmos mission payloads
- stabilised platform (APS), world-class pointing accuracy, used on Vega 1 & 2 spacecraft to study Venus and the Halley comet and on Mir



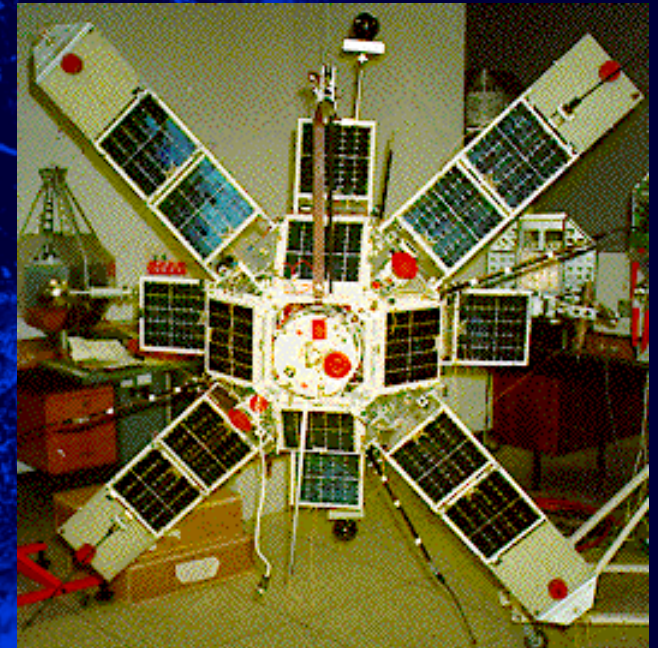
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MAGION (MAGnetospheric & IONospheric)

Satellite series from Czechoslovakia

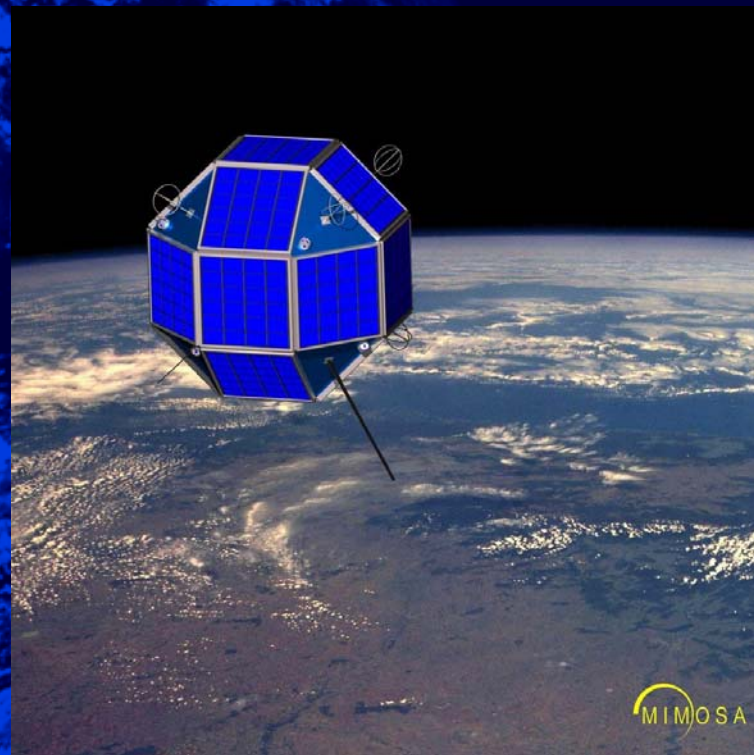
- 1st parallel plasma measurements from 2 satellites with controlled spacial separation
- 1978 Magion1, 15 kg
- 1989 and 1991 Magion 2 & 3
52 kg, own propulsion
- 1995 and 1996, Magion4 & 5
spin stabilised



Latest satellite development - Mimosa

Micrometeoroids Of Satellite Acceleration

- to measure atmospheric drag and other non-gravitational forces in LEO
- built by Space Devices Ltd. for the Astronomical Institute of the Czech Academy of Sciences
- life expectancy 5 years, 65 kgs

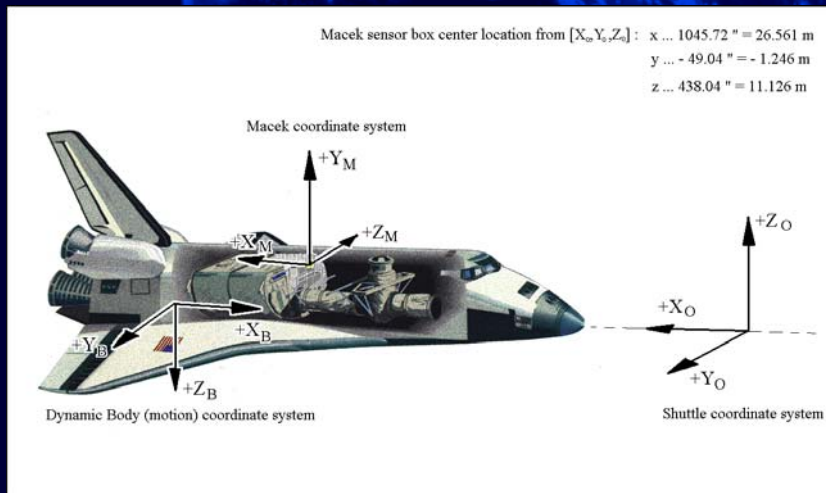
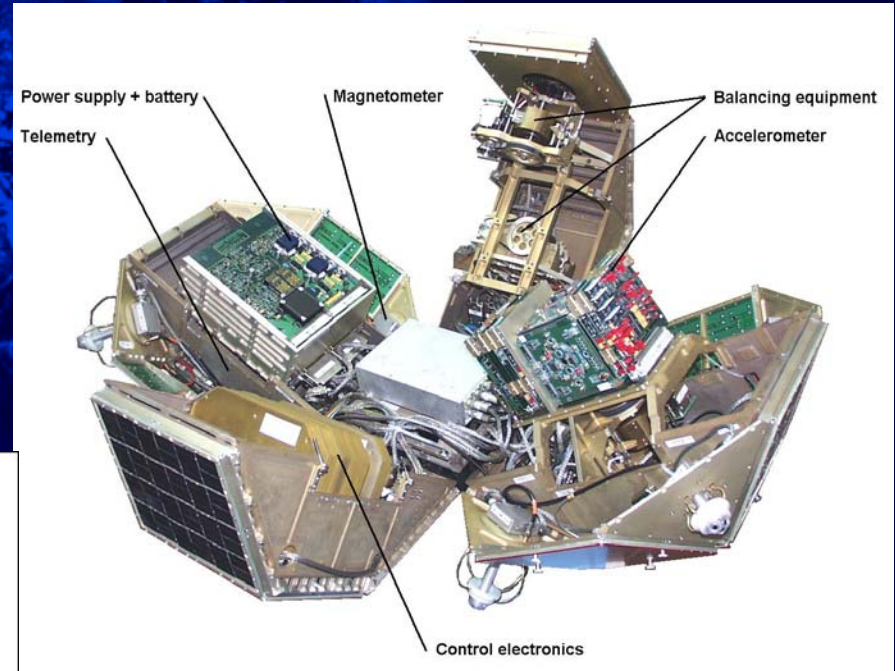


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Latest satellite development - Mimosa

based on 3-axis compensated μ -accelerometer Macek



that flew on the Shuttle Atlantis in 1996



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Relationship with ESA



1996 open-ended co-operation frame agreement with ESA

1997 - 2005 - participation in science research projects

- space physics
- astronomy,
- earth observation,
- materials research
- sociopsychology

2005 – 2010(?) PECS - “transition” membership of ESA

THE GOAL : full membership in ESA before 2010



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ESA Plan for European Co-operating States

PECS - Plan for European Co-operating States

to enable the ex-communist Central and East European countries Czech Republic, Hungary, Poland and Rumania to bridge the high hurdle of joining ESA

Minimum contribution is 1 million € per annum for min. 5 years

Objectives

- prepare the countries for future accession to ESA convention
- allow limited access to ESA programmes
- foster understanding of ESA organisation and procedures



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ESA audit of Czech space capabilities

Concluded – good potential for participation in ESA

Existing experience in several key domains:

- software and hardware design
 - ground segment
 - on-board
- structures
- optics design and manufacture
- research projects on advanced materials
- value-added services

High competitiveness level, due to a high quality / cost ratio



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ESA audit of Czech companies' capabilities

Wide range of application experience, such as

- space materials research – BBT
- space qualified hardware - CSRC
- remote sensing applications - GISAT
- satellite control software – Iguassu Software Systems a.s.
- mini-satellite platform & payload construction - Space Devices

Thanks to Nodal Consultancy and ESA for allowing the use of their slides.



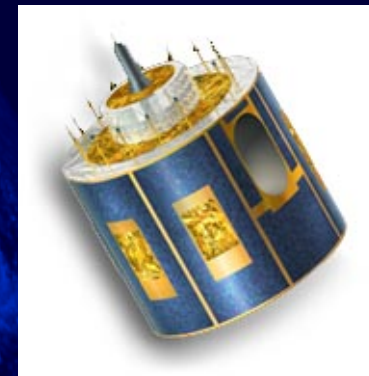
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Audit example – Iguassu Software Systems

Achieved top results in the ESA audit

- established in 1994, extensive international experience
- develops space subsystems in Prague, Germany, UK and Spain
- participates in ESOC, ESRIN, Eumetsat, Iridium projects, totalling 40 man-years
- current work on GNSS/EGNOS SISNeT, Galileo search & rescue, GRID technology application in EO
- provides also marketing consultancy for Czech and Latin American aerospace, based on 10 years' experience



MINISTÉRIO DA CIÊNCIA E TECNOLOGIA
INSTITUTO NACIONAL DE PESQUISAS ESPACIAIS



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Czech Parliament and Space

Czech Parliament

- Committee for Economics
 - Subcommittee for Avionics and Space supports aerospace topics in the parliament
 - Inter-parliament conference on space

Co-ordinator for Space

- Deputy Prime Minister / Minister of Transport
 - responsible for inter-sectorial coordination



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Current structures

Responsibilities

Application areas

Co-ordination

Information
Dissemination
Representation

Ministry of
Environment

GMES

Ministry of
Transport

Galileo

Ministry of
Education
Youth & Sport

Research & ESA &
international relations

Czech Space
Office

Czech Board for
Space Activities



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Czech Board for Space Activities (CBSA)

CBSA is an advisory body for all Czech space endeavours

- created by the Ministry of Education in 1997, and originally called the Czech Board for Co-operation with ESA
- advisory role – whilst the formal responsibility for the relationship with ESA lies with the international department of the Ministry of Education, Youth and Sports
- works together with the Czech Space Office (CSO)



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CBSA members and aims

Currently some 16 members

Originally only from academic institutes

2001 the Ministry of Education invited also

- representatives of interested industries
- and the Ministry of Transport & Communications

2002 it changed to current name, expanding its aims

- integration into non-ESA international co-operation in space research & applications
- support of bi-lateral co-operation with other countries



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Czech Space Office (CSO)

Non-profit private company that

- administers Czech space activities on behalf of the ministries responsible for given areas
- is a contact point for international relationships for
 - ESA
 - national space agencies
- represents Czech Republic in international Institutions such as
 - International Aeronautics Federation (IAF)
 - High-level Space Policy Group in the European Union
 - UN Committee for Peace Application of Space



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Czech Space Office (CSO)

Non-profit private company that

- supports Czech industry activities in space
- is an information and advisory centre for space activities
- is involved in education and outreach programmes
- co-ordinates space industry fair participation
- co-ordinates participation in conferences



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EGNOS - Galileo

Ministry of Transport

- Coordination board for GNSS
- Project “Involvement of CR in the Galileo Programme”
- **Period 2001-2006, budget 2.3 M€**

Galileo Masters

- European competition on GNSS application service
- Czech company ICE regional winner in 2005

International Conference in Prague, April 2005

- Galileo System Operations: Chances for SMEs ?



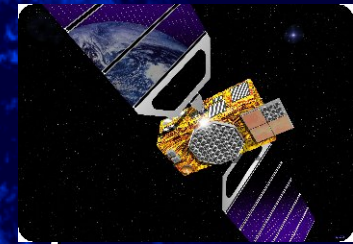
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EGNOS - Galileo

Iguassu is member of INDRA consortium for GISAR Galileo Search & Rescue

- consortium includes Alcatel, CNES, Thales, Capgemini, Edisoft, INTA, Martec
- team co-located in Madrid
- Information Centre development (WP441)



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GMES

Ministry of Environment

Potentials of Czech organisations:

- Land Cover and Vegetation Mapping services
- Modelling methods and tools
- Satellite data processing
- Ground measurements and data collection
- Spatial data analysis in GIS environment
- Data visualisation and map production
- Software development and programming
- Reporting and information assessment

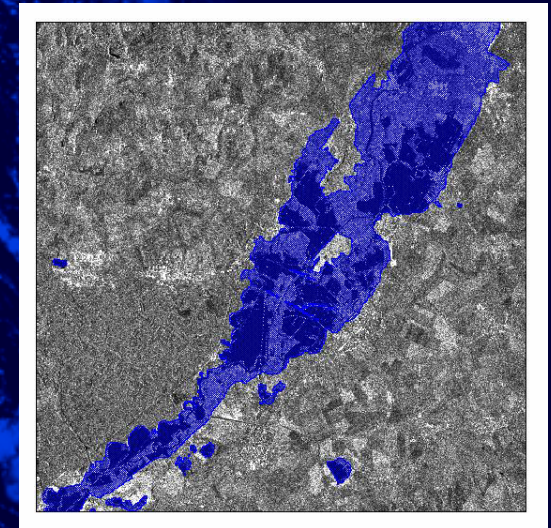


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Earth Observation

- Ozone concentration at higher latitudes
 - NOAA/TOMS and GOME data processing
- Meteorology
 - NOAA station, Meteosat
 - EUMETSAT Associated Member
- Landscape monitoring
 - Land cover mapping (CORINE)
 - floods monitoring
 - SAR interferometry and DTM generation
- Agriculture
 - crop discrimination
- Application of GRID technologies to EO processing



Summary of current status

Czech Republic

- maintained a high standard education system (ESA Audit)
 - Has above average language skills (Czechinvest survey)
 - 35% population speak fluent English
 - 75% Czechs / 53% EU citizens - speak a foreign language
 - “high technical competencies and quality, with attractive costs” (Nodal Consultancy / ESA Audit)
- excellent human resources & high cost-effectiveness
- good partner in international co-operation



Summary of current status

Czech Republic

- has a long record of achievements in space science and technology
- has become “European Co-operating State” in ESA and as such has access to ESA’s international projects
- has become member of the European Union as such has access to EU projects such as Galileo
- externally assessed to have active and highly competent industrial and scientific resources



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Principal targets for Co-operation

- Galileo, EGNOS
- telecommunication
- Earth observation
- sciences - space, material, life
- space technology



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Contacts for Czech Space Office



Doc. J. Kolář
Chairman
Czech Space Office
Czech Board for Space Activities
Katerinská 10
128 00 Prague 2
Czech Republic

Tel.: +420-22491 8288
Fax: +420-22491 4121
jan.kolar@czechspace.cz
Home page: www.czechspace.cz



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Thank you for your attention.

Petr Bareš
Iguassu Software Systems
Evropská 120
160 00 Prague 6
Czech Republic

Tel.: +420-23535 1000
Fax: +420-23535 1934
UK fax: 07092 - 034415
US fax: 516-977 1826

petr@compuserve.com
Home page: www.iguassu.cz



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