ДЕРЖАВНИЙ ВИЩИЙ НАВЧАЛЬНИЙ ЗАКЛАД
«УЖГОРОДСЬКИЙ НАЦІОНАЛЬНИЙ УНІВЕРСИТЕТ»
(м. УЖГОРОД, УКРАЇНА)
КОШИЦЬКИЙ ТЕХНІЧНИЙ УНІВЕРСИТЕТ
(м. КОШИЦЕ, СЛОВАЦЬКА РЕСПУБЛІКА)

ISSN 2218-5348

МІЖНАРОДНИЙ НАУКОВИЙ ВІСНИК

Випуск 1 (12)

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«Науковий парк як універсальна регіональна структура інноваційної діяльності»
(м.Ужгород, Україна – м.Кошице, Словацька Республіка, 3 березня 2016 р.)

Ужгород – Кошице
2016

УДК 001:378

Вісник містить наукові статті і тези доповідей, проголошених та обговорених на Міжнародній науково-практичній конференції «Науковий парк як універсальна регіональна структура інноваційної діяльності», проведеній Ужгородським національним університетом спільно з Кошицьким технічним університетом (Словацька Республіка) 3 березня 2016 року в рамках наукового проекту «Інноваційний університет – інструмент інтеграції в європейський освітній і науковий простір».

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STATE UNIVERSITY
«UZHHOROD NATIONAL UNIVERSITY»
(UZHHOROD, UKRAINE)
TECHNICAL UNIVERSITY OF KOŠICE
(KOŠICE, SLOVAK REPUBLIC)

ISSN 2218-5348

INTERNATIONAL SCIENTIFIC HERALD

Edition 1 (12)

Materials of International scientific and practical conference
"Science Park as universal regional structure of innovative activity"
(Uzhhorod, Ukraine – Košice, Slovak Republic, March 3, 2016)

Uzhhorod – Košice
2016

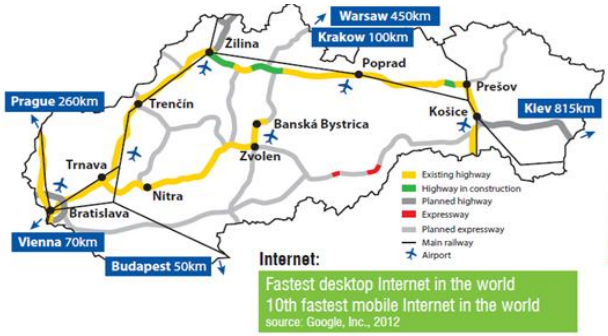
UDC 001:378

The Herald contains scientific papers and report theses, enunciated and discussed at the International scientific and practical conference "Science Park as universal regional structure of innovative activity", held on March 3, 2016, by Uzhhorod National University together with the Technical University of Košice (Slovak Republic) as part of implementation of the research project "Innovative university – tool of integration to European educational and research area".

The publication is issued with the financial support of the International Visegrad Fund.

WAY TO UNIVERSITY SCIENCE PARK TECHNICOM (UVP / USP TECHNICOM) BACKGROUND AND APPROACH TO DEVELOPMENT

Anton Lavrin, Frantisek Jakab,
University Centre for Innovation, Technology Transfer and Intellectual Property Protection (UCITT) at the Technical University of Košice (TUKE)



- population: 5,4 mil.
- capital: Bratislava
- 2nd largest city: Kosice
- avg. monthly salary: € 859
- avg. unemployment: 11%
- GDP: € 76 bil.

Labor Cost Structure (simplified)

	Employee	Employer
Social Security	9.4%	25.2%
Healthcare Insurance	4.0%	10.0%

The fees are derived from employees' gross salaries

National Holidays: 15 days

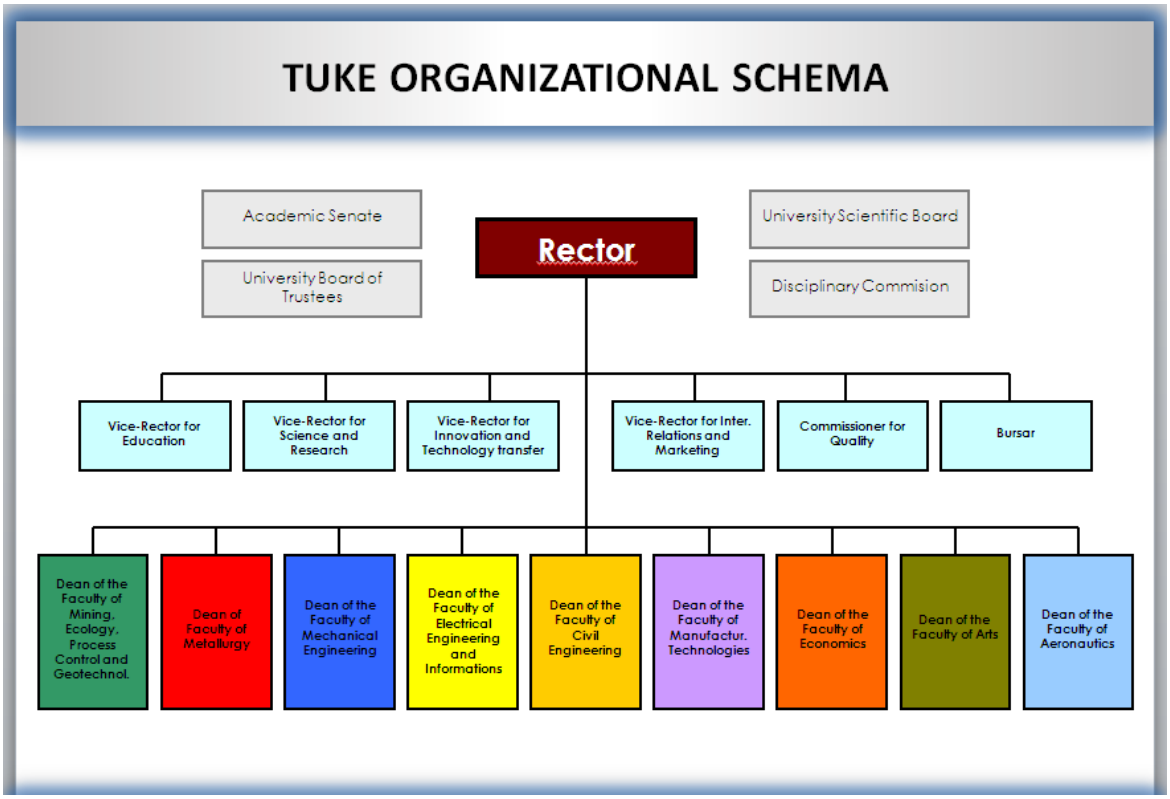
Mission of the TUKE is to contribute to society by its
education, learning, scientific and technological knowledge basis and innovation,
in order to form beneficial and sustainable future and high quality of life.




From long term strategy of the TUKE :

- To be known as Internationally recognized research university
- **Efficient RTD collaboration with national and international partners from public and enterprise sectors**
- Guarantee expected and required quality for offered education and training programes.

TUKE ORGANIZATIONAL SCHEMA



TUKE In Numbers

Established in 1952
Modern library, language center, ICT centre and fast internet
Barrier free centre, sports centre,
High-tech laboratories, R&D centers

No.	Faculty of	Year of Foundation	Students (approx.)	Graduates (approx.)
1.	Mining, Ecology, Process Control and Geotechnology	1952	2 288	862
2.	Metallurgy	1952	706	205
3.	Mechanical Engineering	1952	2 435	768
4.	Electrical Engineering and Informatics	1969	2 548	852
5.	Civil Engineering	1977	1 141	280
6.	Economics	1992	1 189	385
7.	Manufacturing Technologies (campus located in Prešov)	1992	1 275	476
8.	Arts	1998	287	72
9.	Aeronautics (former University of Military)	2005	1 055	392

The Community	
9 714	Students
128	Professors
217	Assoc. Professors
829	Prof. Assistants
629	PhD. Students
50%	women employees

Robustness (approx.)
125 mil. € total current assets
66 mil. € total revenue:
• 41,5 mil € government support
• 24,5 mil € from other sources

UCITT performs the following tasks:

- Connects science with practice
- Protects and highlights your ideas
- Seeks partners for your success at home and abroad
- Supports research and innovation projects
- Identifies sources for your projects

ucitt.tuke.sk

University Centre For Innovation, Technology Transfer and Intelectual Property Protection

UCITT - University Centre for Innovation, Technology Transfer and protection of intellectual property rights

Developing of services able to ensure required performance of R&D activities, collaborative projects, transfer processes etc.

The services fully support:

- Efficient collaboration and technology transfer with social and commercial practice.
- Development and establishment of relevant „Spin – off" and „Start – up" firms.
- Human resource development for management and administration of research and TT.
- Marketing in the fields of R&D and Technology Transfer.
- **Guarantee for the Scientific and technology park TECHNICOM**
- Preparation, development and performance of national and international R&D collaborations, projects and other R&D activities.

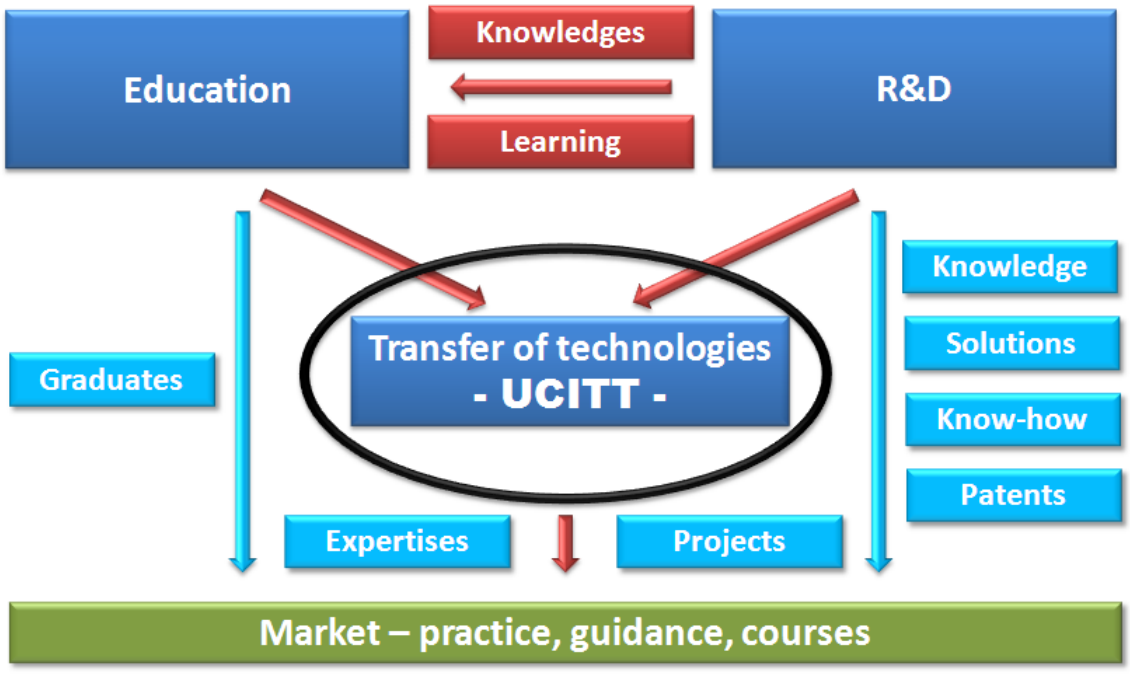
For more information, visit the website http://ucitt.tuke.sk

Operačný program VÝSKUM a VÝVOJ

Európska únia

Európsky fond regionálneho rozvoja

Basic roles (mission) of the university



The WAY
Step by step approach to create
the University scientific park TECHNICOM ...
from the TUKE point of view

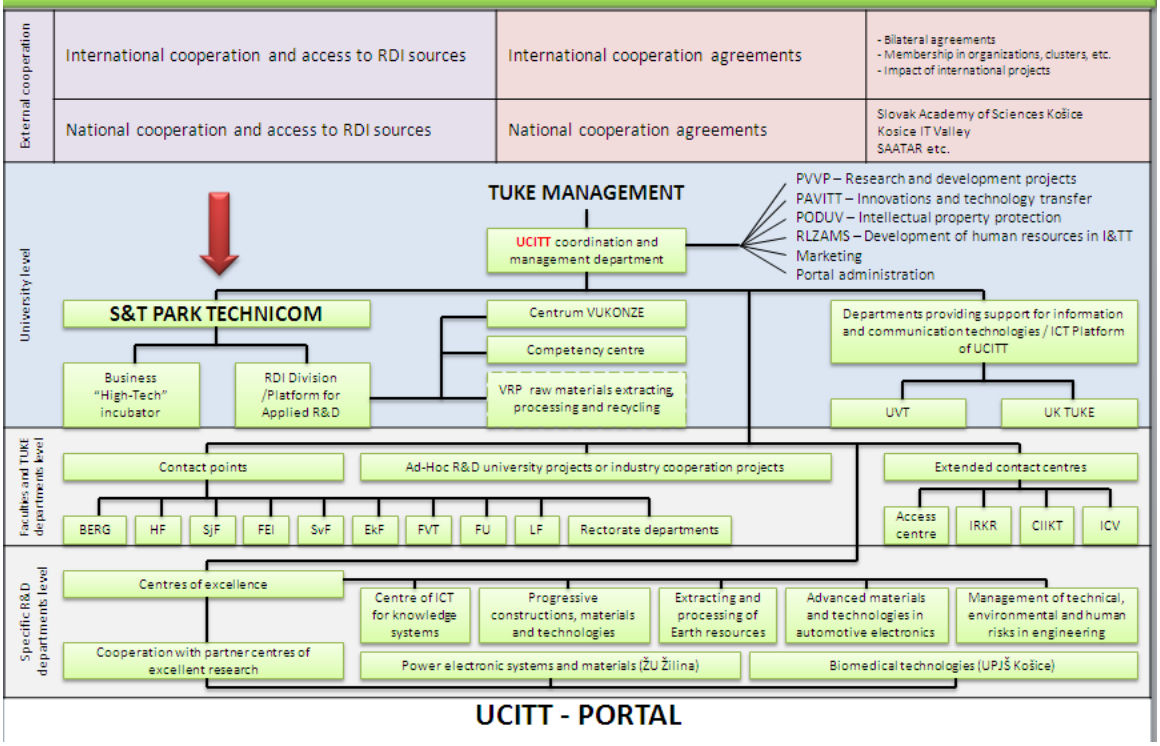
University scientific park TECHNICOM - UVP TECHNICOM

(**Glossary** / IASP): "**Science parks** are sources of entrepreneurship, talent, and economic competitiveness, and are key elements of the infrastructure supporting the growth of today's global knowledge economy. By providing a location in which, universities, government and public sector and private companies cooperate and collaborate.

Short history:

- Traditionally good cooperation with practice;
- Log - term vision of the University (initialized in 1990);
- At the beginning of 90-tis (1993 – 1994) – first attempt with "Cassovia Technopolis";
- A "triple – helix" based Association TECHNICOM (in 2000) - the concept and technical project for a **Scientific and technological park TECHNICOM (S&T park TECHNICOM)** was elaborated under coordination of the TUKE. **At 2010 construction of its main building was started.**
- **UCITT establishment in the framework of the project supported by SF (2008 – 2010).**
- **Nowadays, the project focused on the development and establishment UVP TECHNICOM is in progress**

University Centre for Innovation, Technology Transfer and protection of intellectual property rights – activities and impacts

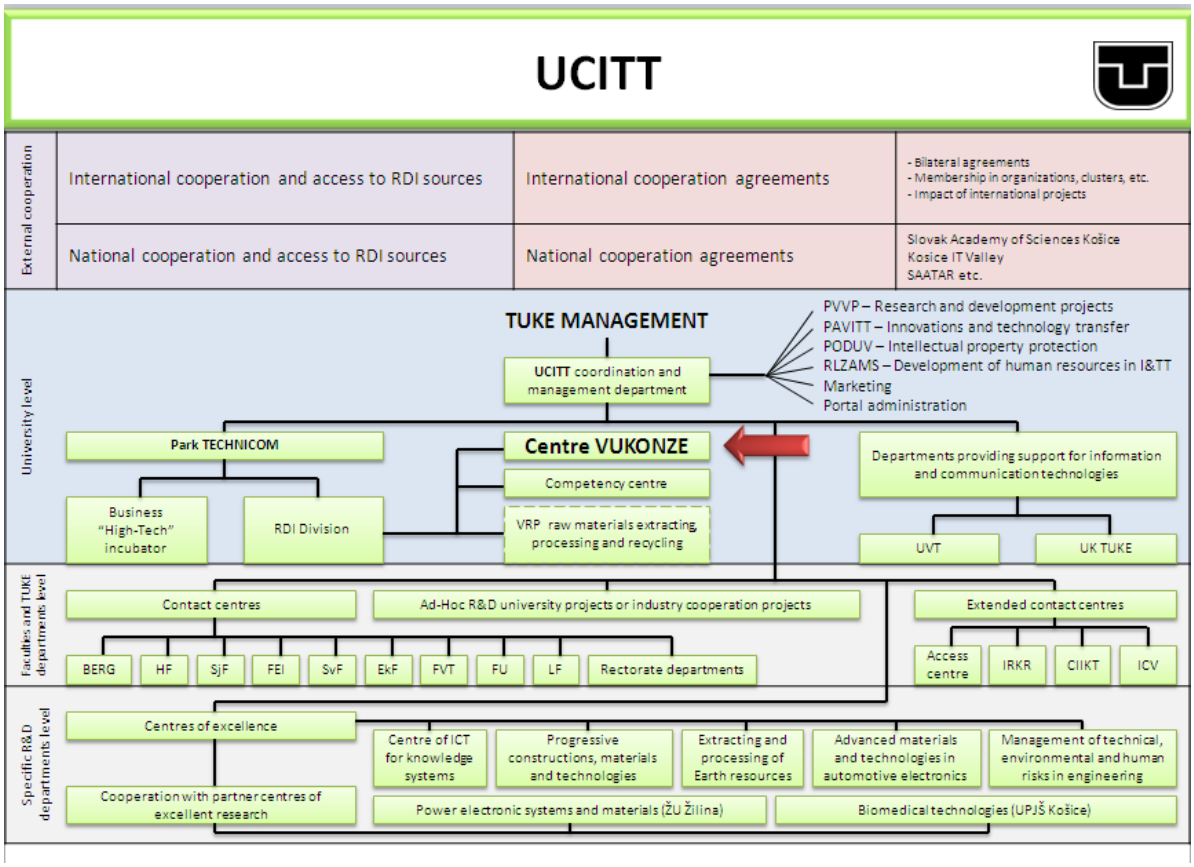


UCITT - PORTAL

SCIENCE AND TECHNOLOGY PARK TECHNICOM -> University Science Park TECHNICOM

MISSION

- Support for active "Win to Win" collaboration between academic, public and commercial R&D organisations;
- Open and flexible R&D platform for targeted applied R&D, based on W2W collaboration with "excellent" research centers from TUKE and its partners Universities and institutions from the SAS allocated mainly in Kosice;
- Support for the technology transfer activities at processing of expected and required outcomes on the part of practice;
- Incubator for „Hi-Tech" companies in the framework of Spin-off, Start-up initiatives;
- Management, development and operation issues are provided by the UCITT;
- Consultancy, expertises, technical and technological support for the transfer of research knowledge and products
- Relevant support for education and training activities
- Nowadays main mission is ... to be "responsible and useful „god-father" of the University science park (UVP) TECHNICOM ... ... i.e. the project : "UVP TECHNICOM for innovative applications with knowledge-based technologies support"
- PARTNERS:
  - Technical University of Košice ... coordinator.
  - University of P.J.Šafarik in Košice ... partner
  - University of Prešov ... partner.



Centrum VUKONZE
TECHNICKÁ UNIVERZITA V KOŠICIACH

Operačný program Výskum a vývoj

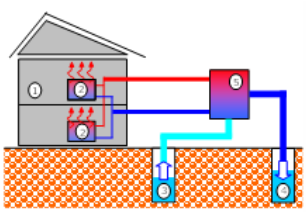
Európska únia

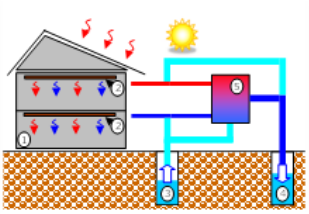
Research centre for efficient integration of the renewable energy sources

Nowadays, there are capacities of 110 researchers in the R&D platform built on the integration of twelve laboratories at TUKE (11 laboratories from 5 Faculties) and the Institute of the Material Science from SAS (Slovak Academy of Science).

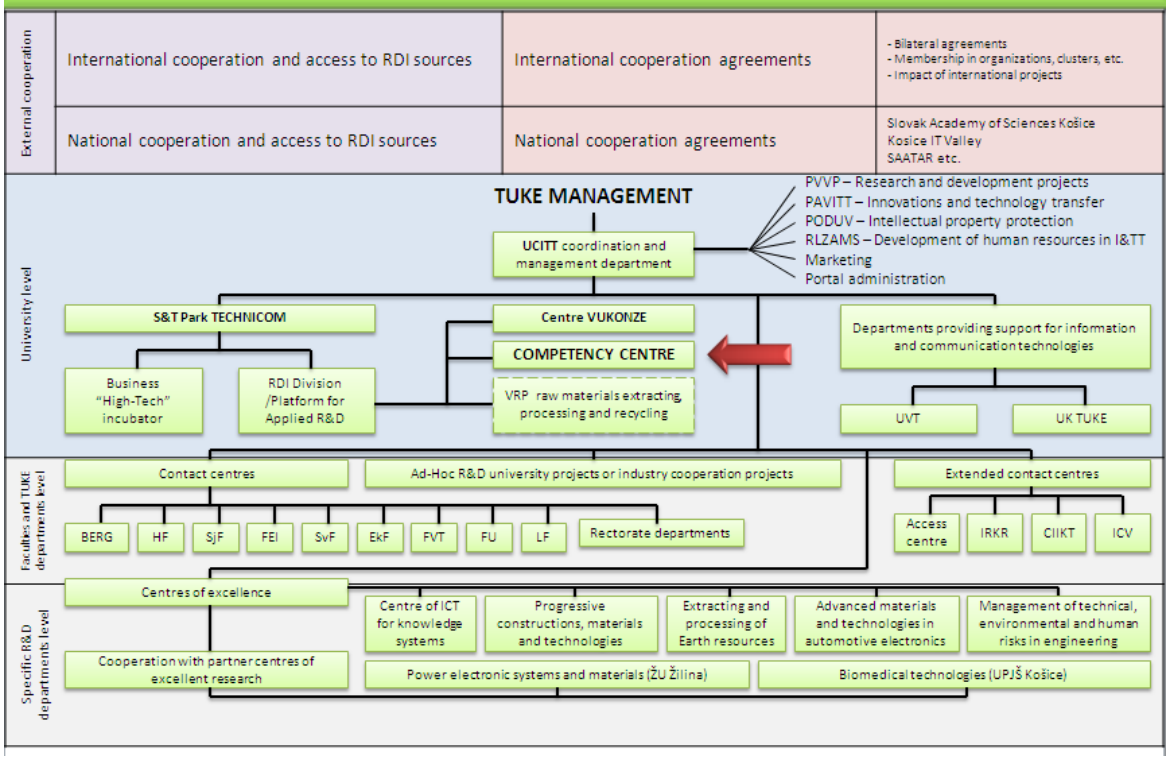
Main R&D activities are oriented to:

- Technologies of the biomass utilisation in energy sector;
- Solar energy and technologies for hydrogen utilisation and storage;
- Efficient exploitation of the geothermal resources;
- Efficient integrations of different renewable energy (smart low energy building);
- Intelligent control and distribution systems;
- The integrated support for the risk's life-cycle management.





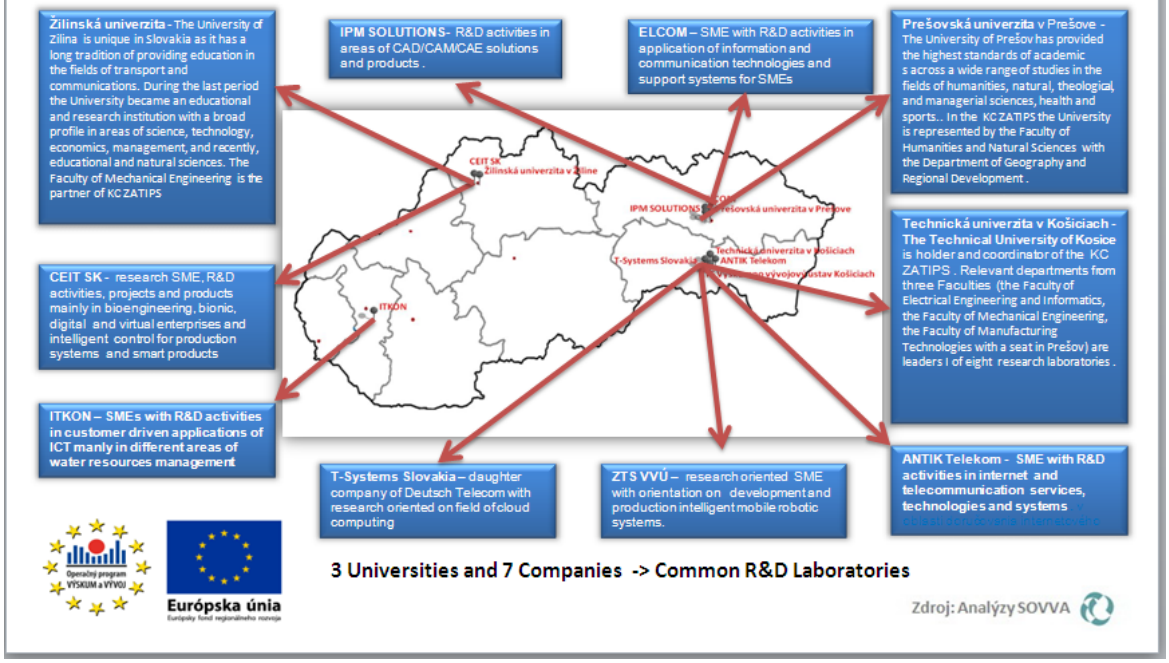

UCITT



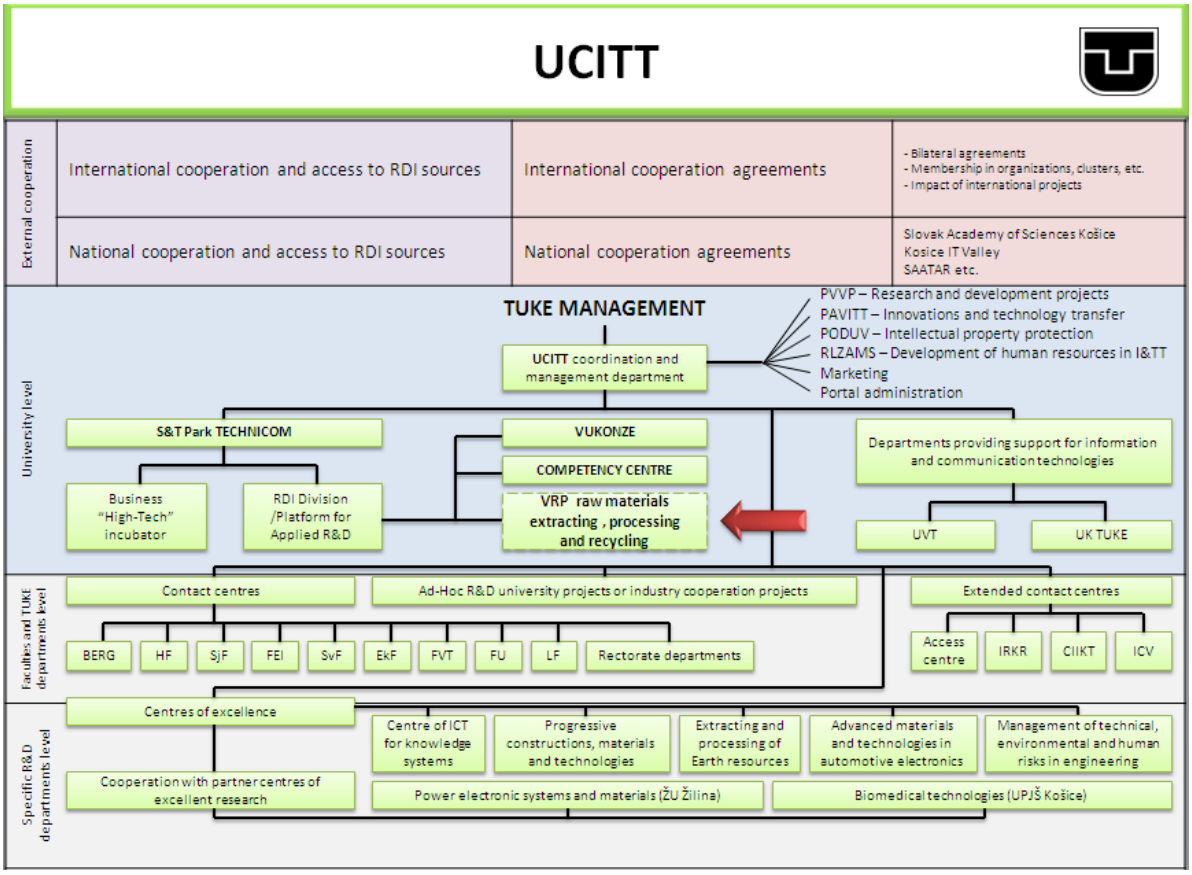
COMPETENCY CENTRE

KC ZATIPS

COMPETENCY CENTRE FOR KNOWLEDGE TECHNOLOGIES APPLIED AT INNOVATION OF PRODUCTION SYSTEMS FOR INDUSTRY AND SERVICES



UCITT



RTD Innovation and Education Support

- research, development, innovation and educational capacities in the raw materials extraction and treatment through the whole RM chain from extraction to recycling
- new advanced methods for eco-efficient secondary raw materials recycling with reuse of landfills, piles of waste rock, tailings ponds etc.
- New technologies for carbon-carrier RM processing
- Innovative product concept based on Slovak magnesite

International cooperation

- A member of European Technology Platform

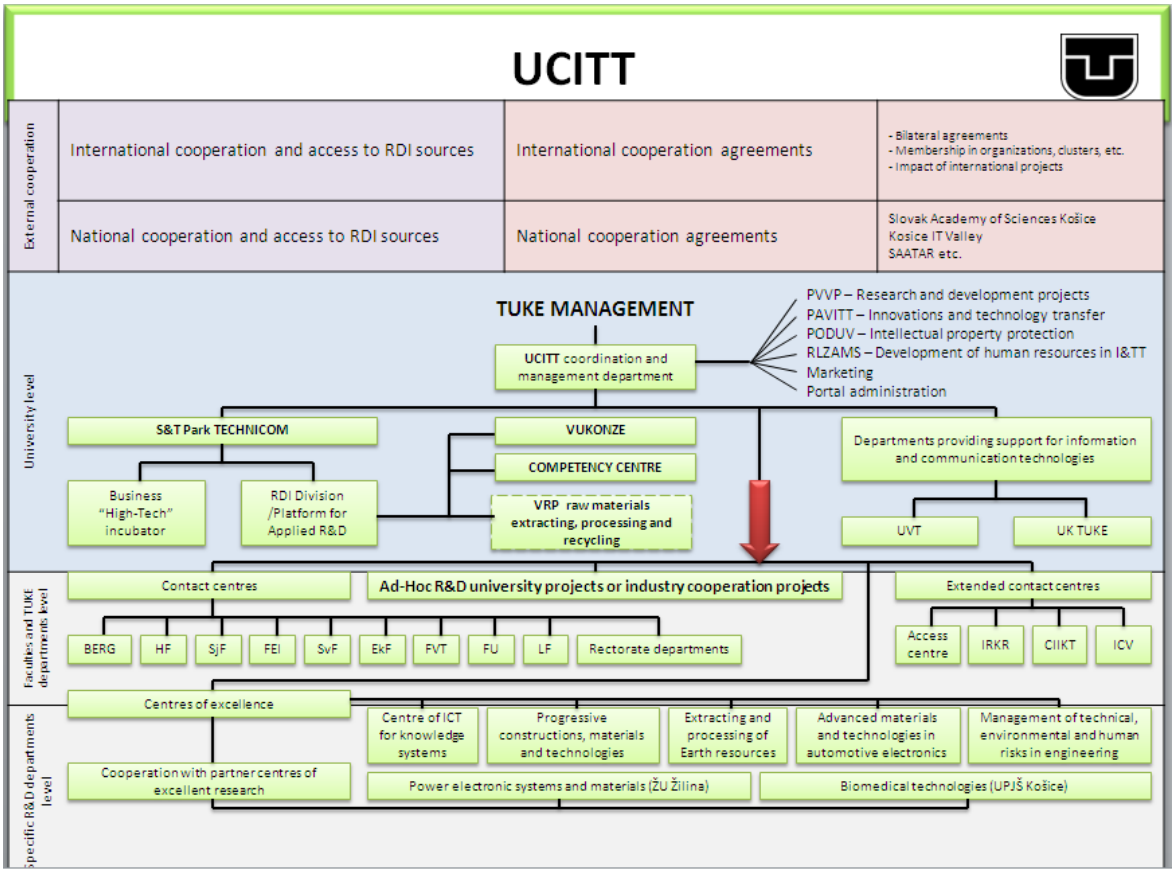
European Technology Platform on Sustainable Mineral Resources

- FP7 Project ERA-MIN – the member of the group WG1 - primary sources and expert group.
- 7FP - Project I²Mine "Innovative technologies and concepts for intelligent deep mine of the future"
- Cross-border Co-operation Programme HUSK- Project "Virtual reality laboratory for factory of the future"
- Cooperation with KGHM Polish Cuprum in copper concentrate drying, Montáže, a.s. Přerov (Czech) in industry furnace construction, TOMRA Sorting Solutions Mining in near-to-face sensor-based sorting Emerging cooperation: K+S (Germany),
- H2020 Associate partner in EIT / KIC Raw Material project KIC RM

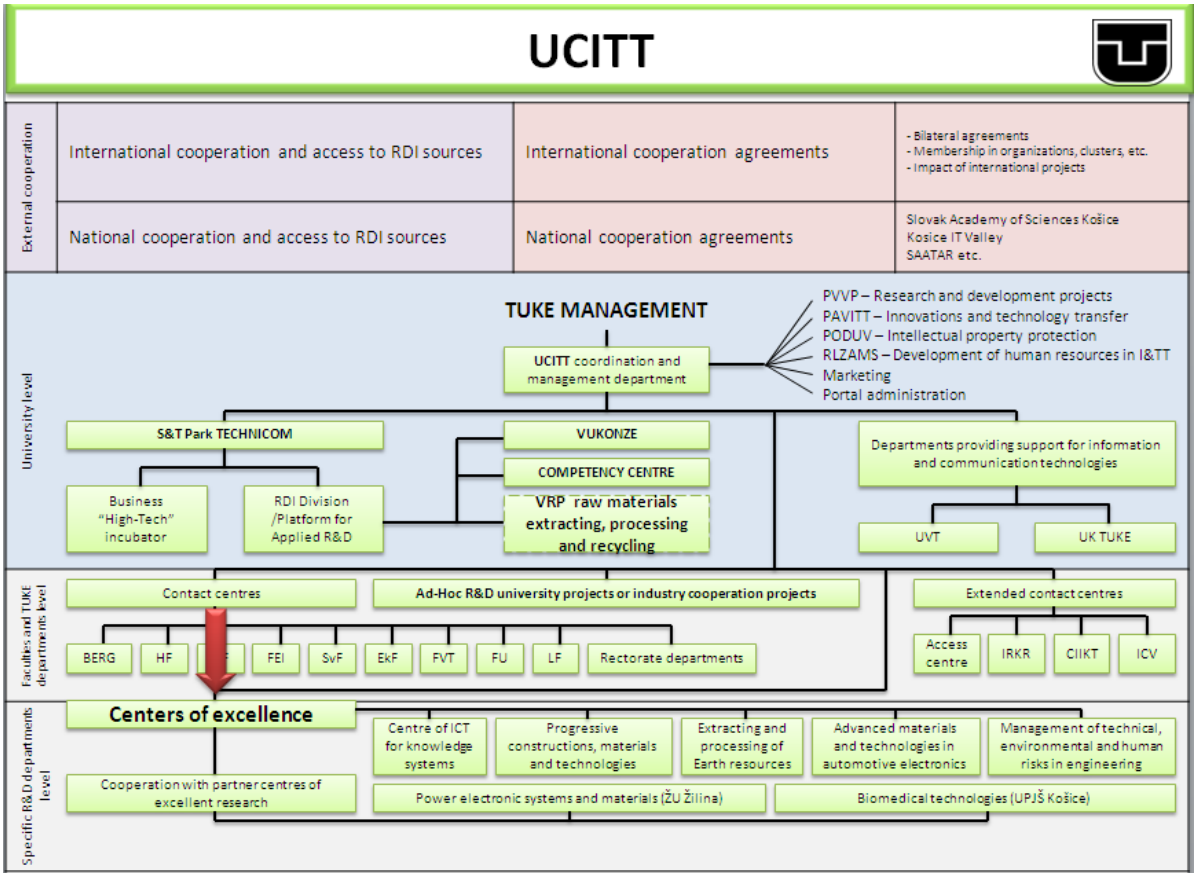
eit RawMaterials

Cooperation with practice

- The Centre of cooperation with practice now have 15 companies from a significant Slovak industrial and mining sector .


UCITT
External cooperation
International cooperation and access to RDI sources
International cooperation agreements
- Bilateral agreements
- Membership in organizations, clusters, etc.
- Impact of international projects
National cooperation and access to RDI sources
National cooperation agreements
Slovak Academy of Sciences Košice
Kosice IT Valley
SAATAR etc.
University level
TUKE MANAGEMENT
UCITT coordination and management department
PVVP – Research and development projects
PAVITT – Innovations and technology transfer
PODUV – Intellectual property protection
RLZAMS – Development of human resources in I&TT
Marketing
Portal administration
S&T Park TECHNICOM
VUKONZE
COMPETENCY CENTRE
Departments providing support for information and communication technologies
Business "High-Tech" incubator
RDI Division /Platform for Applied R&D
VRP raw materials extracting, processing and recycling
UVT
UK TUKE
Faculties and TUKE departments level
Contact centres
Ad-Hoc R&D university projects or industry cooperation projects
Extended contact centres
BERG
HF
SjF
FEI
SvF
EkF
FVT
FU
LF
Rectorate departments
Access centre
IRKR
CIIKT
ICV
Specific R&D departments level
Centres of excellence
Centre of ICT for knowledge systems
Progressive constructions, materials and technologies
Extracting and processing of Earth resources
Advanced materials and technologies in automotive electronics
Management of technical, environmental and human risks in engineering
Cooperation with partner centres of excellent research
Power electronic systems and materials (ŽU Žilina)
Biomedical technologies (UPJŠ Košice)


JOINT TUKE - INDUSTRY LABORATORIES and TRAINING
CISCO IPv6 Lab
CISCO Telepresence
RWE
VW robotic cell
Laboratory IBM
METRONOM Carl Zeiss
Laboratory ABB
T · · Systems · · ·
U. S. Steel Košice
United States Steel LLC
CEIT-KE
CENTRAL EUROPEAN INSTITUTE OF TECHNOLOGY
GETRAG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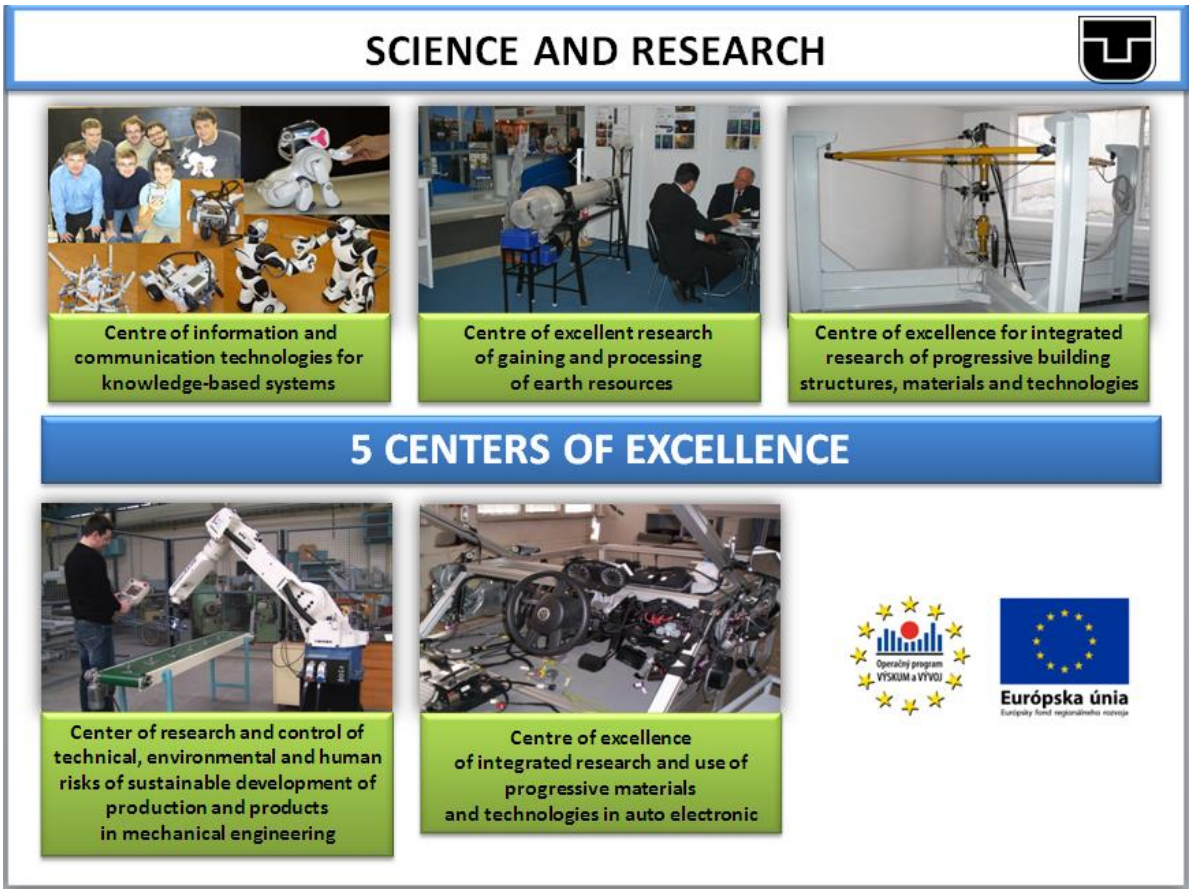
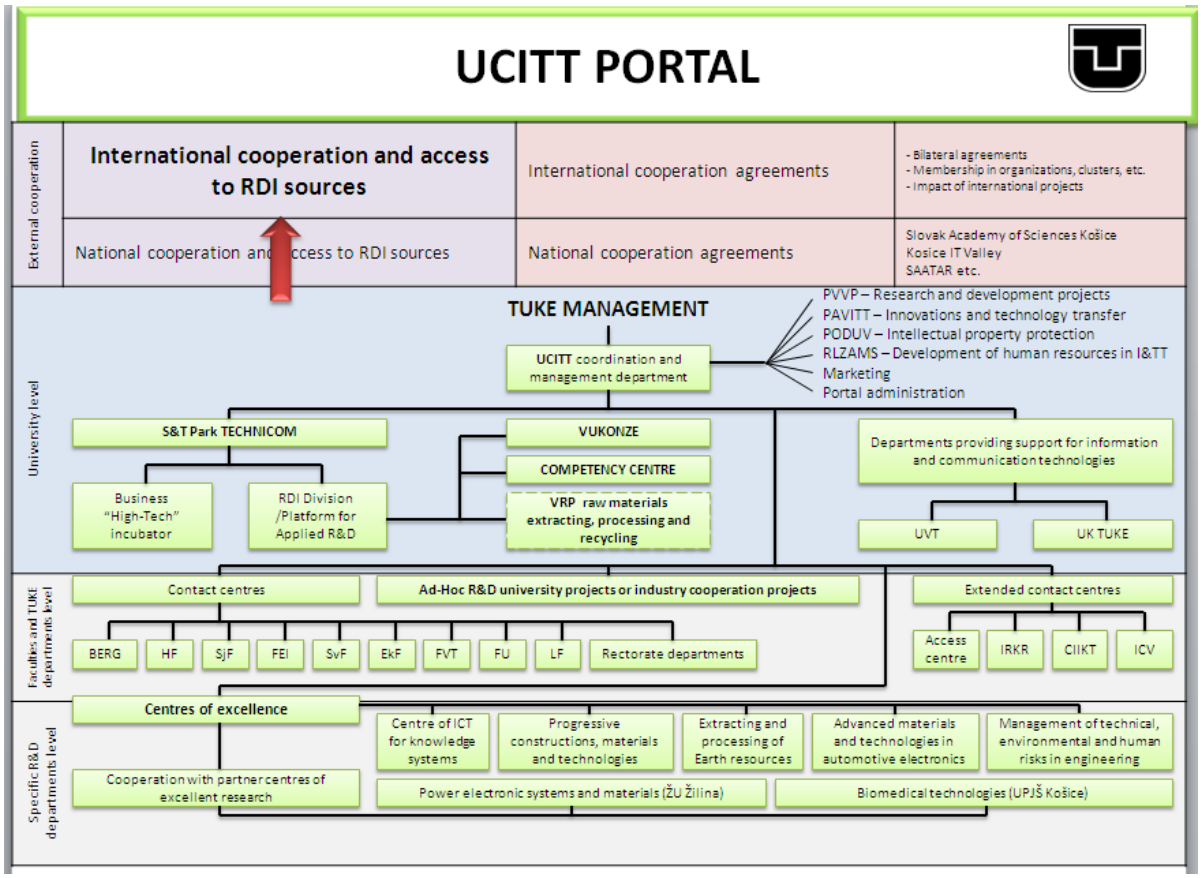

SCIENCE AND RESEARCH
Centre of information and communication technologies for knowledge-based systems
Centre of excellent research of gaining and processing of earth resources
Centre of excellence for integrated research of progressive building structures, materials and technologies
5 CENTERS OF EXCELLENCE
Center of research and control of technical, environmental and human risks of sustainable development of production and products in mechanical engineering
Centre of excellence of integrated research and use of progressive materials and technologies in auto electronic
Operačný program VÝSKUM a VÝVOJ
Európska únia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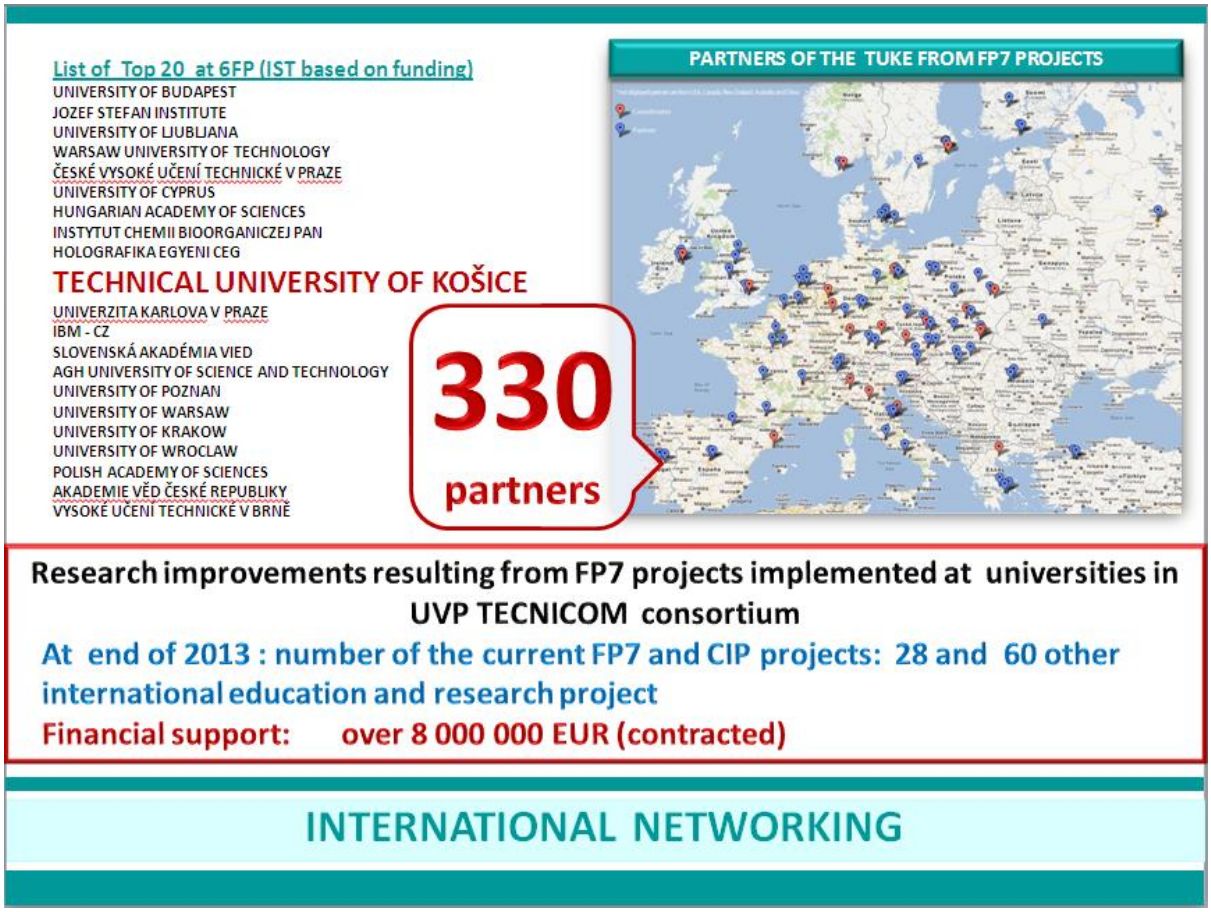
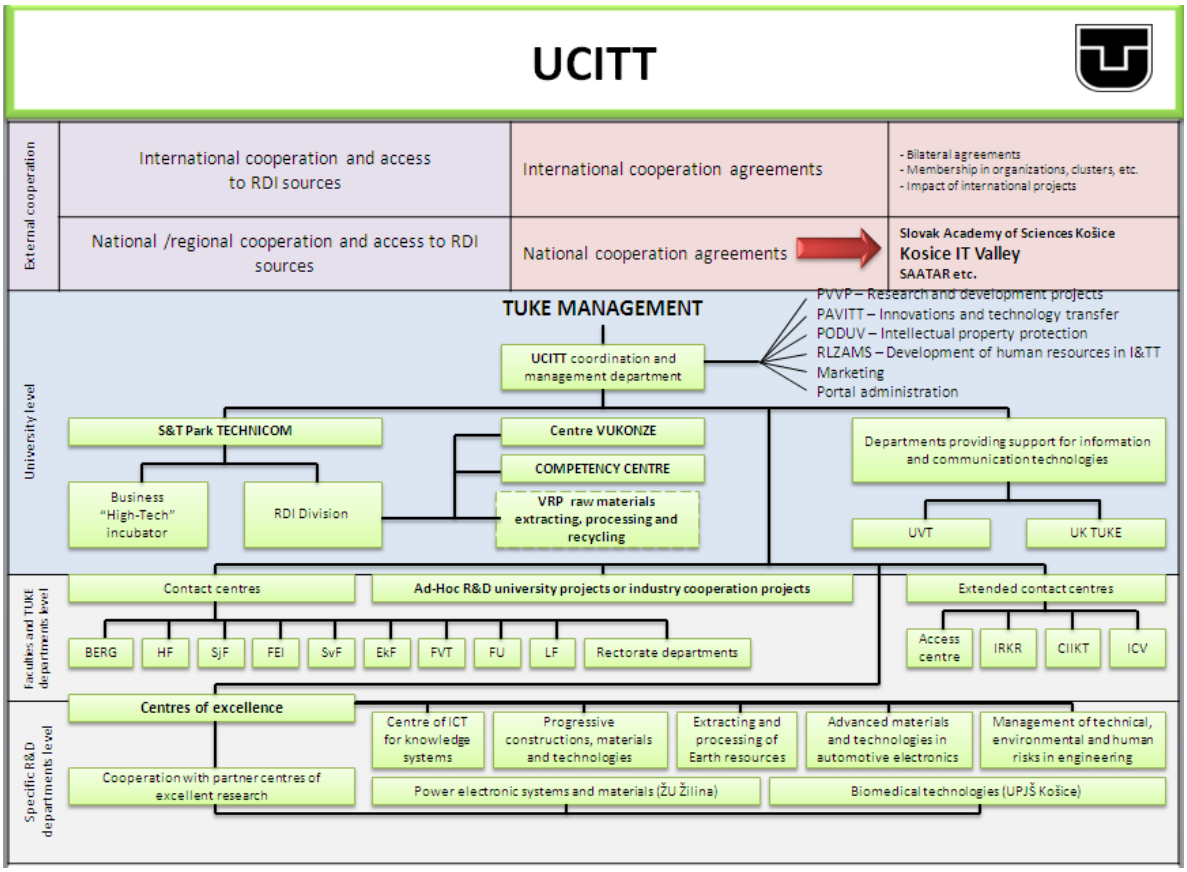

List of Top 20 at 6FP (IST based on funding)
UNIVERSITY OF BUDAPEST
JOZEF STEFAN INSTITUTE
UNIVERSITY OF LJUBLJANA
WARSAW UNIVERSITY OF TECHNOLOGY
ČESKÉ VYSOKÉ UČENÍ TECHNICKÉ V PRAZE
UNIVERSITY OF CYPRUS
HUNGARIAN ACADEMY OF SCIENCES
INSTYTUT CHEMII BIOORGANICZEJ PAN
HOLOGRAFIKA EGYENI CEG
TECHNICAL UNIVERSITY OF KOŠICE
UNIVERZITA KARLOVA V PRAZE
IBM - CZ
SLOVENSKÁ AKADÉMIA VIED
AGH UNIVERSITY OF SCIENCE AND TECHNOLOGY
UNIVERSITY OF POZNAN
UNIVERSITY OF WARSAW
UNIVERSITY OF KRAKOW
UNIVERSITY OF WROCLAW
POLISH ACADEMY OF SCIENCES
AKADEMIE VĚD ČESKÉ REPUBLIKY
VYSOKÉ UČENÍ TECHNICKÉ V BRNĚ
PARTNERS OF THE TUKE FROM FP7 PROJECTS
330
partners
Research improvements resulting from FP7 projects implemented at universities in UVP TECNICOM consortium
At end of 2013 : number of the current FP7 and CIP projects: 28 and 60 other international education and research project
Financial support: over 8 000 000 EUR (contracted)
INTERNATIONAL NETWORKING



TUKE – e.g. AS A MEMBER OF THE ASSOCIATION ...

košice IT VALLEY association

Košice IT Valley Association / Cluster

Slovak Association of Automation Technology and Robotics / Cluster

CEIT-KE
CENTRAL EUROPEAN INSTITUTE OF TECHNOLOGY

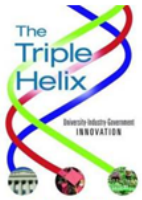
InTech Žiar nad Hronom z.p.o.

KOŠICE IT VALLEY ASSOCIATION / Cluster

EASTERN SLOVAKIA DESPERATELY NEEDS !

1. *to improve the quality of life*
2. *to make region more atractive*

1. Regional and local government
2. University
3. Business community



Košice IT Valley integrates all the major IT players.

Founding Members (10), year 2006:

- Universities (TUKE, UPJŠ)
- Košice Region
- ICT companies (T-Systems, NESS, Global Logic, Siemens PSE, VSE IT, Cisco Systems, ST, Microsoft, ...)

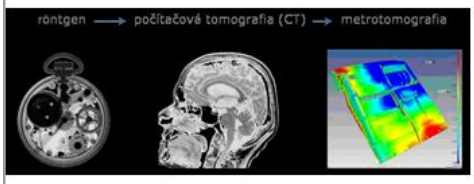
- at present ... more than 50 members
- about 6000 new ICT job positions !!!

CENTRAL EUROPEAN INSTITUTE OF TECHNOLOGY

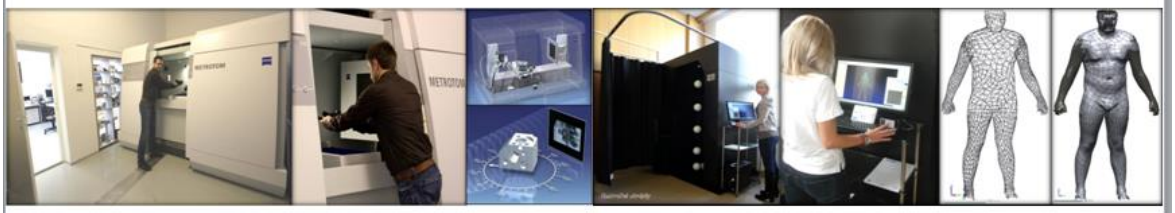
CEIT-KE
CENTRAL EUROPEAN INSTITUTE OF TECHNOLOGY

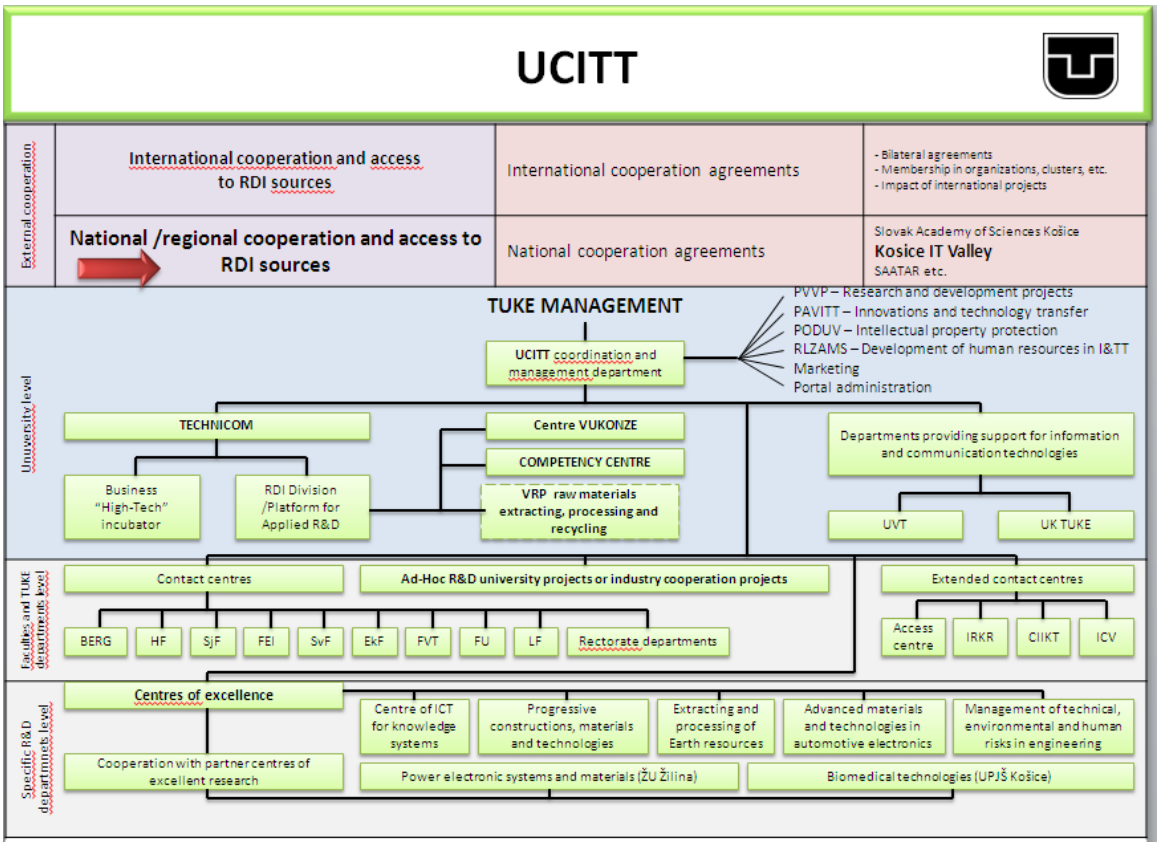
- founded in 2010,
- is focused on research and development activities in the field of biomedical engineering, diagnostics and measurement for industrial practice, and project management activities.

The main activities can be divided into:



- Industrial diagnostics and measurement,
- 3D scanning and data capture,
- Additive manufacturing, rapid prototyping,
- 3D printing / research, development and production of implants





PROJECT TITLE:

UVP TECHNICOM

University Science Park TECHNICOM for Innovation Applications Supported by Knowledge Technology

Operational Programme Research and Development
Priority axis 2: Support to research and development
Measure 2.2: Transfer of knowledge and technology from research and development into practice. Code: OPVaV-2011/2.2/01-PN
ITMS: 26220220182

RECIPIENT:

Technical University of Košice (TUKE)

PARTNERS:

University of Pavol Jozef Šafárik in Košice (UPJŠ in Košice)

Prešov University in Prešov (PU in Prešov)

BUDGET:

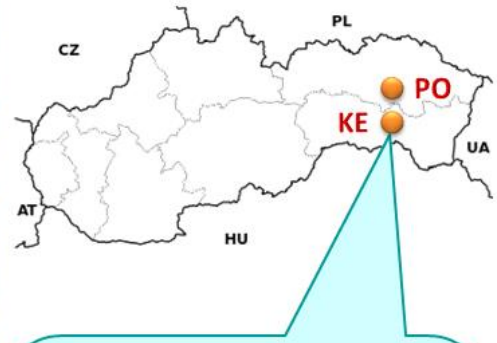
EUR 41,984,703.52
Eligible costs: EUR 41,735,688.04
Non-returnable financial subsidy: EUR 39,648,903.64

DURATION:

01/06/2013 – 31/10/2016 ???

Európska únia

PROJECT INTRO



Cities	2	(Košice, Prešov)
Campuses	3	(TUKE, UPJŠ, PU in Prešov)
Buildings	78	
Area	302 hectares	

UNIVERSITY IN NUMBERS

SCIENCE AND TECHNOLOGY PARK TECHNICOM -> University Science Park TECHNICOM

MISSION

- Support for active "Win to Win" collaboration between academic, public and commercial R&D organisations;
- Open and flexible R&D platform for targeted applied R&D, based on W2W collaboration with "excellent" research centers from TUKE and its partners Universities and institutions from the SAS allocated mainly in Kosice;
- Support for the technology transfer activities at processing of expected and required outcomes on the part of practice;
- Incubator for „Hi-Tech" companies in the framework of Spin-off, Start-up initiatives;
- Management, development and operation issues are provided by the UCITT;
- Consultancy, expertises, technical and technological support for the transfer of research knowledge and products
- Relevant support for education and training activities
- Nowadays main mission is ... to be "responsible and useful „god-father" of the University science park (UVP) TECHNICOM ... ... i.e. the project : "UVP TECHNICOM for innovative applications with knowledge-based technologies support"
- PARTNERS:
  - Technical University of Košice ... coordinator.
  - University of P.J.Šafarik in Košice ... partner
  - University of Prešov ... partner.

STRATEGIC GOAL OF THE PROJECT (MISSION): *„TO BUILD USP TECHNICOM AS AN INTERNATIONALLY RECOGNIZED CENTRE FOR RESEARCH AND TECHNOLOGY TRANSFER IN THE AREAS OF INTEREST BY MEANS OF INNOVATIVE APPLICATIONS SUPPORTED BY KNOWLEDGE TECHNOLOGY"*

Specific objectives of the project:

1) Organizational and managerial facilitation of the establishment and operation of USP TECHNICOM on the basis of high-quality scientific management
2) Building the physical and functional infrastructure of the park as a sophisticated research and technology entity
3) Cutting-edge applied research and development in the selected fields of science and technology:
    1. Information and communication technologies,
    2. Electrical engineering, automation and control systems,
    3. Mechanical engineering,
    4. Civil engineering (construction, transport, geodesy), and
    5. Environmental engineering (mining, metallurgy, water management),

    taking into account the corresponding social and human dimensions (impact).

The solution is focused on the coordination and facilitation of 36 selected PILOT PROJECTS of applied research and development in priority areas of USP TECHNICOM

in compliance with the OP RD call:

"The transfer of the relevant knowledge and technology from research and development into social and economic practice."

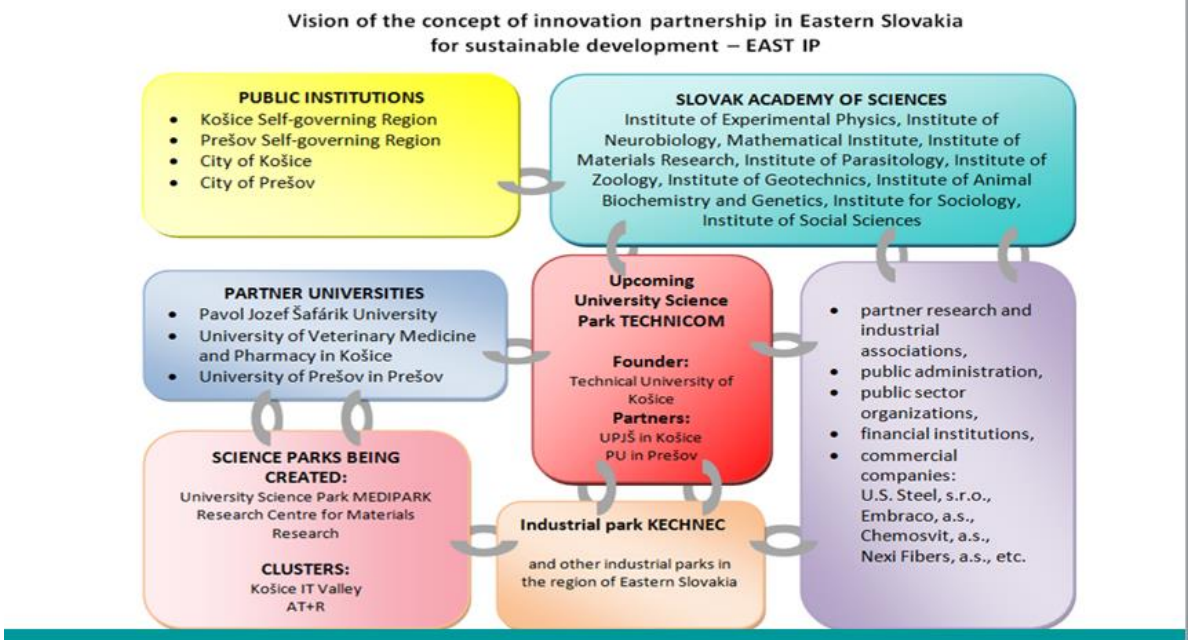
Goals and objectives of USP TECHNICOM

MISSION OF USP TECHNICOM:

- Creating the University Science Park TECHNICOM which focuses on knowledge-based research, education and innovation services aiming toward integrated solutions, products and systems applied with adequate support of information, communication and knowledge technologies.
- Creating an effective platform for applied research and development (R&D) and practical support for innovative activities, transfer of knowledge and technologies, on the basis of effective cooperation between the academic, social and economic spheres (region, nation and EU).
- USP TECHNICOM based on effective cooperation between the academic, social and economic spheres (region, nation and EU) with a direct relation to acceleration of research-based innovative business (based on the principles of spin-off and start-up effects of knowledge transfer from research to commercial or public practice).
- One of the key impacts USP TECHNICOM will be its ongoing support for economic and social development in the Košice and Prešov Region (forming region of Eastern Slovakia – NUTS II.) in the context of Slovak Smart Specialization Strategy (RIS3 SK).

VISION OF AIM/DEVELOPMENT OF USP TECHNICOM

SUPPORT FROM USP TECHNICOM FOR THE DEVELOPMENT OF EASTERN SLOVAKIA IN THE CONTEXT OF "RIS3 SK"



IMPACT IN THE FIELD OF RESEARCH AND DEVELOPMENT

TUKE STARTUP CENTRE (TECHNICOM)

Activities of TUKE Startup Centre fully cover the areas corresponding to the project USP TECHNICOM in area of "Business Acceleration".
The advantage of the Startup Centre allocation is access to the high quality R&D infrastructure and relevant mentoring support within TUKE

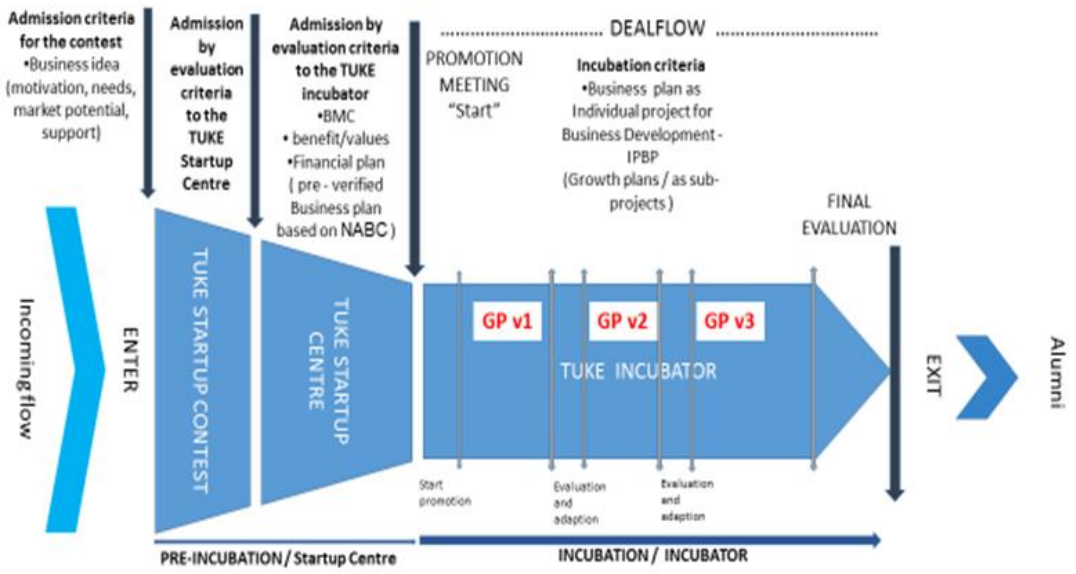
Activities of the TUKE Startup Centre in 2014:

- **Three rounds of innovative ideas competitions titled "Have you got an idea? Present your START-UP!"** There ~40 candidates entered the three competitions and presented their ideas before a selection committee in March and November 2014 and July 2015) and 19 candidates ware step by step selected for pre-incubation in the Startup Centre.
- In November 2014, the "Evaluation of the six-month pre-incubation stay of startups in the TUKE Startup Centre" took place; 2 projects from the first round were selected for incubation.
- Nowadays there are 5 "start-up" projects in the pre-incubation and **6 companies are included in to the incubation process.**

startupcentrum.tuke.sk

Overview of selected activities supporting the implementation of USP TECHNICOM

Business ACCELERATION – TUKE Model of the Deal-flow



Adapted by the courtesy of the Lead Incubator (Sweden)

USP TECHNICOM, MEMBER OF IASP

Member of IASP International Association of Science Parks and Areas of Innovation

- Conference titled **Qatar Science and Technology Park (QSTP) – DOHA, QATAR (October 2014)**
- **Welcoming ceremony for new IASP members** – representatives of USP TECHNICOM accepted a symbolic IASP membership certificate from the hands of Director General of IASP Luis Sanz.

Overview of selected activities supporting the implementation of USP TECHNICOM

3D VIRTUAL CAVE

STEREOSCOPIC DISPLAYS AND SYSTEMS

TABLETOP MICROSCOPE

DIGITAL MICROSCOPE

THERMOMECHANICAL ANALYZER

3D LASER SCANNER

WIRE CUTTING MACHINE

Key infrastucture and laboratories

HYDROGEN-POWERED CAR

ENERGY EFFICIENCY AND GREEN BUILDING MODEL

RESEARCH AND CONTROL OF TECHNICAL, ENVIRONMENTAL AND HUMAN RISKS OF SUSTAINABLE DEVELOPMENT OF PRODUCTION AND PRODUCTS

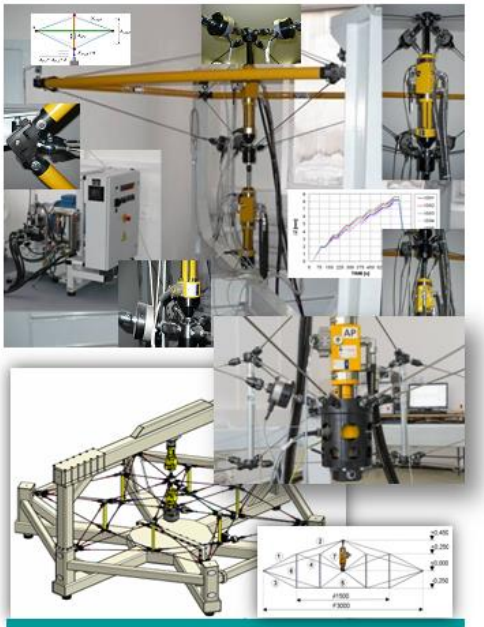
EQUIPMENT FOR LABORATORY ROLLING OF SAMPLES

X-RAY DIFFRACTOMETER

MULTIROTOR AERIAL SOLUTIONS - QUADCOPTER

STRAIN AND STRESS MEASUREMENT

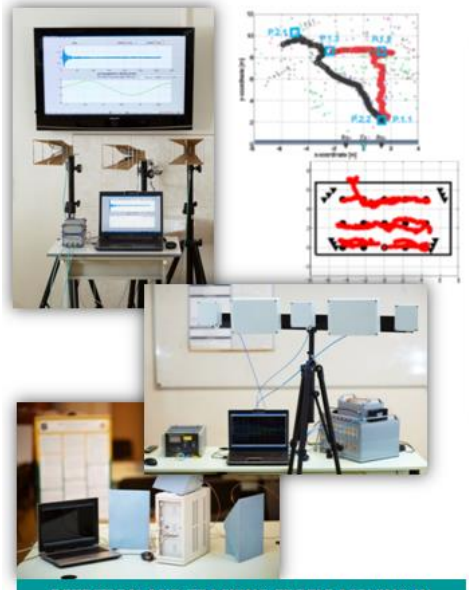
Key infrastucture and laboratories



DEVELOPING ADAPTIVE „TENSEGRITY" CONSTRUCTIONS

ARTIFICIAL INTELLIGENCE SYSTEMS

Key infrastucture and laboratories



DETECTION AND TRACKING PEOPLE MOVING IN SHORT DISTANCE USING UWB RADAR SYSTEM DESIGN OF CUSTOMIZED INTEGRATED CIRCUITS

RESEARCH IN BUILDING AND PROJECTING AN AUTOMATED AND ROBOTIC SYSTEMS

Key infrastucture and laboratories

Project USP TECHNICOM: Activity 3.5. Pilot projects in the field of Environmental Engineering

Faculty of Faculty of Mining, Ecology, Process Control and Geotechnology and Faculty of Metallurgy

PP-1. **New technologies and systems for efficient processing of carbon-bearing raw materials.** Assoc.Prof. Ing. Ján Spišák, PhD. (FP 7 – I²MINE, R&D Service):

1. New technology for energetic (combustion) and material (carbonization) treatment of carbon-bearing raw materials
2. Advanced control systems of thermal aggregates for energetic and material materials treatment

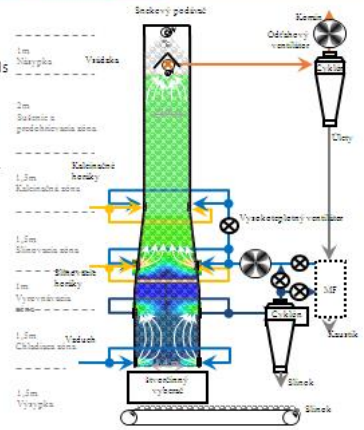
PP-2. **Testing and verification workplace for rubber products**... Prof. Ing. Daniela Marasová, CSc. (R&D Service – Diagnostic laboratory)

PP-3. **Innovative product concept based on Slovak magnesite /** Magnesium compounds, caustic calcined magnesia ... Prof. Ing. Pavel Raschman, CSc. (Spin-off)

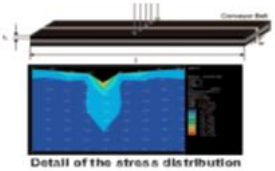
PP-4. **Recycling technology for secondary materials** ... Prof. Ing. Tomáš Havlík, DrSc. (Spin-off),

Electric arc furnace (EAF) dust = highly valued secondary raw material for zinc recovery .... Final products:

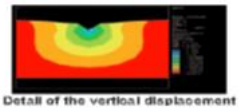
1-Electrolytic Zn, 2 -ZnSO4*7H2O, 3- ZnO



ŽELEZIARNE PODBREZOVÁ



UVP TECHNICOM



Európska únia

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