

11th Annual IEEE International Conference and Workshop

on the Engineering of Computer Based Systems

ECBS 2004

**May 24–27, 2004
Brno, Czech Republic**

TECHNICAL PROGRAMME



COMMITTEES

General chair:

Miroslav Švéda, Brno University of Technology, Czech Republic

Programme chair:

Václav Dvořák, Brno University of Technology, Czech Republic

Steering committee:

Miroslav Švéda, Brno University of Technology, Czech Republic

Václav Dvořák, Brno University of Technology, Czech Republic

Jerzy Rozenblit, University of Arizona, USA, U.S. Chair

Perry Alexander, University of Kansas, USA, TC-ECBS Chair

Programme committee:

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Magda Florea Adina, Romania	John Leaney, Australia
Perry Alexander, USA	Jacek Malec, Sweden
Ulf Asklund, Sweden	Mike Mannion, UK
Jakob Axelsson, Sweden	Bonnie Melhart, USA
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Nikola Bogunovic, Croatia	Miroslav Popovic, Serbia
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Piotr Czapiewski, USA	Wilhelm Rossak, Germany
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Witold Jacak, Austria	Janos Sztipanovitz, USA
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Gabor Karsai, USA	Hans van Vliet, The Netherlands
Franz Kurfess, USA	Jeffrey Voas, USA
Jonah Lavi, Israel	Stephanie White, USA

Local organizing committee:

Richard Růžička, chair

František Zbořil

Lukáš Sekanina

Rudolf Čejka

Jaromír Marušinec

Miroslav Linhart

WELCOME TO IEEE ECBS 2004

Welcome to the 11th IEEE International Conference and Workshop on the Engineering of Computer-Based Systems ECBS 2004!

The conference is dedicated to formulating and advancing methods, techniques and tools for the engineering of computer-based systems. This emerging discipline is devoted to the design, development, deployment, and analysis of complex systems whose behavior is largely determined or controlled by computers. CBSs are characterized by functional, performance, and reliability requirements that mandate the tight integration of information processing and physical processes. ECBS encompasses many facets: system modeling, requirements specification, simulation, architectures, communications, safety, security, reliability, software, hardware, human computer interfacing, system integration, verification, validation, and project management. ECBS is the integration of several engineering disciplines including software, hardware, and communications into a complete engineering discipline. The conference provides a bridge between industry and academia, and the program provides a balanced view of academic research and industrial developments.

The Brno meeting launches the second decade of ECBS gatherings and, concurrently, it is the first meeting in one of countries just accepted to the European Union. The success of this conference and workshop depends on many volunteers who have contributed their effort and enthusiasm. We are beneficiaries of the personal commitment to the quality of the program and proceedings by all reviewers. Special thanks belong to all who submitted papers; your ideas and accomplishments create the groundwork for our discussion and for progress in ECBS.

Miroslav Švéda
General chair

Václav Dvořák
Program chair

Jerzy Rozenblit
US chair

<http://www.fit.vutbr.cz/events/ECBS2004>



TIMETABLE

23.5.2004 Sunday

18:00-20:00 Get-together party

24.5.2004 Monday

09:00-09:30 Opening Session

09:30-10:15 Invited lecture – Prof. Lavi

10:15-10:45 coffee break

10:45-12:15 Session A1 Session B1

12:30-13:30 Lunch

14:00-15:30 Session A2 Session B2

15:30-16:00 coffee break

16:00-17:30 Session A3 Session B3

18:00-20:00 Social programme: Reception at the City Hall

25.5.2004 Tuesday

09:00-09:45 Keynote lecture - Prof. Honzík

09:45-10:15 coffee break

10:15-11:45 Session A4 Session B4

12:00-13:00 Lunch

14:00-15:30 Session A5 Session B5

15:30-16:00 coffee break

16:00-17:30 Session A6 Session B6

19:00-21:00 Social programme: Conference Dinner

26.5.2004 Wednesday

09:00-09:45 Keynote lecture - Prof. Kubát

09:45-10:15 coffee break

10:15-11:45 Session A7: MBD Session B7

12:00-13:00 Lunch

14:00-16:00 Session A8: MBD B8: Industrial Track 1

16:00-16:30 coffee break

16:30-18:00 A9: Workshop EASe 1 B9: Industrial Track 2

18:00-19:00 Technical Committee Meeting

20:00-22:00 Social programme: Farewell party in a wine cellar

27.5.2004 Thursday

09:00-10:30 A10: Workshop EASe 2 B10: Workshop MBD 1

10:30-11:00 coffee break

11:00-12:30 A11: Workshop EASe 3

13:00-14:00 Lunch

14:00-15:30 A12: Workshop SIAMAS 1 B12: Workshop FS 1

15:30-16:00 coffee break

16:00-18:00 A13: Workshop SIAMAS 2 B13: Workshop FS 2

28.5.2004 Friday

Trip to Prague

EVENTS AND LOCATIONS

The conference and workshops will take place at:

Brno University of Technology Centre (BUT Centre)

Address:

Antonínská 1, Brno

(Vysoké učení technické v Brně – rektorát, in Czech)



ECBS - 11th Annual IEEE International Conference and Workshop on the Engineering of Computer Based Systems 2004

Lecture rooms: A, B

MBD – 2nd Workshop and Session on Model-Based Development of Computer Based Systems: Appropriateness, Consistency and Integration of Models 2004

Lecture room: B

EASe - Workshop on Engineering of Autonomic Systems 2004

Lecture room: A

SIAMAS - Workshop on Security, Interoperability, and Applications of Mobile Agent Systems 2004

Lecture room: A

FS – IEEE TC-ECBS and IFIP WG10.1 5th Joint Workshop on Formal Specifications of Computer-Based System

Lecture room: B

Social programme will run at various places, for details see **SOCIAL EVENTS**.

MONDAY – MAY 24, 2004

9:00 – 9:30 Opening session

Chair: Miroslav Švéda and Václav Dvořák, Brno University of Technology (CZ)

9:30 – 10:15 Invited lecture

Chair: Miroslav Švéda, Brno University of Technology (CZ)

Systems Modeling and Requirements Specification Using ECSAM: A Method for Embedded Computer-Based Systems Analysis

J. Z. Lavi and J. Kudish, CBSE Associates (Israel)

10:15 – 10:45 Coffee break

10:45 – 12:15 Session A1: Modeling

Chair: Armin Eberlein, American Univ. of Sharjah (UAE)

A Comparative Analysis of Object-Oriented and Other Methods For Modeling Computer-Based Systems

S. M. White

Modeling and Simulation of Stability and Support Operations (SASO)

L. Suantak, D. Hillis, M. Barnes, F. Momen, J. Rozenblit, and J. Schlabach

Domain Independent Generative Modeling

B. Kusy, Á. Lédeczi, M. Maróti, and P. Völgyesi

10:45 – 12:15 Session B1: SW Architecture

Chair: Matthias Riebisch, Ilmenau Technical University (D)

The Scheduling Algorithms in Software Architecture Modeling

J. Guo and Y. Liao

An Explicit Definition of Connectors for Component-Based Software Architecture

M. Oussalah, A. Smeda, and T. Khammaci

Closing the Gap Between Software Modelling and Code

F. Wagner, T. Wagner, and P. Wolstenholme

12:30 – 13:30 Lunch

14:00 – 15:30 Session A2: Performance Analysis and Optimization

Chair: Yael Gilboa, Technion Haifa (IL)

Performance Analysis of Embedded Systems in the Virtual Component Co-Design Environment

P. Garg, A. Gupta, and J. W. Rozenblit

Enabling Optimisation in the Design of Complex CBS
J. Leaney, M. Denford, and T. O'Neill

Gradient Method with Topology Discovery for Load-Balancing in Active Networks
T. Koutný and J. Šafařík

14:00 – 15:30 Session B2: SW Techniques

Chair: Per Runeson, Lund University (S)

WICCAP: From Semi-structured Data to Structured Data
Z. Li and W. K. Ng

Suffix Caching Techniques of Streaming Media Based On Batch Patching
Cai Qingsong, Li Zimu, and Hu Jianping

Advanced Bayesian Optimization Algorithms Applied in Decomposition Problems
J. Schwarz, J. Očenášek, and J. Jaroš

15:30 – 16:00 Coffee break

16:00 – 17:30 Session A3: Distributed and Mobile Embedded Systems

Chair: Gabor Karsai, Vanderbilt University (USA)

A Design Framework for Internet-Based Embedded Distributed Systems
M. Švéda

WASP: A Radio Geolocation System on Highly Resource Constrained Mobile Platforms
K. Chhokra, T. Bapty, J. Scott, S. Winberg, J. Sztipanovits, D. van Rheeden, and B. Abbott

Efficient SOAP Processing in Embedded Systems
J. Janeček

16:00 – 17:30 Session B3: Formal Techniques 1

Chair: Armin Eberlein, American Univ. of Sharjah (UAE)

DVTG and Test Harnessing Using Rosetta Specifications
K. Zinjuwadia and P. Alexander

Applying Model Checking to Workflow Verification
J.-H. Pfeiffer, W. R. Rossak, and A. Speck

Validation of Reactive Embedded System against Temporal Requirements
J. Strug, S. Deniziak, and K. Sapiecha

18:00 – 20:00+ Reception at the City Hall

TUESDAY – MAY 25, 2004

9:00 – 9:45 Keynote lecture

Chair: Václav Dvořák, Brno University of Technology (CZ)

The Survey of Some Aspects Of European Higher Education at the Beginning of the Third Millennium

J. M. Honzík, Brno University of Technology (CZ)

9:45 – 10:15 Coffee break

10:15 – 11:45 Session A4: System Architecture

Chair: Miroslav Popovic, University of Novi Sad (Serbia)

Non-Functional Refinement of CBS Architecture

M. Denford, J. Leaney, and T. O'Neill

Architectural Description with Integrated Data Consistency Models

P. Tabeling

Theory and Applications of Evolvable Embedded Systems

L. Sekanina and V. Drábek

10:15 – 11:45 Session B4: Formal Techniques 2

Chair: John Leaney, University of Technology, Sydney (AU)

An Approach for the Verification of UML models Using B

N.-T. Truong and J. Souquieres

Formal Abstract Architecture for Use Case Specifications

O. Ryšavý and F. Bureš

Formal Specification of Shared Variables Using CSP

F. Ščuglík

12:00 – 13:00 Lunch

14:00 – 15:30 Session A5: CBS Tools

Chair: Jerzy Rozenblit, The University of Arizona (USA)

Improving CBS Tool Development with Technological Spaces

J. Sprinkle

GeneralStore - A CASE-Tool Integration Platform Enabling Model Level Coupling of Heterogeneous Designs for Embedded Electronic Systems

C. Reichmann, M. Kühn, P. Graf, and K. D. Müller-Glaser

A Concept of an Integrated Development Environment for Reactive Systems

I. Velikić, M. Popović, and V. Kovačević

14:00 – 15:30 Session B5: Simulation

Chair: Miroslav Popovic, University of Novi Sad (Serbia)

Efficient and Effective Simulation of Memory Maps for System-on Chip

G. Luculli

Simulation Approach to Embedded System Programming and Testing

P. Grillinger, P. Brada, and S. Racek

Simulation and Verification Tool for Hierarchical Real-Time Systems

J. Sebestyénová

15:30 – 16:00 Coffee break

16:00 – 17:30 Session A6: Requirements Engineering

Chair: Stephanie M. White, Long Island University (USA)

A Methodology for Requirements Engineering Process Development

Li Jiang, A. Eberlein, and B. H. Far

IRIS: A Semi-formal Approach for Detecting Requirements Interactions

M. Shehata, A. Eberlein, and A. Fapojuwo

Requirements Trade-offs During UML Design

A. Andrews, P. Runeson, and R. France

16:00 – 17:30 Session B6: Special Design and Teaching Techniques

Chair: Lukáš Sekanina, Brno University of Technology (CZ)

Network Virtual Laboratory for External Devices Programming

R. Klemous, J. Nikodem, T. Walkowiak, and J. Rozenblit

Role-Playing, Group Work and Other Ambitious Teaching Methods in a Large Requirements Engineering Course

B. Al-Ani and N. Yusop

Contracts and Games in Controller Synthesis for Discrete Systems

R.-J. Back and C. C. Seceleanu

19:00 – 21:00+ Conference dinner

WEDNESDAY – MAY 26, 2004

9:00 – 9:45 Keynote lecture

Chair: Miroslav Švéda, Brno University of Technology (CZ)

Induction in Time-Varying Domains: Motivation, Origins, and Encouragements

M. Kubát, University of Miami (USA)

9:45 – 10:15 Coffee break

10:15 – 11:45 Session A7: Model-Based Development 1

Chair: Matthias Riebisch, Ilmenau Technical University (D)

Features with Fuzzy Probability

A. Pieczyński, S. Robak, A. Walaszek-Babiszewska

Hand-written vs. MOF-based Metadata Repositories: The SOFA Experience

P. Hnětynka and M. Piše

Symbolic Model Checking of UML Statechart Diagrams with an Integrated Approach

V. S. W. Lam and J. Padget

10:15 – 11:45 Session B7: Applications

Chair: Josef Schwarz, Brno University of Technology (CZ)

Formal Approach to Synthesis of a Test Controller

R. Růžička and P. Tupec

An Efficient Implementation of the 1D DCT using FPGA Technology

H. EL-Banna, A. A. EL-Fattah, and W. Fakhr

Particle Rendering Engine in DSP and FPGA

P. Zemčík, A. Herout, L. Crha, O. Fučík, P. Tupec

12:00 – 13:00 Lunch

14:00 – 16:00 Session A8: Model-Based Development 2

Chair: Silva Robak, University of Zielona Gora (PL)

Supporting Evolutionary Development by Feature Models and Traceability Links

M. Riebisch

Functional and Object-Oriented Views in Embedded Software Modeling

J. M. Fernandes and J. Lilius

Tool Support for DFD-UML Model-based Transformations

D. Truscan, J. M. Fernandes, and J. Lilius

A Foundation for Tool-Supported Critical Systems Development with UML

J. Jürjens and P. Shabalin

14:00 – 16:00 Session B8: Industrial Track 1

Chair: Richard Růžicka, Brno University of Technology

Evolution of Software for Embedded Systems in Processor Expert

D. Kolář and S. Černý

The Networked Photo-Enforcement and Traffic Monitoring System Unicam

O. Fučík, P. Zemčík, P. Tupec, L. Crha, and A. Herout

ADC Position-Sense Interface

J. Háze and R. Vrba

A Modular Approach to SystemC based Codesign

Promoting Reuse of High-level Legacy C-models

O. Blaurock

16:00 – 16:30 Coffee Break

16:30 – 18:00 Session A9: Workshop on Engineering of Autonomic Systems (EASe 2004) 1

Chair: Roy Sterritt, University of Ulster (IRL)

Verification of Emergent Behaviors in Swarm-Based Systems

C. Rouff, A. Vanderbilt, M. Hinchey, W. Truszkowski, and J. Rash

Exploring Autonomic Options in an Unified Fault Management Architecture through Reflex Reactions via Pulse Monitoring

R. Sterritt, D. Gunning, A. Meban, and P. Henning

A Model-Based Self-Adaptive Approach to Image Processing

J. Nichols and T. Bapty

16:30 – 18:00 Session B9: Industrial Track 2

Chair: Otto Fučík, Brno University of Technology (CZ)

Throughput Computing

P. Matěna

COTS (Commercial Of The Shelf) Distributed System for Critical Application

V. Opluštil, L. Gáspár, D. Svačina, and Š. Szabó

Design and Optimization of Distributed Control System using UML Model

J. Kotzian and V. Srovnal

18:00 – 19:00 Technical Committee Meeting

20:00 – 22:00+ Farewell party in a wine cellar

THURSDAY – MAY 27, 2004

9:00 – 10:30 Session A10: Workshop EASe 2

Chair: Michael Hinchey, NASA GSFC (USA)

Model Based Self Adaptive Behavior Language for Large Scale Real-time Embedded Systems

S. Shetty, S. Neema, and T. Bapty

Asteroid Exploration with Autonomic System

W. Truszkowski, J. Rash, C. Rouff, and M. Hinchey

Some Autonomic Properties of Two Legacy Multi-Agent Systems – LOGOS and ACT

W. Truszkowski, J. Rash, C. Rouff, and M. Hinchey

9:00 – 10:30 Session B10: Workshop MBD 1

Chair: Wilhelm Rossak, University Jena (D)

Model-Based Development – Beyond Model Transformation

P. Tabeling

Closing the Gap Between Models and Code

P. Wolstenholme

Refinement and Formalization of Use Case Descriptions

Matthias Riebisch, Michael Hübner

10:30 – 11:00 Coffee break

11:00 – 12:30 Session A11: Workshop EASe 3

Chair: Ted Bapty, Vanderbilt University (USA)

Towards a Model-Driven Architecture for Autonomic Systems

D. Gračanin, S. A. Bohner, and M. Hinchey

Self-Adaptive and Self-Healing Message Passing Strategies for Process-Oriented Integration Infrastructures

Y. Caseau

Personal Autonomic Computing Self-Healing Tool

R. Sterritt and S. Chung

13:00 – 14:00 Lunch

14:00 – 15:30 Session A12: Workshop on Security, Interoperability, and Applications of Mobile Agent Systems (SIAMAS 2004) 1

Chair: Sergi Robles, Universitat Autònoma de Barcelona (E)

Applications for Mobile Agents in Peer-to-Peer Networks

D. Lübke and J. M. Gómez

Migration of Mobile Agents in Ad-hoc, Wireless Networks
N. Migas, W. J. Buchanan, and K. McArtney

A Formal Approach for Interoperability between Mobile
Agent Systems and Component Based Architectures
U. Pinsdorf

14:00 – 15:30 Session B12: Workshop FS1

Chair: Václav Dvořák, University of Technology Brno (CZ)

A MOF-Based Metamodeling Environment
M. J. Emerson, J. Sztipanovits, and T. Bapty

Platform Modeling and Transformations for Formal
Analysis
T. Szemethy, G. Karsai, and T. Bapty

Modelling Architectural Abstraction with a Category of
Poset Labelled Graphs to Aid the Practice of Design via
Refinement
M. Denford, A. Solomon, and J. Leaney

15:30 – 16:00 Coffee break

16:00 – 17:30 Session A13: Workshop SIAMAS 2

*Chair: Ulrich Pinsdorf, Fraunhofer Inst. For Computer
Graphics (D)*

An Implementation of Self-Protected Mobile Agents
J. Ametller, S. Robles, and J. A. Ortega-Ruiz

A Service-Oriented Software Architecture for Mobile Agent
Toolkits
*P. Braun, I. Müller, S. Geisenhainer, V. Schau, and
W. Rossak*

16:00 – 18:00 Session B13: Workshop FS2

Chair: Miroslav Švéda, Brno University of Technology (CZ)

Modular Design of Concurrent Systems
C. C. Seceleanu and T. Seceleanu

Formal Specifications of an Extended Phase-Parallel
Model of Stream Processing
V. Dvořák

Tools for Parametric Verification – A Comparison on a
Case Study
P. Matoušek

Integration of Formal Methods in a Specification
Framework for Embedded Systems
O. Ryšavý, F. Bureš, F. Ščuglík, and M. Švéda

SOCIAL EVENTS

Sunday – Get-together party

Place: Best Western Premier Hotel International Brno

Time: 18:00 – 20:00+

Monday – Reception at the City Hall

Place: the City Hall at Dominikánské náměstí (square) in downtown

Meeting point: at 17:40 in the front of BUT centre. We will walk together to the City Hall (approx. 10 minutes).

Tuesday – Conference Dinner

Place: Continental Hotel

Time: 19:00 – 21:00+

Wednesday – Farewell party in a wine cellar

Place: a wine cellar „U Královny Elišky“ at the Mendlovo náměstí (Mendel square)

Meeting point: at 19:30 in the front of BUT centre. We will walk together to the wine cellar (approx. 20 minutes). The party will be enriched by performance of the **Hradišťan Dulcimer Band**.

The Hradišťan Dulcimer Band belongs to the oldest and most well-known Moravian dulcimer bands. Since 1975 Jiří Pavlica has been the artistic director and the first violinist. Together with continuous and independent work of the Hradišťan dulcimer band the ensemble as a whole also started producing thematic musically choreographic projects (There was the Battle of Austerlitz, Moravian outlaw songs...). Folklore becomes a source of inspiration, while its philosophical nature is kept preserved.

The methods of work, dramaturgy and artistic standard make Hradišťan one of the most unique ensembles not only within the region. It is a regular guest of television programmes, national and international festivals of traditional, alternative, but also classical music, where it has gained numerous awards. The Hradišťan dulcimer band has recorded more than 20 records and CDs itself and has cooperated on many others. Although concert performances (about 150 concerts a year) are the band's main activities, the joy of music is the basic sense.

Friday – Trip to Prague

A trip to Prague is organized by Best Western Premier Hotel International Brno on Friday. Please ask for details at the registration desk before Wednesday 10:00 AM.

REGISTRATION

The registration desk will be located at the BUT centre and manned at the following times:

Monday	8:00 – 17:00
Tuesday	8:00 – 17:00
Wednesday	8:00 – 17:00
Thursday	8:00 – 12:00

Onsite registration fee:

IEEE Member	\$395
Non-Member	\$570
Fulltime Student	\$270
Student Member	\$215
Accompanying person	\$150
FS workshop only	\$120

Forms of payment accepted: credit cards (VISA, VISA Electron, EuroCard/MasterCard, American Express, JCB), cash

BRNO

Brno is the second city in the Czech Republic, in Southern Moravia. Although the city is famous for its trade fairs and for its motorcycling Grand Prix, it is also an interesting tourist destination. In this city you will find interesting Art Nouveau houses, Gothic and Baroque churches and good operas. Sights include the Cathedral of Sts. Peter and Paul, Old Town Hall and the Capuchin Monastery. The 13th-century Špilberk Castle, a prison before World War II, has a wonderful view of the city and countryside. Near the castle is the Augustinian monastery where Gregor Mendel first discovered the laws of genetics using pea plants. Part of the monastery houses a museum, and Mendel's experimental garden can still be toured.

Local transport in Brno

There are no conductors in buses and trams. Tickets must be purchased in advance and validated by passengers upon entry. A 40-min. ticket costs 13 CZK in Brno and may be purchased in selected newspaper/tobacco shops and ticket machines. You can use taxi as well. Usual prices are about 20 CZK per km. It's a good idea to agree on a price with a driver before committing to the ride, and be sure that the meter is running while you are in the taxi.

Brno University of Technology (BUT)

With 15,000 students BUT is now the second largest university in Brno. BUT comprises faculties of Civil Engineering, Mechanical Engineering, Faculty of Electrical Engineering and Communication, and Architecture. The study at these faculties has recently been complemented by a number of new courses. Thanks to the establishment of the Faculty of Business and Management, Faculty of Fine Arts, re-establishment of the Faculty of Chemistry and establishment of the Faculty of Information Technology, the range of the study areas has been widened so that, at present, the Brno University of Technology, as the only technical university in the Czech republic, covers the whole spectrum of technical sciences.

The Faculty of Information Technology (FIT) at Brno University of Technology was established on 1st January 2002. It was developed from the former Department of Computer Science and Engineering, Faculty of Electrical Engineering and Computer Science, Brno University of Technology. The Department of Computer Science and Engineering was established in 1964 and has had a long tradition in teaching computer science and informatics in the framework of the former Faculty of Electrical Engineering.

At present, the Faculty of Information Technology provides education to future specialists in the Bachelor study programme and the Master study programme in Computer Science and Engineering and the Doctoral study programme in the scientific branch Information Technology. From academic year 2002/3 the Faculty offers a new three-year Bachelor study programme Information Technology (Bc.). Starting from the academic year 2005/2006 a two-year follow-up Master study programme Information Technology (Ing.) will be opened. These study programmes respect the principles of the Bologna Declaration for the development of tertiary education in Europe. The structures of both study programmes are fully compatible with the European space for higher education.

The second-level students and postgraduate doctoral students are involved in research projects, which form an important part of the Faculty activities. A considerable part of teaching and research activities is centralized in the Computer Centre. Apart from the scheduled laboratory work, students work individually on their own semester, year or diploma projects. Laboratories equipped with personal computers are at their disposal as well as the laboratory with workstations.

<http://www.fit.vutbr.cz>

ACKNOWLEDGEMENTS





○ U Královny Elišky – wine cellar (Mendlovo náměstí)

● Brno University of Technology Centre
(Rektorát VUT, Antonínská 1)



-  Best Western Premier Hotel International Brno (Husova 16)
-  Continental Hotel (Kounicova 6)
-  Brno University of Technology Centre (Rektorát VUT, Antonínská 1)
-  City Hall (Dominikánské náměstí)

NOTES