



# Department of Radio Electronic

**prof. Ing. Aleš Prokeš, Ph.D.**

## BRNO UNIVERSITY OF TECHNOLOGY (18 200 students)

### FACULTIES

- Faculty of Civil Engineering
- Faculty of Mechanical Engineering
- **Faculty of Electrical Engineering and Communication** (3200 st)
- Faculty of Architecture
- Faculty of Chemistry
- Faculty of Business and Management
- Faculty of Fine Arts
- Faculty of Information Technology

### UNIVERSITY INSTITUTES

- Institute of Forensic Engineering
- Centre of Sports Activities
- Central European Institute of Technology (CEITEC BUT)

### DEPARTMENTS

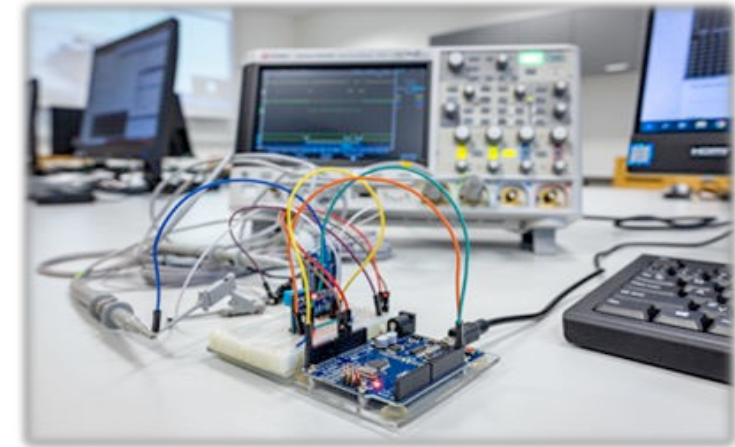
- Department of Biomedical Engineering
- Department of Control and Instrumentation
- Department of Electrical Power Engineering
- Department of Electrical and Electronic Technology
- Department of Foreign Languages
- Department of Mathematics
- Department of Microelectronics
- Department of Physics
- Department of Power Electrical and Electronic Engineering
- **Department of Radio Electronics** (200 st)
- Department of Telecommunications
- Department of Theoretical and Experimental Electrical Engineering

### RESEARCH CENTRES

- Centre for Research and Utilization of Renewable Energy Sources
- Centre of Sensor, Information and Communication System

### STUDY PROGRAMS

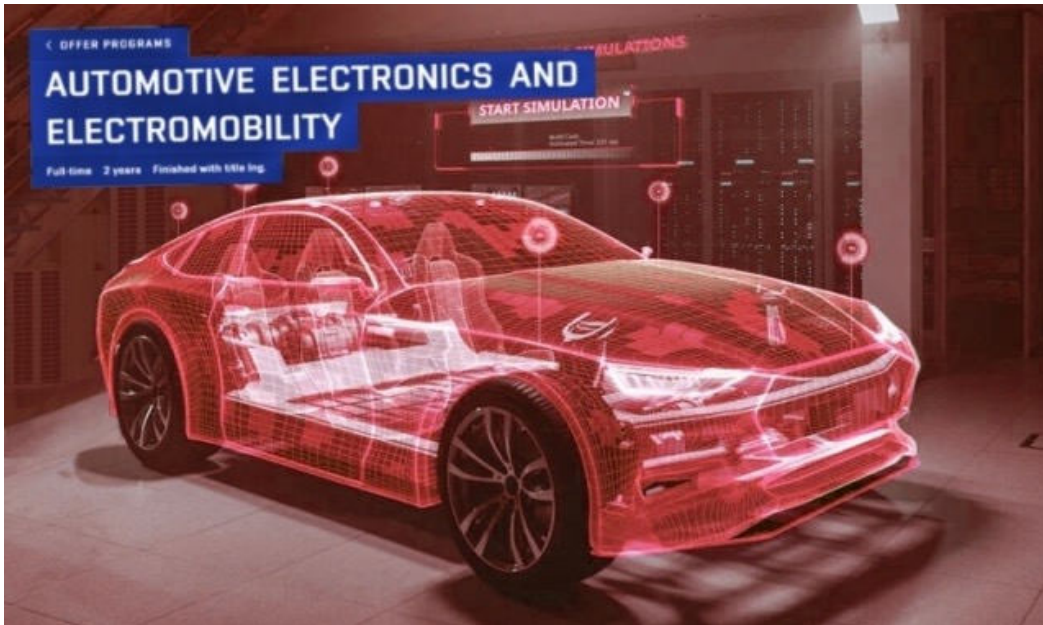
- Bachelor's degree
  1. Electronics and communication technology, full-time, distant (Czech, MPC-EKT, MKC-EKT)
- Master's degree
  2. Electronics and communication technology, full-time, distant (Czech, MPC-EKT, MKC-EKT).
  3. Space Applications, full-time (English, MPA-SAP)
  4. Telecommunications, full-time (English, MPA-TEC)
  5. Telecommunications, full-time (JD with TU Vienna, MPAJ-TEC)
  6. Automotive Electronics and Electromobility, full-time (English, MPA-AEE)
- Doctoral study
  7. Electronics and communication technology, full-time, distant (English and Czech DPC/DKC-EKT, DPA/DKA/EKT)



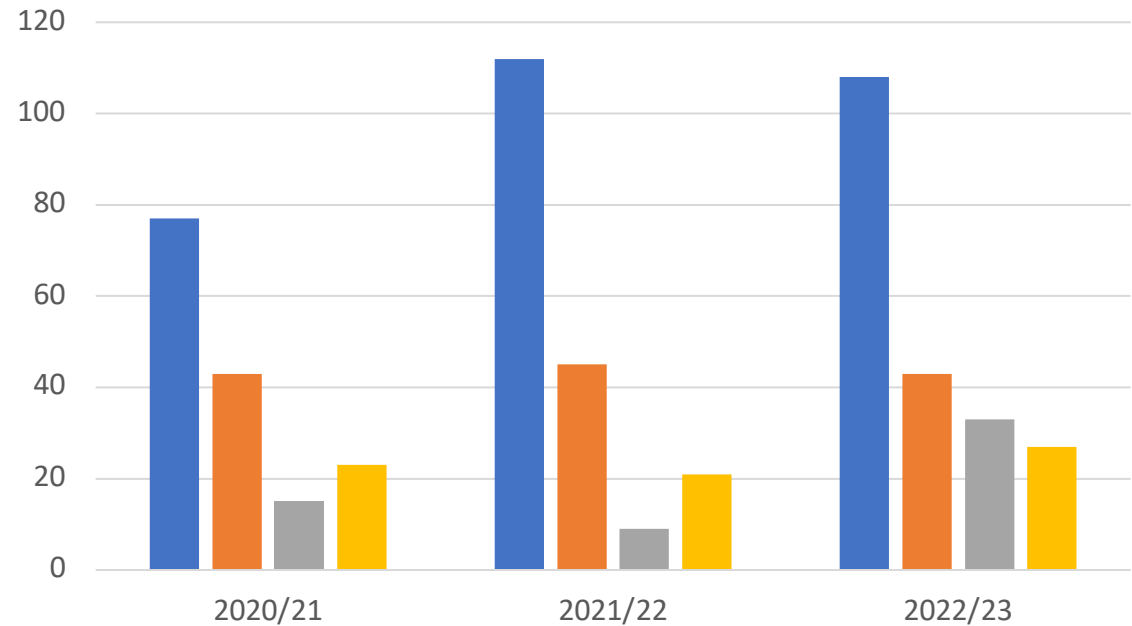
English programs

### Numbers of courses (2022)

- 35 courses in the bachelor's study, 10 of which are in English
- 58 in master's studies, of which 36 are in English.



### Numbers of students in partial study types

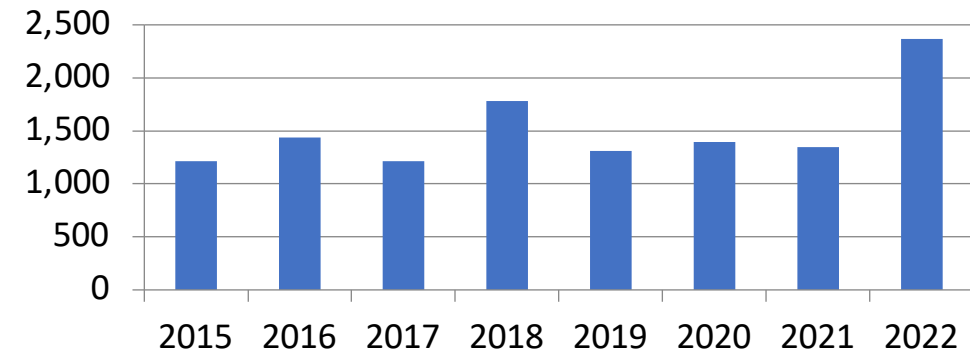


- Bachelor studies in total (2nd and 3rd year)
- Master's Czech study EKT (4th and 5th year)
- Master's English study TEC, SAP, AEE, (4th and 5th year)
- Doctoral studies DPC/DKC-EKT, DPA/DKA/EKT (1st to 5th year)

## AREAS OF R&D

- Applied Electromagnetism
- Radio frequency systems
- Mobile wireless communication
- Coexistence of wireless services
- Optical communications – OptaBro
- Special electronics and embedded systems

Publication results - evaluation by the government



**Honeywell**

**unipi** technology

**SEWIO**

**MEGA**  
MĚŘICÍ ENERGETICKÉ APARÁTY

**ELDIS**  
RADAR  
SYSTEMS

**AkuEnergy**

**YSOFT**

**FOXCONN**

**meopta**

**DAIKIN**

**ASTOTEC**  
Automotive



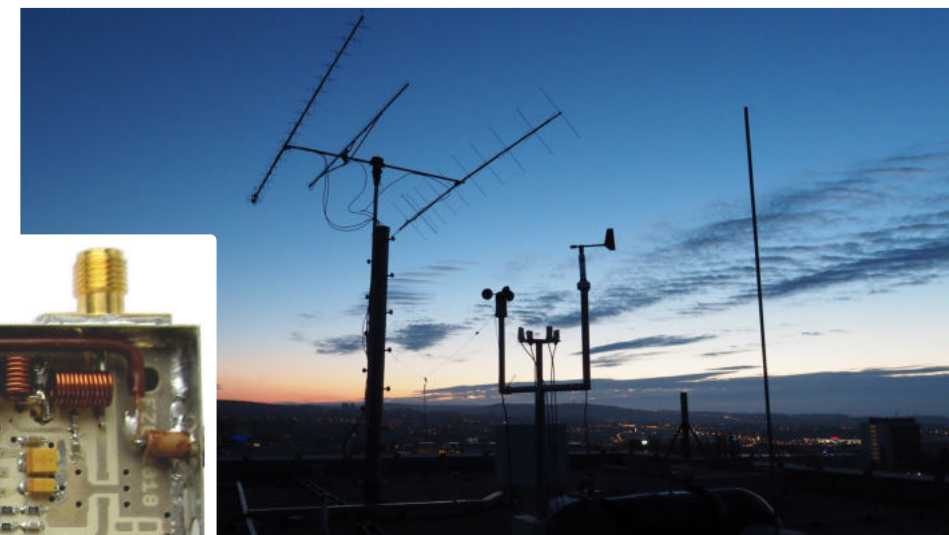
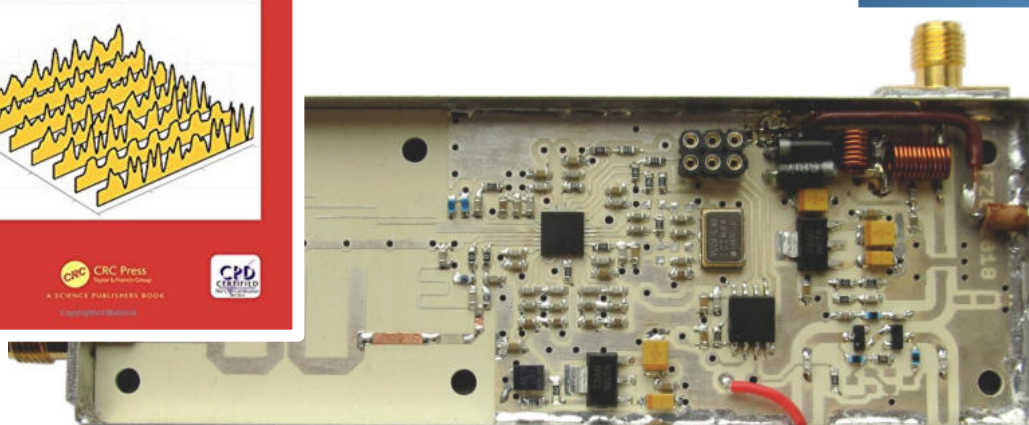
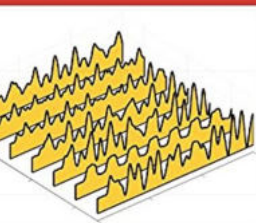
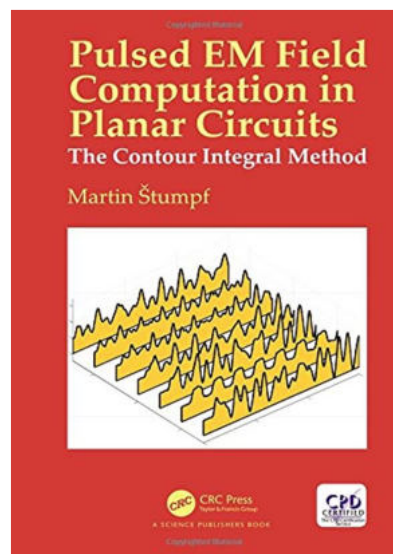
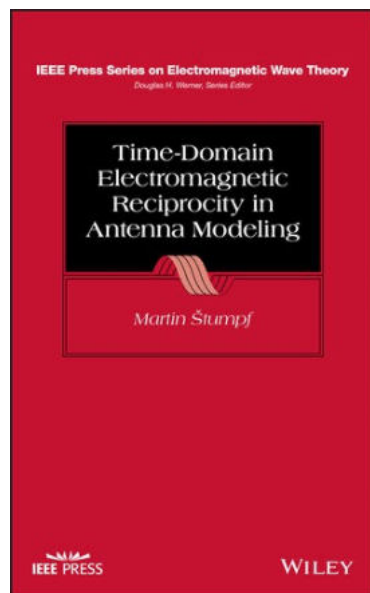
**esa**  
European Space Agency

# RESEARCH ACTIVITY



- Applied Electromagnetism: [Jaroslav LÁČÍK](#)

- ✓ UHF RFID concepts that can be used with unmodified EPC Gen2 tags.
- ✓ New technologies for microwave links and antennas in the 38 GHz and 75 GHz / 85 GHz bands.
- ✓ High power transmission antennas for DVB-H and DVB-T.
- ✓ Computational electromagnetism.



# RESEARCH ACTIVITY



- Radio frequency and wireless optical systems: [Aleš Prokeš](#)

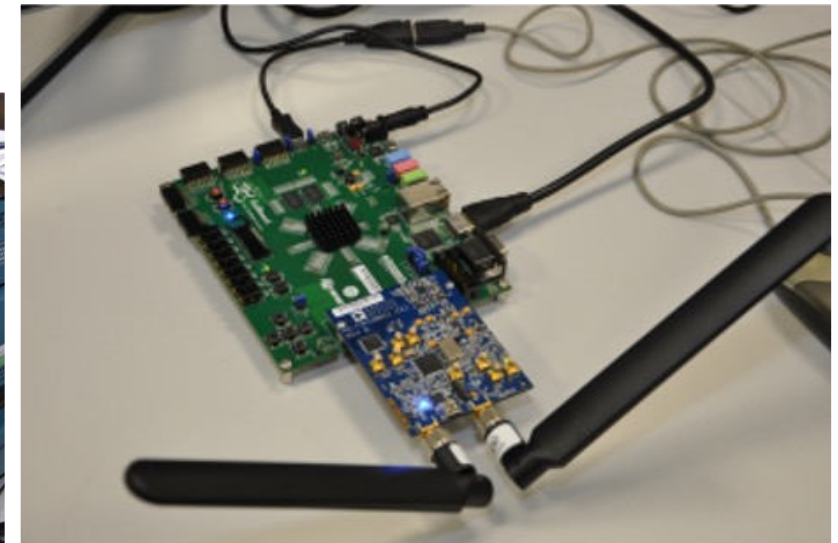
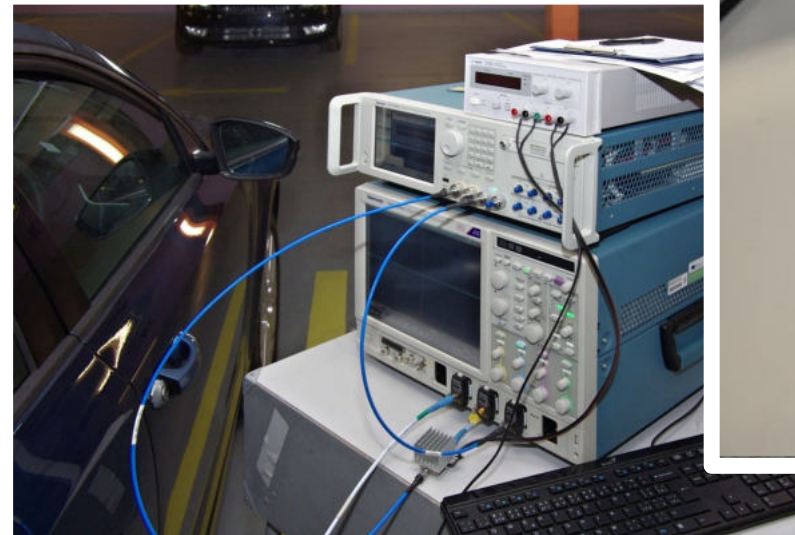
- ✓ Modeling and analysis of transmission channels in the millimeter wave band.
- ✓ Implementation of RF system algorithms into SDR, development of systems for channel analysis.
- ✓ Modeling the atmospheric transmission environment for wireless optical links.
- ✓ Modulation techniques for VLC and applications of fully photonic wireless systems.



# RESEARCH ACTIVITY



- Mobile wireless communication: [Roman Maršálek](#)
  - ✓ Research of new modulation techniques (OTFS).
  - ✓ Algorithms for compensation of imperfections radio communication chain system.
  - ✓ Prototypes of RF/IF power amplifiers in the band 50 MHz - 5.5 GHz.
  - ✓ Image and video compression and transmission with a focus on perceived quality.

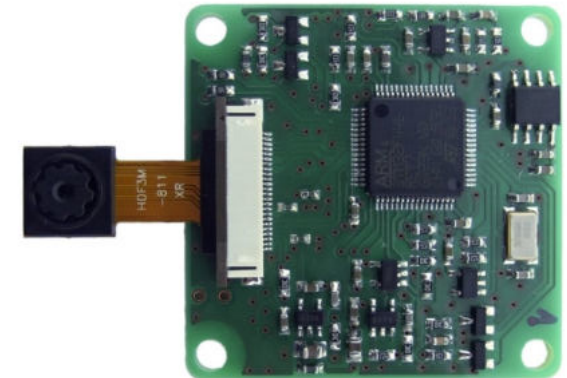




# RESEARCH ACTIVITY



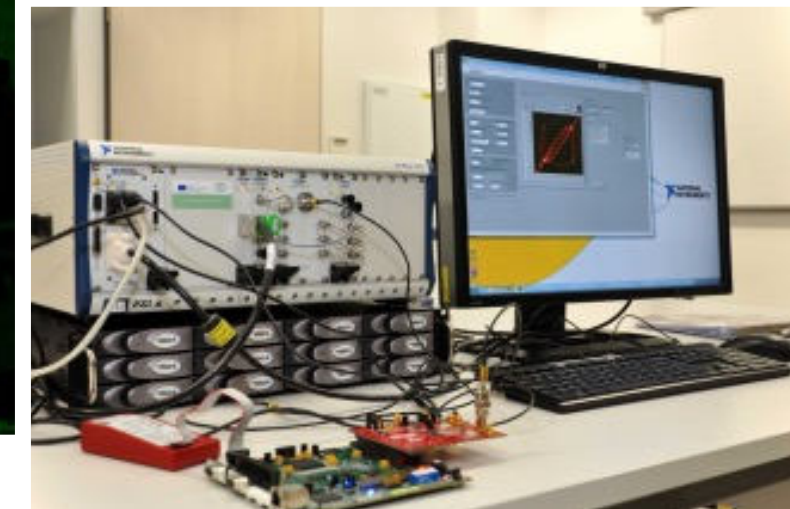
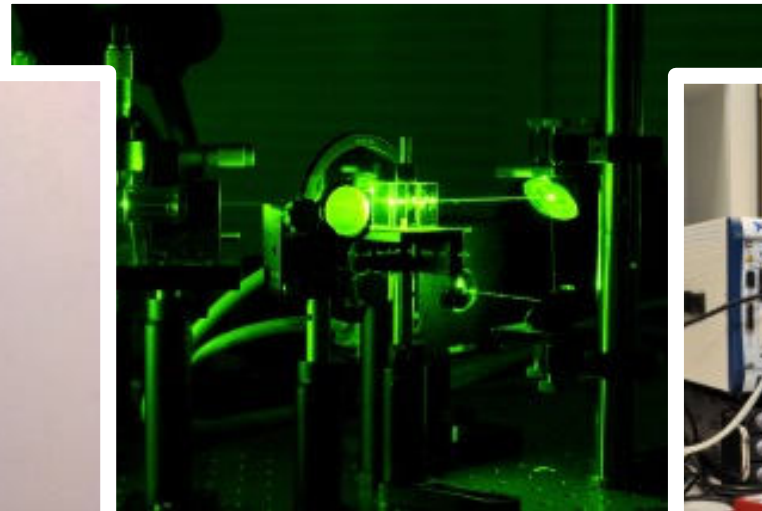
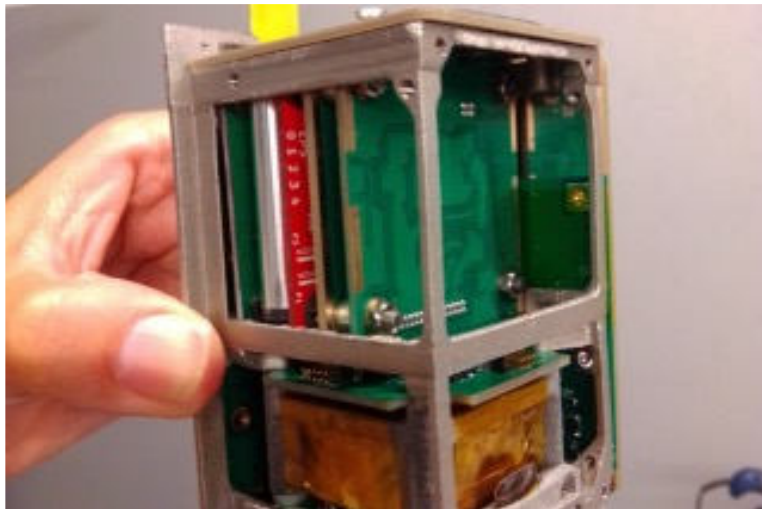
- Special electronics & embedded systems: [Michal Kubíček](#)
  - ✓ Set for automated EMC measurement of cars (Škoda a.s.)
  - ✓ Equipment design for the aerospace and automotive industries and space applications.
  - ✓ Development of instruments for measurement of ionizing radiation, radiolocation, optoelectronics, control and regulation.
  - ✓ Application of wireless communication interfaces GSM/LTE, LoRaWAN, RFID, WiFi, Bluetooth, ANT.
  - ✓ Control and display unit of air conditioning systems for small aircraft and helicopters (MESIT s.r.o.).



# FEATURED LABORATORIES

Introduction of DREL

- ✓ Antenna LAB
- ✓ RF and Communication Systems LAB
- ✓ Satellite and Space LAB
- ✓ Optical Communications LAB



- EMC anechoic chamber



- ŠKODA Auto, Czech Republic
- ŠKODA Auto India Private Limited C/o Volkswagen India Pvt. Ltd



### EMI receivers Rohde&Schwarz ESU 26 and ESRP 7

- R&S HL-562
- R&S HL-050
- Aaronia 7040

### Susceptibility testing

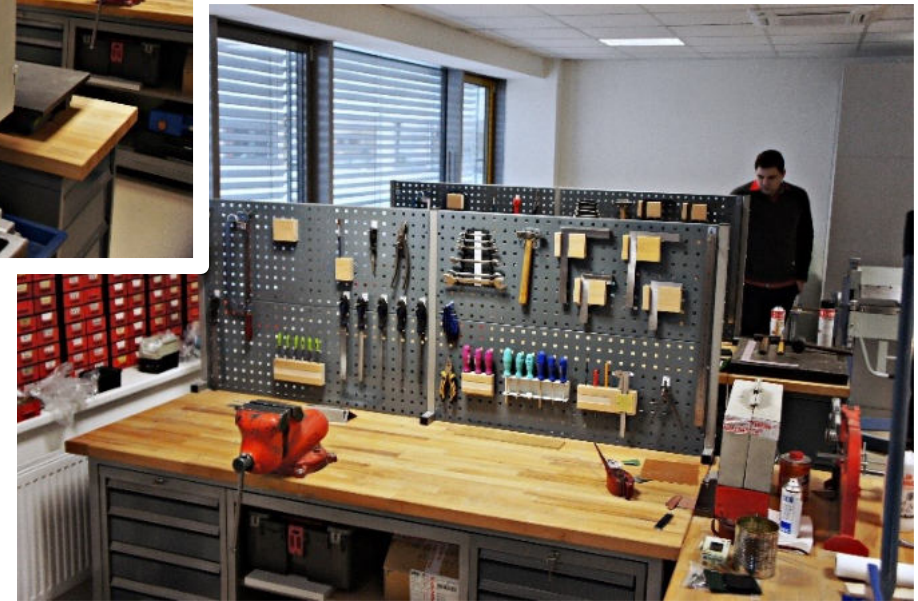
- ESD -> EN 61000-4-2
- Burst -> EN 61000-4-4
- Surge -> EN 61000-4-5
- Dips -> EN 61000-4-11



# OTHER LABS AND FACILITIES

Introduction of DREL

- Mechanical workshop



## PROFESSIONAL STRUCTURE OF THE INSTITUTE

- 10 professors,
- 11 associate professors,
- 6 assistant professors (all Ph.D.),
- 13 researchers (mostly Ph.D. students),
- 2 assistants and two technical staff.



## Department of Radio Electronics

[fekt-urel@vut.cz](mailto:fekt-urel@vut.cz)

Technicka 3082/12

616 00 Brno

Czech Republic

Web: [www.urel.fekt.vut.cz](http://www.urel.fekt.vut.cz)

Tel: +420 5 4114 6556

