

SELF-EVALUATION REPORT MODULE 3

**EVALUATED UNIT: Faculty of Electrical Engineering,
Czech Technical University in Prague**

FORD: 2. Engineering and Technology

MODUL 3 SOCIAL RELEVANCE

SOCIAL RELEVANCE / SOCIAL BENEFIT OF THE EVALUATED UNIT¹

3.1 General self-assessment of the social benefit of R&D&I in the fields of research at the evaluated unit, and of the evaluated unit as a whole

The evaluated unit gives a concise, general but informative account of the benefit of R&D&I in the fields in the 2014–2018 reporting period.

CTU FEE, as one of the top research institutions in the Czech Republic, conducts **original** and **innovative scientific research** in many fields. In the evaluation of faculties carried out by a broadsheet daily (Hospodářské Noviny, 2018), we were awarded the highest mark in the categories of scientific orientation, international openness and attractiveness, evaluation of courses and teachers, and graduate employment. In particular, predominantly due to FEE's scientific outputs, the **QS World Rankings**, in both **Computer Science and Electrical Engineering (CS & EE)**, have consistently placed CTU in the 151th to 200th range.

FEE affects the society via extensive **cooperation with high-tech companies**, in projects as well joint laboratories e.g. with Electrolux, Red Hat, CRRC and Toyota, which are located on faculty premises. Faculty R&D teams also work on projects **responding** to the **needs** of the **government**, especially **health, security** and **defence institutions**. FEE participates in **space projects** and collaborates with agencies, including foreign agencies (DARPA). In the monitored period, we completed 668 international and domestic grant-funded projects in basic and applied research, including European structural fund projects. FEE is a **sought-after partner for industry**: the income from our economic activity increased from EUR 2.0 million to EUR 4.3 million in the 2014-2018 period, and totalled EUR 15.6 million.

As a social benefit, FEE provides **highly educated professionals** in many CS & EE branches. The survey of FEE graduates from 2015 to 2018 found that only one of the 392 respondents was unemployed. 76% of FEE graduates work in a field related to their degree. In 2018, the average gross income of a fresh graduate was EUR 1 800 (CZK 45 000), and after three years of practice it rises to EUR 2 400 (CZK 60 600) on average, about double the national average.

FEE intensively **popularizes science and research**. From 2014 to 2018, we registered over 2 500 media appearances of our academic staff on TV, on radio, in the press, and on the Internet.

HTML links to additional documentation:

¹ In accordance with Section 22(1) of Act No 111/1998 on universities, amending certain acts (the Universities Act), as amended.

APPLIED RESEARCH PROJECTS

3.2 Applied research projects²

The evaluated unit presents a maximum of the five most significant (from the perspective of evaluated unit) applied research projects in the 2014–2018 reporting period from the complete list in the appendix (tables 3.2.1 and 3.2.2), particularly with regard to the results achieved or a project's potential for application.

Over 160 applied research projects were started in the reporting period. About 100 were supported by national sources, 50 from within the EU, and the rest received support from the USA, Japan, and other developed countries.

- Distributed computing, storage and radio resource allocation over cooperative femtocells. **FP7 project "TROPIC"**, 10 partners from 7 countries, Results: new concepts of small cell-clouding, which merges cloud computing with small cells towards 5G mobile networks – Mobile Edge Computing, 72 contributions to int. standardizations, 23 journals, 47 conf. papers.
- **Integrated Satellite and Terrestrial Navigation Technologies Centre.** TACR Centre of Competence of FEE CTU and four industrial partners. Results: increased competitiveness of the Czech Republic by launching the new device; a navigation device with maximum precision, accessibility of information, and good reliability; a demonstrator. More than 50 IPR or publ. results, some of them applied in satellite and navigation systems.
- **CAP - Centre for Advanced Photovoltaics.** Established in 2016, supported from European Structural and Investment Funds and from the Czech Republic state budget. CAP brings together top experts in the field of photovoltaics from CTU in Prague and abroad. Over 60 results of various types, including 1 patent, more than 30 publications in scientific journals and many contributions at int. conferences.
- **Advanced sensors and sensor data processing methods.** TACR Centre of Competence, 8 partners from industry and academia, led by CTU. Results: advanced sensors and methods for sensor data processing for a wide area of industrial applications from the automotive, rail and aerospace sectors, 2 patents, 2 verified technologies, 2 results with legal protection, 14 functional samples, 1 software and 31 other publ. outputs, established several new European and national projects, results applied in the aerospace and rail industries, and remote sensing.
- **V3C- Visual Computing Competence Centre.** TACR Centre of Competence, two academic partners and four industrial partners. Over 70 results of various types, including patents (6 US pat.), software (2), and top journal publications (17) in the area of Computer Graphics and Computer Vision applied in the movie industry and in various visual surveillance systems.

² Under Section 2(1)(b) of Act No 130/2002, applied research is theoretical and experimental work aimed at gaining new knowledge and skills for the developing of new or substantially improved products, processes or services; applied research includes industrial research or experimental development, or a combination of both. Under Article 2 of Commission Regulation (EU) No 651/2014 of 17 June 2014 declaring certain categories of aid compatible with the internal market in application of Articles 107 and 108 of the Treaty, industrial research means planned research or critical investigation aimed at the acquisition of new knowledge and skills for developing new products, processes or services, or for bringing about a significant improvement in existing products, processes or services. It comprises the creation of component parts of complex systems, and may include the construction of prototypes in a laboratory environment or in an environment with simulated interfaces to existing systems as well as of pilot lines, when necessary for the industrial research and notably for generic technology validation; experimental development means acquiring, combining, shaping and using existing scientific, technological, business and other relevant knowledge and skills with the aim of developing new or improved products, processes or services. This may also include, for example, activities aiming at the conceptual definition, planning and documentation of new products, processes or services.

HTML links to additional documentation:

<https://www.ict-tropic.upc.edu/>
<https://starfos.tacr.cz/en/project/TE01020186>
<http://www.cap.fel.cvut.cz/en/>
<https://www.fel.cvut.cz/en/aktuality/2013/senzory.html>
<https://starfos.tacr.cz/en/project/TE01020415>

3.3 Contract research³

The evaluated unit briefly comments on revenues from contract research for the 2014–2018 reporting period from the complete list in the appendix (tables 3.3.1 and 3.3.2).

More than 360 contracts were signed with large corporations and with small or medium-size enterprises (SME). The income from the contracted research totals approx. EUR 6.8M. The revenues from these activities represent a significant part of the faculty budget, and they have been growing in recent years; revenues in the reporting period: EUR 607k (2014), EUR 1 066k (2015), EUR 1 409k (2016), EUR 1 685k (2017), EUR 2 444k (2018).

HTML links to additional documentation:

3.4 Revenues from non-public sources (besides grants or contract research) from research work

The evaluated unit briefly comments on revenues for the 2014–2018 reporting period for R&D&I from non-public sources, besides grants or contract research (e.g. licences sold, spin-off revenues, gifts, etc.). A complete list is presented in the appendix (table 3.4.1).

Revenues from non-public sources in the reporting period:
licenses sold for EUR 13k (2014), EUR 32k (2015), EUR 51k (2016), EUR 19k (2017), EUR 9k (2018).
Research awards in the form of unrestricted gifts with a total value of EUR 206k (2014), EUR 162k (2015), EUR 195k (2016), EUR 306k (2017), EUR 329k (2018). In total, license sales reached EUR 125k, and the gifts totalled EUR 1.2M.

HTML links to additional documentation:

APPLIED RESEARCH RESULTS

3.5 Applied research results with an existing or prospective economic impact on society

The evaluated unit briefly comments on a maximum of the five most significant (from the perspective of the evaluated unit) applied research results that have already been applied in practice, or that will realistically be applied, in the 2014–2018 reporting period from the overview in the appendix (table 3.5.1).

³ For a definition of contract research for the purposes of evaluation in the universities sector, see Article 2.2.1 of the Community framework for State aid for research and development and innovation (2014/C 198/01).

Of the five most significant applied research results, two are covered by a non-disclosure agreement (NDA) which does not allow their names to be mentioned.

- **Toyota Research Lab - algorithms/software for autonomous driving.**
The Toyota Research Lab, headed by Prof. Matas, was established in 2017 as a result of long-term collaboration, since 2003, on a project basis. The funding has been growing and reached approx. EUR 1 million in 2018. The Lab covers a broad range of expertise (computer vision, artificial intelligence, simulation, graphics) relevant to autonomous driving.
- **Detection of malicious communication in computer networks.**
The collaboration with CISCO, one of the world's leading computer science company, was focused on detecting malicious communications in computer networks. The methods that were developed led to two US patents. We received EUR 461,500 in relation to IPR transfer of a FEE start up acquired by the company and in support of a follow-up research program.
- **Development of CyberCalc software for key-lock system design calculation.**
Licence sold to a leading world company. Most of the multiple-key-lock systems produced in the Czech Republic are calculated using this software. Total revenues were of the order of EUR 300k. IP then sold entirely after 2018 through an undisclosed contract.
- **Optimizing Computation of the Minimum Cut in Graphs with Grid Topology.**
US pat. No. 8,533,139. It introduces the currently fastest computation of the "Minimum Cut" problem in graphs with grid topology. In the reporting period, we sold 19 licences to leading software companies for approx. EUR 68k.
- **Controlling Patch Usage in Image Synthesis.**
The software describes a state-of-the-art algorithm for guided patch-based synthesis. It can be used to perform example-based artistic style transfer to 3D models, faces or arbitrary videos. Its key advantage over the concurrent approach is that it can fully retain the visual quality of the original artwork. We have sold 1 exclusive license (US pat. No. 9,905,054) to a leading world computer graphics company for approx. EUR 48k.

HTML links to additional documentation: [GridCut](#)

3.6 Significant applied research results with an impact other than an economic one on society

The evaluated unit gives a concise account of a maximum of the five most significant (from the perspective of the evaluated unit) applied research results with an impact other than an economic one on society in the 2014–2018 reporting period (typically results from disciplines in the humanities and social sciences) from the overview in the appendix (table 3.6.1).

Self-evaluation:

- **Method for precise automatic non-invasive sensing of a blood pulse wave** and a device for implementing the method (subsequent cooperation with the Mayo Clinic - USA). It increases a patient's quality of life due to a reduced risk of inadequate treatment of hypertension and increased protection of organs affected by hypertension.
- **Intelligent interface of a stick for blind persons** for the design of a new navigation centre for control and navigation of the blind in a general outdoor area.
- Research on a complex network analysis of the Egyptian Empire, resulting in the birth of **cyber-Egyptology** in the Czech Republic (a new direction in research on laws in the development of civilization).
- **A system for documenting historical monuments** (a team of unmanned aerial vehicles) was deployed in several historical sites within the Czech Republic and Poland.
- **Open-source for processing data acquired by structured illumination microscopy** well suited for fast live-cell imaging (modular set SIMToolbox for MATLAB) was used in many biomedical

imaging labs around the world (Harvard Medical School, Laboratory of Nanoscale Biology - EPFL, University of Bielefeld).

HTML links to additional documentation:

[Cyber-Egyptology, Historical monuments documentation](#)

COOPERATION WITH THE NON-ACADEMIC ENVIRONMENT AND TECHNOLOGY TRANSFER

3.7 The evaluated unit's most significant interactions with the non-academic application/corporate sphere

The evaluated unit gives a concise account of the most typical users of its outputs. It explains whether and how it identifies them and how it works with them. It provides examples of a maximum of ten of the most significant interactions with the non-academic environment in the 2014–2018 reporting period.

FEE cooperates with major domestic and international companies on important long-term projects and on short-term industrial orders. The faculty resolves numerous studies and methodologies for governmental bodies and assists in the implementation of national/international standards. The faculty is involved in national/international applied research projects, cooperating with major agencies, including strong space activities. Several workplaces/laboratories are created based on mutual cooperation with the non-academic sphere, including workplaces supported by donations. Selected significant interactions with the non-academic environment:

- **Company Adobe (USA)** – a gift (189k USD) in support of research activities in the field of automatic stylization of images and videos based on hand-drawn exemplars, 9 journal articles and 6 U.S. patents were created (2014-2018).
- **Company Škoda Auto** - Long term cooperation with the leading auto manufacturer in the Czech Republic on projects such as the virtual reality system for pre-production phases, user control of advanced car functions, algorithms for computation of the design of surface reflectors, analyzing the behaviour of the production line and creating a mathematical model describing the production line, etc.
- **European Space Agency (ESA)** – many contracts focused on development and characterization of components for terrestrial and space use, e.g., thermal hyperspectral imaging system (THETIS) integrating a calomel-based acousto-optic tunable filter, etc.
- **Czech Aerospace Research Centre**, together with other companies (VZLU, 5M, Rigaku, TTS, IST, HVM Plasma) - Preparation and implementation of experiments for Czech satellite VZLUSAT-1 for miniCube missions QB50 (launched June 23, 2017).
- **Red Hat Open Source Laboratory** - Long-term funding of student projects in open source software and software testing methods. Financial support EUR 60k.
- **Facebook Artificial Intelligence Research** - Facebook FAIR within their partnership program selected 15 world-class research groups which were donated GPU servers to speed up AI research. (given 2 out of 22 donated servers).
- **SNAP (USA)** - Financial gift (USD 30k) in support of research collaboration which began in 2018 in the field of automatic style transfer to images and videos based on the use of neural networks.
- **International Telecommunication Union (ITU) academy member** - CTU in Prague was the Centre of Excellence for Cybersecurity (2015-2018).
- **Ministry of Industry and Trade (MIT)** - Data processing, recommendations and a methodology for overcompensation control of electricity support from supported energy sources was prepared for MIT. The potential impact on the sector is about EUR 1.8 billion per year.

- **Accredited Laboratory of Photovoltaic Systems Diagnostics** - Measurement and verification of photovoltaic modules and electrochemical sources for number of companies (TÜV SÜD Czech, FVE Czech, etc.).

HTML links to additional documentation:

3.8 System and support of technology transfer and intellectual property protection (can be extended to the whole university, emphasising the specific features of the evaluated unit)

The evaluated unit gives a concise account of its system of technology transfer. It conducts an evaluation of the quality of its applied research and the effectiveness of technology transfer using the data presented in the appendix (table 3.5.1). This commentary will highlight the number of filed and granted patents (Czech and international) and licences sold.

The TT and IP protection system of CTU has its centralized base within the Rectorate. In addition, FEE commercializes its results independently, if they were achieved only by the faculty itself. FEE reported the following results in the period under review: patents (PAT) 66 (of which 23 were international patents), utility models (UZV) 61, software (ASW) 8, pilot operation (PPR) 7. Between 2014 and 2018, 47 licenses for 8 results were sold, with a total revenue of EUR 216k.

HTML links to additional documentation:

<http://evaluation-cvut.cz/files/H2020-Technologytransfer.pdf>

3.9 Strategy for set up and support of spin-off firms or other forms of commercialization of R&D&I results (can be extended to the whole university, emphasising the specific features of the evaluated unit)

The evaluated unit gives a concise account of the practical use of its intellectual property in the form of setting up spin-off firms or other forms of commercialising R&D&I results (both with or without the participation of the university) established by the evaluated unit (university), another entity controlled by the evaluated unit (university), or an employee of the evaluated unit, presenting the model for their functioning and coordination, and control of intellectual property management of the evaluated unit (university).

CTU has a Technology Transfer Office, an incubator (InQBay), and a strategy for commercialization of IP.

HTML links to additional documentation:

<http://evaluation-cvut.cz/files/H2020-Technologytransfer.pdf>

[Eyedea Recognition, s.r.o., InQBay incubator](#)

RECOGNITION BY THE SCIENTIFIC COMMUNITY

3.10 The most significant individual awards for R&D&I

The evaluated unit presents a maximum of ten examples of the most significant R&D&I awards received (in the Czech Republic and in other countries) in the 2014–2018 reporting period.

FEE is scientifically the most productive faculty at CTU. The work of its academic staff and students is often highly valued and has won various awards and prizes from local and national bodies in the fields of education and R&D.

- **ESHO - Pyrexar Award** in 2015 for a contribution to the development of hyperthermia in the treatment of cancer (prof. J. Vrba),
- **Longuet-Higgins Prize** in 2017 for Computer Vision and Pattern Recognition research (assoc. prof. O. Chum),
- **Eurographics Fellow** award in 2017 for long term successful activities in education and research in Computer Graphics (prof. J. Zara),
- NATO Modelling & Simulation Centre of Excellence Medal "**HONOS ALIT ARTES**" in 2017 (prof. J. Holub),
- **1st place in the Mohamed Bin Zayed International Robotics Challenge** (MBZIRC) 2017 for cooperative collection of objects using a group of autonomous UAVs (team led by Dr. M. Saska).
- **Discovery Award** by global healthcare company Novartis in 2014 for a contribution to an extraordinary shift in the field of medicine (assoc. prof. J. Ruzs),
- **Werner von Siemens Prize** for the best innovation result in the Czech Republic in 2016 (prof. F. Zelezny),
- **Česká Hlava** Prize – Doctorandus in 2016 for wireless power supply (Dr. J. Kracek),
- **Neuron Prize** for a Young Researcher in 2017 (prof. D. Sykora),
- **Česká Hlava** – Prize in 2018 for a method combining machine learning and a new algorithm for searching text in images (Dr. L. Neumann).

HTML links to additional documentation:

[Discovery Award 2014](#), [ESHO - Pyrexar Award 2015](#), [Longuet-Higgins Prize 2017](#), [Eurographics Fellow 2017](#), [HONOS ALIT ARTES 2017](#), [MBZIRC 2017](#), [AI Awards 2018](#)

3.11 Recognition by the international R&D&I community

The evaluated unit provides the following information / examples demonstrating recognition by the international scientific community in the 2014–2018 reporting period, with a commentary:

It presents a maximum of ten examples of its academic staff participation on the editorial boards of international scientific journals (e.g. editor, member of the editorial board) in the appendix (table 3.11.1),

It presents a maximum of ten examples of the most significant invited lectures by the evaluated unit's academic staff abroad in the appendix (table 3.11.2),

It presents a maximum of ten examples of the most significant lectures by foreign scientists and other guests relevant to the R&D&I field in the appendix (table 3.11.3),

It presents a maximum of ten examples of the most significant elected memberships of professional societies (table 3.11.4).

A list of the ten most significant records of academic staff members in the editorial boards of prestigious scientific and engineering journals (quartile Q1 journals in their respective fields according to WoS) is given in Tab. 3.11.1.

The academic staff at FEE is repeatedly invited by top world universities and organizations (e.g. KTH Stockholm, Movement Disorders Society) or to world leading events (e.g. NATO Modelling and Simulation for Autonomous Systems) to present their recent work. The ten most significant invited lectures are listed in Tab. 3.11.2. In addition, world-renowned experts frequently visit FEE. Short-term invitations are organized individually or via workshops. One of the best examples of workshops is Colloquia. Colloquia has been taking place twice a year for the last 22 years. Each year, 10-12 top-

level international speakers, including large number of ERC grantees, give talks at FEE on topics in the area of computer vision, machine learning and pattern recognition; see Tab. 3.11.3.

FEE is represented in recognized international and national scientific societies, associations, federations, institutes, and national chapters of leading bodies by chairs, board of director members, general assembly members and members. The ten most significant examples are listed in Tab. 3.11.4.

HTML links to additional documentation:

POPULARISATION OF R&D&I

3.12 The most significant activities in the popularisation of R&D&I and communication with the public

The evaluated unit gives a concise account of its main activities in the area of popularisation of R&D&I and communication with the public in the 2014–2018 reporting period and presents a maximum of ten examples that it considers the most significant.

An integral part of our academic work is the popularization of science and scientific results. We have been organising **Physics Thursdays** for more than 25 years. Seminars are designated for a wide public audience and they are focused on current topics in science and engineering.

During the evaluation period, we took part in more than 2,500 **media appearances** on TV, in print, on the internet or on radio. The topics were focused on current scientific challenges addressed by our teams, e.g. J. Ruzs and his team, working on **diagnostics of Parkinson's disease**, M. Saska's team, working on **cooperative control of UAVs**, the Department of Cybernetics, working on **self-driving cars**, and many more.

In 2015 we participated in broadcasting the **documentaries "Jednou nohou v absolutnu"** in co-production with Czech TV – 8 episodes covering science, research and co-operation with industry at CTU, FEE in particular.

We also focus on young people – a very popular example of which is **P. Habala's** cycle of public **video lectures** dealing with high school mathematics with the mathematics of daily life. A group of female student "**wITches**" is focused on the education of elementary school children. FEE coordinates its own network of **faculty-related schools**.

The well-known **Robosoutěž competition** – in which students deal with tasks in robotics and programming – is focused on the education and motivation of high school students. We also organize **electronics** and **programming courses** for talented pupils and their teachers.

Some members of our faculty make their dreams come true outside the institution, e.g. **J. Zemánek**, who brought the **Maker Fair** exhibition to the Czech Republic and acts as its programme director.

HTML links to additional documentation:

[Physics Thursdays](#); www: [Ruzs](#); [assoc. prof. Habala's video lectures](#)

APPENDICES (TABLES)

3.2 Applied research projects

3.2.1 Projects supported by a provider from the Czech Republic

As the beneficiary						
Provider	Project title	Support (EUR thousand)				
		2014	2015	2016	2017	2018
TACR	Monitoring Eye Movements for the Diagnosis of Neuroscience	50	50	50	54	0
TACR	Small gyro stabilized camera head	26	0	0	0	0
TACR	Research and development of technologies for radiolocation mapping and navigation systems	48	0	0	0	0
TACR	Research and Development of New-generation Communication Devices for Transmission Over High-voltage Power Lines	155	166	0	0	0
TACR	Advanced Navigation of the Blind	42	42	0	0	0
TACR	Automated data analysis of an air handling unit in commercial buildings towards quality evaluation and estimation of missing sensor values	29	31	0	0	0
TACR	Intelligent System for Safe and Reliable Electrical Energy Supply in a Region	56	117	122	74	0
TACR	Tools for synthesis of antennas and sensors	19	28	33	37	0
TACR	A wideband optical source based on soft glass fibers	36	62	62	62	0
TACR	Centre for Applied Cybernetics 3	397	408	0	0	0
TACR	Integrated Satellite and Terrestrial Navigation Technologies Centre	195	195	231	227	207
TACR	Advanced sensors and sensor data processing methods	147	196	196	196	196
TACR	Flexible 2D and 3D polymer photonic structures	0	18	36	35	18
TACR	Ludus: Machine Learning and Game Theory to Collaboratively Defend Against Internet Threats	0	0	0	119	102
TACR	Design of Large Master-Key Systems through Artificial Intelligence (CyberCalc)	0	0	0	60	50

TACR	Quality Assurance System for Internet of Things Technology	0	0	0	49	64
TACR	Development of a Probe for Preventive Protection of IoT Devices Against Attempted Takeover	0	0	0	15	46
TACR	Evaluation of energy efficiency programmes	0	0	0	0	26
TACR	Technology for Competencies Assessment Using Virtual Reality and Eye Tracking	0	0	0	0	58
TACR	Climate-energy plan for the heating branch in the Czech Republic	0	0	0	0	24
MZd	Computer analysis of speech expression, EEG records and MR tractography in children with developmental dysphasia	7	0	0	0	0
MK	Defects in immovable cultural heritage objects: a knowledge-based system for analysis, intervention planning and prevention	88	91	0	0	0
MK	Information Technologies Serving the Language Cultural Heritage (IT JAKUB)	69	71	0	0	0
MK	A Century of Information: The World of Informatics and Electrical Engineering – The Computer World Inside Us	0	0	0	0	35
MK	Safe scanning of historical objects UUAVs - assistive technologies, methodics and exploitation in heritage protection	0	0	0	0	86
MV	A Miniature intelligent system for analyzing concentrations of gases and pollutants, particularly toxic gases and pollutants	152	102	0	0	0
MV	Behavioral Detection of Advanced Persistent Threats in Computer Networks	58	0	0	0	0
MV	Systems for Identification and Processing of Signaling and Transmission Protocols	105	136	0	0	0
MV	RFID Locator	137	32	0	0	0
MV	Unique versatile security camera based on nanotechnologies	0	24	76	70	74
MV	Strategic infrastructure protective system detecting illegal acts affecting GNSS signals	0	0	0	214	234
MO	BASKET - "Recognizing whether the analyzed bitrate is compressed or encrypted"	0	0	0	0	17
MSMT	Centre for Advanced Photovoltaics (CAP)	0	0	0	857	868

MSMT	Research Center for Informatics (RCI)	0	0	0	10	915
MSMT	Novel nanostructures for engineering applications (NANO)	0	0	0	0	113
MSMT	Advanced Testing of Automotive Radars (PTAR)	0	0	0	0	159
Total		1819	1770	807	2078	3293
As another participant						
Provider	Project title	Support (EUR thousand)				
		2014	2015	2016	2017	2018
TACR	Research and development of advanced technologies for electric motors	66	0	0	0	0
TACR	Fluxgate gradiometer for space application	52	0	0	0	0
TACR	Research and development of methods and tools supporting safe integration of renewable energy sources into the electric power system of the Czech Republic.	83	81	0	0	0
TACR	Development of High-Power Wide Spectrum Sources of Light for Application in Medicine	33	0	0	0	0
TACR	Research and development of a new communication system with a multi-channel approach and multi-layer co-operation for industrial applications	44	0	0	0	0
TACR	Automatic Three-dimensional Terrain Monitoring	22	0	0	0	0
TACR	An intelligent measuring diagnostic system for estimating the operational state of high voltage electrical rotary and non-rotary machines	48	0	0	0	0
TACR	Intelligent industrial system for automated testing of train wheels	43	43	0	0	0
TACR	Optimization of ozone generation and ozone transport	19	19	20	0	0
TACR	Minimizing the Reverse Effects of Non-linear and Dynamic Loads on the Supplying Grid	74	76	77	0	0
TACR	Fiber optic detection of liquids	84	84	84	0	0
TACR	A robotic measuring system for monitoring the capability of the production process	38	38	0	0	0
TACR	A smart metering system for energetics	38	0	0	0	0

TACR	Potential of biomass as an energy source to cover local, regional and/or national fuel needs	5	8	8	8	0
TACR	RSTN - Radio for Smart Transmission Networks	50	92	74	37	0
TACR	Universal radio gateway for IP communication in dispatch systems	12	44	44	27	0
TACR	Active and compatible sensor elements for sufficient enhancement of the sensitivity of standard Raman photometers for environment analysis.	23	37	36	36	0
TACR	E-mobility smart charging station	12	23	12	0	0
TACR	V3C - Visual Computing Competence Center	252	253	262	263	264
TACR	Center for Intelligent Drives and Advanced Machine Control	62	80	84	80	80
TACR	Application of Eye Tracking Technology to Testing of Competencies	0	62	67	63	0
TACR	Open Data and semantic approaches to uncover social aspects of urban quality	0	12	12	6	0
TACR	Complex hydrogen technology for removing contaminants from the subsurface	0	23	25	24	21
TACR	A microwave thickness gauge for a metal strip for dividing lines	0	29	43	30	0
TACR	New magnetizer prototype and methodics for magnetic particle testing of tube ends for the purposes of defectoscopy	0	14	18	16	0
TACR	Tools for analyzing the market utilization and the competitiveness of biomass for the energy needs in local communities	0	0	13	13	0
TACR	Innovation in history education: Development of a digital application for work with resources	0	0	6	6	0
TACR	The Multichannel Communication Platform for the Internet of Things (IoT)	0	0	0	39	42
TACR	Development of a methodology for estimating the interior heat parameters in residential timber structures, for reducing energy use, and environmental factors related to the reduction of greenhouses gases	0	0	0	177	75
TACR	A compact diagnostic system for operating high-voltage condition monitoring of electrical machines using DC and low-frequency AC test voltage	0	0	0	32	28

TACR	Advanced oxidation technology for water, disinfectants and environmental applications	0	0	0	0	31
TACR	MEMS sensors with optical scanning	0	0	0	0	55
TACR	A hybrid navigation system for autonomous vehicles in environments with denied GNSS services	0	0	0	0	24
TACR	Absolute and relative positioning within the 4th industrial revolution environment	0	0	0	0	10
TACR	Integration of services for route planning and a navigation system for the disabled with city management systems and open data on cities.	0	0	0	0	37
TACR	Intelligent public transport using V2X	0	0	0	0	40
TACR	Development of a cybernetic assistant for small arm, aimed at increased probability and safety of hitting a target	0	0	0	0	33
TACR	Historylab: using technology to foster historical literacy	0	0	0	0	31
TACR	A comprehensive evaluation of the potential of bioenergy development in relation to landscape functions	0	0	0	0	19
TACR	Virtual Prototyping and Validation of Electromagnetic Systems	0	0	0	0	0
MPO	KOMPOZITEX - Composite Textile Materials for Protection of Humans and Devices Against the Effects of Electromagnetic and Electrostatic Fields	120	120	0	0	0
MPO	Research and Development of Efficient Combined Production of Electricity and Thermal Energy with Verification of Results.	24	0	0	0	0
MPO	Analyzer of the modal structure in optical components	0	0	28	68	68
MPO	The New-Generation White Cane Featuring Navigation and Wireless Communication	0	0	42	50	50
MPO	Automated system for spatial noise monitoring	0	0	23	54	50
MPO	Automatic verification of the properties of production lines during virtual commissioning	0	0	15	30	31
MPO	Increase the reliability and service life of linear electromechanical actuators used in aerospace applications	0	0	23	38	36
MPO	Large surface modification system	0	0	5	13	12

MPO	A Control Platform for High-Accuracy Microelectronics Assembly	0	0	0	54	111
MPO	Real time video detection of persons in tunnels	0	0	0	28	60
MPO	High precision fiber collimator arrays	0	0	0	0	72
MPO	A radio-optical transmission terminal for 5G networks	0	0	0	0	61
MPO	NANOTROTEX - Composite nanostructured electrode materials with textile matrix	0	0	0	0	95
MPO	Mobile radio with digital signal processing	0	0	0	0	38
MZd	XGENE.ORG -- a public tool for integrated analysis of microarray, microRNA and methylation data	48	48	0	0	0
MZd	Impact of Cardiotocography evaluation by means of artificial intelligence on perinatal care	17	17	0	0	0
MZd	Defining epileptogenicity markers in tuberous sclerosis and making improvements in epilepsy surgery	7	7	0	0	0
MZd	Prediction of the response to demethylation treatment in patients with myelodysplastic syndromes using integrative genomics	14	14	0	0	0
MZd	Prediction of a relapse in bipolar affective disorder by means of telemetric actigraphy and social rhythmicity assessment.	19	16	0	0	0
MZd	Functional organization of the temporal lobe epilepsy neuronal network	8	8	0	0	0
MZd	Speech disorders and an analysis of their mechanisms in Parkinson's disease and other movement disorders.	0	16	22	22	22
MZd	A graph-theory approach to the complex organization and dynamics of human epileptic networks: implications for epilepsy surgery planning.	0	16	25	25	25
MZd	Preventing motor deficits after resective epilepsy surgery in children	0	16	22	22	22
MZd	A System for Continuous Early Postoperative Monitoring of Kidney Graft Blood Perfusion	0	0	20	26	38
MZd	Long non-coding RNAs in myelodysplastic syndromes: clinical relevance and implication in pathogenesis	0	0	0	11	14

MZd	Functional and structural reorganization of brain networks after a stroke: implications for diagnosis.	0	0	0	25	36
MZd	Integrative analysis of high-throughput genomics and multiparameter flow cytometry to improve the diagnosis and monitoring of childhood acute leukemia	0	0	0	0	6
MK	Laterna magika. Past and Present, Documentation, Preservation and Presentation	0	0	20	36	40
MV	Research and development of secure and reliable communications network equipment in support of the distribution of electric energy and other critical infrastructures	85	85	0	0	0
MV	The modern structure of photonic sensors and new innovative principles for intrusion detection systems, integrity and protection of critical infrastructure: GUARSENSE	37	13	0	0	0
MV	Utilization of a two-survey-point range-finding system for perimeter security (screen)	42	24	0	0	0
MV	Development of adaptable and data processing systems for high-speed, secure and reliable communication in extreme conditions	93	0	0	0	0
MV	Comprehensive fiber optic sensor security of critical infrastructures and objects using modern information systems	0	11	50	53	53
MV	Detection of a carrier of improvised explosive devices	0	0	0	24	24
Mze	Development of Unmanned Aerial Vehicles for Forest Monitoring	0	21	21	21	21
MSMT	Research Center of Cosmic Rays and Radiation Events in the Atmosphere (CRREAT)	0	0	0	107	323
Total		1574	1449	1201	1566	2096

3.2.2 Projects supported by a provider from another country

As the beneficiary						
Provider	Project title	Support (EUR thousand)				
		2014	2015	2016	2017	2018
European Commission	Application of distributed control on smart structures	1	23	101	29	44
FM EHP and Norway	Enhanced navigation algorithms in joint research and education	0	1	40	0	0
International Atomic Energy Agency, Vienna, Austria	Characterization of High Energy Deuteron Pulses Produced by Dense Magnetized Plasmas	4	1	0	0	0
ESA	MOFINT - Propagation Models for Interference and Frequency Coordination Analyses	32	0	0	0	0
ESMO AIM	European Student Moon Orbiter - AOCS Integration Module	1	0	0	0	0
USA, European Office of Aerospace Research and Development	STENOGRAPHY- Universal Batch Steganalysis	25	7	83	0	0
Stichting Nlnet Foundation	Stratosphere IPS - Intrusion Prevention System	0	20	8	0	0
The Michael J. Fox Foundation	Automatic acoustic speech analysis and REM sleep behaviour disorder for detecting subjects at high risk for Parkinson's disease and other alpha-synucleinopathies	0	0	0	87	102
US Army	Development and Validation of the Enhanced AGENTFLY Simulation Platform with an ATC Agent	74	0	2	14	8
Air Force Office of Scientific Research (AFOSR)	Flexible and Resilient Autonomous Systems	0	0	0	0	12
USA, European Office of Aerospace Research and Development	Domain-Independent Multiagent Planning: models, Stability and Complexity (Towards Robust Multiagent Plans)	67	76	0	0	0
US NAVY, OFFICE OF NAVAL	Optimizing the Heterogeneous Intrusion Detection System Against a Rational Adversary	52	33	6	0	0

RESEARCH GLOBAL						
USA, European Office of Aerospace Research and Development	Support for the 13th International Conference on Autonomous Agents and Multi-Agent Systems (AAMAS 2014)"	7	0	0	0	0
US NAVY, OFFICE OF NAVAL RESEARCH GLOBAL	12th European Conference on Multi-Agent Systems (EUMAS 2014)	0	0	0	0	0
US NAVY, UK, NICOP	Extension of the Traffic Flow Modeling Project	0	0	2	0	0
US NAVY, OFFICE OF NAVAL RESEARCH GLOBAL	Using deep reinforcement learning to simulate a security analyst	0	0	0	0	2
US NAVY, OFFICE OF NAVAL RESEARCH GLOBAL	Defeating the Dark Triad in Cyber Security Using Game Theory	0	0	0	55	38
Total		262	163	242	185	207
As another participant						
Provider	Project title	Support (EUR thousand)				
		2014	2015	2016	2017	2018
European Commission	Aircraft External Noise Research Network and Co-operation	6	12	0	0	3
European Commission	Dextrous Assembler Robot Working with embodied Intelligence	154	19	0	0	0
European Commission	Designing Dynamic Distributed Cooperative Human-Machine Systems	7	0	0	0	0
European Commission	Multiscale Modelling and Materials by Design of interface-controlled Radiation Damage in Crystalline Materials	119	0	0	0	0
European Commission	Sustainable and PERsuasive Human Users moBility in future cities	246	0	0	0	0
European Commission	GLObal Robotic telescopes Intelligent Array for e-Science	21	0	0	0	0

European Commission	Mobile Assistance for Social Inclusion and Empowerment of Immigrants with Persuasive Learning Technologies and Social Network Services	108	79	0	0	0
European Commission	Clothes Perception and Manipulation	154	22	0	0	0
European Commission	Deformation Monitoring by High Resolution Terrestrial Long-Range Sensing	13	0	0	0	0
European Commission	Wireless Friendly Energy Efficient Buildings	139	94	0	0	0
European Commission	SEcurity and SAFety MOdelling	9	5	0	2	0
European Commission	Design, Monitoring and Operation of Adaptive Networked Embedded Systems	17	8	0	4	0
European Commission	Adaptive Production Management	74	11	0	0	0
European Commission	SUstainable PREdictive Maintenance for manufacturing Equipment	56	73	0	0	0
European Commission	Distributed computing, storage and radio resource allocation over cooperative femtocells	188	0	0	0	0
European Commission	Dense Cooperative Wireless Cloud Network	148	154	2	0	0
European Commission	Planetary Robotics Vision Data Exploitation	62	82	0	0	0
European Commission	ARTEMIS Innovation Pilot Programme	0	0	0	2	0
European Commission	European Smart Mobility Resource Manager	43	235	50	0	0
European Commission	EMRP RESEARCH EXCELLENCE GRANT	31	31	31	0	0
European Commission	Silicon Carbide Power Electronics Technology for Energy Efficient Devices	54	78	73	98	0
European Commission	Convergence of Electronics and Photonics Technologies for Enabling Terahertz Applications	0	0	1	57	49
European Commission	Integrated Activities for the High Energy Astrophysics Domain	0	0	32	40	35
European Commission	High-Performance Real-time Architectures for Low-Power Embedded Systems	0	0	968	66	0

European Commission	European initiative to enable validation for highly automated safe and secure systems	0	0	32	42	8
European Commission	Energy for Smart Objects	0	0	9	9	85
European Commission	Enabling seamless electromobility through smart vehicle-grid integration	0	0	37	94	81
European Commission	Live Action Data Input and Output	0	0	4	54	0
European Commission	Solid lubrication for emerging engineering applications	0	0	0	17	134
European Commission	Controller Tools and Team Organisation for the Provision of Separation in Air Traffic Management	0	0	0	66	78
European Commission	Unlocking Large-Scale Access to Combined Mobility through a European MaaS Network	0	0	0	9	79
European Commission	European Training Network on Visible light-based Interoperability and Networking	0	0	0	12	96
European Commission	Wide band gap Innovative SiC for Advanced Power	0	0	0	1	37
ESA	DEMON - Quality Evaluation Methods for Calomel Optical Elements	40	0	0	0	0
COST Action T	Development of a European-based Collaborative Network to Accelerate Technological and Clinical Progress in the Area of Medical Microwave Imaging	4	4	0	0	0
Czech-German Cooperation	UMTRIS: Umwelteverträglichkeit von Transformatorenölen - alternative Isolierflüssigkeiten	0	0	0	8	12
Deutsche GIZ	Climate investment capacity: climate finance dynamics&structure for financing the 2030 targets	0	0	0	0	7
Total		1692	907	1240	581	704

3.3 Contract research

3.3.1 Research work contracted by a client from the Czech Republic

Client	Research title	Revenues (EUR thousand)				
		2014	2015	2016	2017	2018
Gisat s.r.o., Praha	Software module implementation	0	3	0	0	0
CESNET, Praha	Project realization 542/2014	0	3	0	0	0
PREdistribuce, a.s. Praha	Evaluation of data communication in AMM pilot projects	0	23	0	0	0
Inovacentrum, Praha	Research on the implementation of an automatic system for evaluating the quality of the execution of automatic parking maneuvers	0	5	0	0	0
Škoda auto, Mladá Boleslav	Realization of Demoshow-Google Glass	0	3	0	0	0
Faurecia Emissions Control Technologies, Mladá Boleslav, s.r.o.	Magnetic field measurements based on the document "Schweissprozess der elektrischen Abgasklappe in die Abgasanlage" WSK.014.463.R,	0	2	0	0	0
Škoda auto, Mladá Boleslav	Optimization of a mathematical and physical car model	0	6	0	0	0
Škoda auto, Mladá Boleslav	New interfaces for assistance system testing	0	4	0	0	0
TECHNISERV, Praha	Design of a technical solution for antennas for GNSS service and for WiMAX service, for inclusion in the TEVOGS system	0	11	0	0	0
ELDIS, Pardubice	Setting the polarization parameters of radar sources	0	1	0	0	0
GISAT s.r.o., Praha	ITI project solution	0	55	0	0	0
Eaton Elektrotechnika, Roztoky	Development of a system for converting a simulink application to RM48	0	12	0	0	0
PAMÁTNÍK NÁRODNÍHO PÍSEMNICTVÍ, Praha	Realization of the software solution of the Most Beautiful Book exhibition	0	6	0	0	0

Faurecia Automotive Czech Republic, Písek	Magnetic field measurements for VW CADDY	0	2	0	0	0
Škoda auto, Mladá Boleslav	Unit behavior tests on CAN and LIN buses	0	7	0	0	0
ELGAS, Pardubice	Analysis on digital signal processing from ultrasonic flow meters	0	2	0	0	0
ÚNMZ Praha	Work and activities connected with solving a metrology development task	0	5	0	0	0
ČTÚ Praha	Expert service, NGA parameters	0	7	0	0	0
ÚNMZ Praha	Work and activity connected with solving a metrology development task	0	5	0	0	0
ÚNMZ Praha	Work and activity connected with solving a metrology development task	0	5	0	0	0
ÚNMZ Praha	Work and activity connected with solving a metrology development task	0	8	0	0	0
VVÚ Brno	Advanced Active Protection - Advanced ballistic active vehicle protection against RPG and PTRS attacks	0	13	0	0	0
Faurecia Automotive Czech Republic, Písek	Magnetic field measurements for PQ35/26	0	4	0	0	0
AŽD, Praha	Research and development work	0	9	0	0	0
Škoda auto, Mladá Boleslav	Car electronics training	0	3	0	0	0
ENVINET a.s.Třebíč	Electromagnetic design of focusing and deflection coils for the HELCZA project	0	8	0	0	0
UVB Technik, Hlučín	Development work	0	5	7	11	0
Continentál Automotive, Trutnov	Process optimization, calibration and testing of PS100 sensors	0	5	18	0	0
Železářny Podbrezová	SVC revision	0	12	0	0	0
Edscha Automotive, Kamenice	Integration of license plate lighting into the trunk handle	0	3	0	0	0
Škoda auto, Mladá Boleslav	USB Switching Module, CAN Gateway II Module	0	8	0	0	0

UK, Praha	Signal processing module	0	5	0	0	0
Preciosa, Jablonec nad Nisou	Experimental verification of methods for finishing the optical-aesthetic properties of jewel stones, with the aim of objectivizing the evaluation	0	3	0	0	0
CESNET Praha	Project implementation 567/2015	0	0	0	11	2
Škoda auto, Mladá Boleslav	Measurements of noise and vibration from the vehicle gearbox	0	5	0	0	0
AŽD, Praha	Measurements of noise and vibration from the vehicle gearbox	0	12	0	0	0
Škoda auto, Mladá Boleslav	Support for the automation of integration testing	0	23	0	0	0
AŽD, Praha	Activation of the GSPU-GNSS signal processing unit	0	0	2	0	2
Eaton Elektrotechnika, Roztoky	Extension of the simulink code generation target for TMS570 platform - SPI support	0	1	0	0	0
RFspin, Praha	Measurements of DRH and QRH antennas	0	2	0	0	0
NÁRODNÍ BEZPEČNOSTNÍ ÚŘAD. Praha	Research and development of methods and procedures for measuring the insertion loss of filters in the frequency band up to 10 GHz	0	0	12	0	0
Jablotron Alarm, Jablonec n. Nisou	Measurements related to an expert study	0	2	0	0	0
Eaton Elektrotechnika, Roztoky	Extension of the simulink code generation target for the TMS70 platform	0	4	0	0	0
Škoda auto, Mladá Boleslav	Simulation of PCD / PLA sensors	0	11	0	0	0
Správa železniční dopravy Praha	Update of TKP Chapter 25a	0	8	0	0	0
CoolPeople, Praha	IBM BPM Application Developer Tester	0	13	0	0	0
Doosan Škoda Power, Plzeň	Research in the field of control valves	0	5	0	0	0
Analogia Praha	EKV system	0	5	0	0	0
Honeywell, Praha	Nonlinear AP Systems Analysis	0	19	0	0	0

Gaben, Ostrava	Implementation of UHF RFID for localization in the near zone	0	2	0	0	0
Navrátilová, Praha	Implementation of innovative voucher DOT / 83/11/01963082015	0	12	0	0	0
Develict Solutions, Praha	Utilization of an RFID UHF chip reader for the implementation of an embedded RFID UHF reader	0	2	0	0	0
Gaben, Ostrava	Utilization of electrical conductive technical textiles for RFID signal shielding in the UHF band	0	2	0	0	0
Bednar, Praha	Stereo camera use limitations	0	8	0	0	0
Masarykova univerzita, Brno	Preparation of a project of preparatory searches for AMM	0	70	0	0	0
RESolar, Praha	Economic Balance of Production and Disposal of Photovoltaic Modules Installed in the Czech Republic.	0	6	0	0	0
Škoda auto, Mladá Boleslav	Automation of ECU tests on the CAN bus	0	0	8	0	0
Merz, Liberec	Consultation	0	0	0	0	0
SEA Chomutov	Development and implementation of kinematic tripod transformation	0	0	1	0	0
Český metrologický institut, Brno	Design of the 38 kOhm quadrifillary standard, including manufacturing documentation, calculation of frequency dependence and uncertainties	0	0	3	0	0
RCD radiokomunikace, Staré Hradiště	Development and production of four-channel EEG	0	0	2	0	0
VVÚ Brno	Advanced Active Protection - Advanced ballistic active vehicle protection against RPG and PTRS attacks	0	0	11	0	0
Škoda auto, Mladá Boleslav	Simulator SW	0	0	6	0	0
Škoda auto, Mladá Boleslav	New interfaces for autonomous driving	0	0	8	0	0
Škoda auto, Mladá Boleslav	Navigation module for JS Direct X as a 3D model	0	0	9	0	0
Alpiq Generation, Kladno	Study	0	0	7	0	0

ÚNMZ Praha	Work and activities connected with a metrology development task	0	0	8	0	0
ÚNMZ Praha	Work and activities connected with a metrology development task	0	0	8	0	0
Valeo Rakovník	Feasibility analysis of refinements to yaw rate data based on available input data provided universally on the internal bus of a car	0	0	2	0	0
EB Services, Tábor	Development and testing activities	0	0	96	0	0
EB Services, Tábor	Development and testing activities	0	0	5	0	0
ÚNMZ Praha	Work and activities connected with a metrology development task	0	0	8	0	0
ČSRES Praha	Technical standardization	0	0	9	0	0
ÚNMZ Praha	Work and activities connected with a metrology development task	0	0	8	0	0
Jablotron Alarm, Jablonec n. Nisou	Professional study	0	0	5	0	0
Škoda auto, Mladá Boleslav	Analysis of noise and vibration transmission from the vehicle gearbox	0	0	7	0	0
CESNET Praha	Project realization	0	0	0	2	4
ČEPS Praha	Commentary on a Methodology Paper	0	0	4	2	0
AMU Praha	Use of Ilm services in support of AMU teaching in Prague	0	0	7	0	0
EON Česká republika, s. r. o., Č.B.	A study of the spatial distribution of the electromagnetic field around a specified standard 110kV overhead line	0	0	3	0	0
Stredoslovenská energetika, Slovensko	Study	0	0	22	0	0
ČMI Brno	Consultation	0	0	3	0	0
IBPM Praha	Process categorization	0	0	9	0	0
Český metrologický institut, Brno	Design of an alternative calibration device for a voltage divider designed for primary traceability of reference impedance standards with unit operating frequency up to tens of MHz.	0	0	3	0	0
ÚFP AV ČR, Praha	Tokamak technical study	0	0	8	0	0

Škoda auto, Mladá Boleslav	Resistance measurements of welded materials	0	0	4	0	0
Škoda auto, Mladá Boleslav	Resource analysis	0	0	4	0	0
Porsche, Praha	integration of Hill Car Comfort equipment	0	0	8	0	0
ÚAM Brno	X-ray analysis of welds	0	0	3	0	0
Pražská plynárenská, Praha	A study of current trends in the photovoltaic systems market	0	0	7	0	0
Škoda auto, Mladá Boleslav	Rebuilding of the BCM control unit for automated integration testing	0	0	5	0	0
ČMI Brno	Design of a quadrifillary standard for resistance 12.9kOhm, including production documentation, calculations of frequency dependence and uncertainties, for the production of thermostat and panel parts	0	0	4	0	0
RCD radiokomunikace, Staré Hradiště	Development and production of EEG	0	0	3	0	0
Škoda auto, Mladá Boleslav	Visualization of SUPF project results	0	0	5	0	0
Škoda auto, Mladá Boleslav	Ethernet communication study	0	0	10	0	0
CESnet Praha	Streamlining the public miXGENE system	0	0	13	0	0
AŽD, Praha	Modeling and analysis of rail circuits	0	0	2	0	0
BBT, Praha	ESA research activities	0	0	20	9	0
Divesoft, Praha	A strategy for ultrasonic communication	0	0	6	0	0
Škoda auto, Mladá Boleslav	Support and extension of PCD sensor simulation	0	0	7	0	0
ATE Cheb	Railway crossing warning sign	0	0	4	0	0
Valeo Rakovník	Debugging algorithm solutions to refine the data yaw rate	0	0	10	0	0
Unicontrol, Praha	Verification of the electricity meter on MTP	0	0	5	0	0
Aveco Praha	Rotary encoder	0	0	8	0	0

Local Energies, Zlín	Professional supervision	0	0	0	1	0
ABB, Ostrava	Professional expertise	0	0	0	2	0
Honeywell International s.r.o., Praha	H-Infinity Controller	0	0	0	14	0
Eyedeia Recognition, Praha	Consultation	0	0	0	8	0
EB Services, Tábor	SW development and implementation	0	0	0	5	0
Škoda auto, Mladá Boleslav	Study	0	0	0	57	0
Spektra Praha	Technical solution study	0	0	0	9	0
Apollo, Praha	System design for UAVs	0	0	0	9	0
ČMI Praha	Second generation design	0	0	0	2	0
Funny Fish, Praha	Development and production of an intelligent 12V regulator	0	0	0	15	0
Škoda auto, Mladá Boleslav	Simulator SW	0	0	0	7	0
Škoda auto, Mladá Boleslav	A module for HUD and AR simulation in driving simulator SW	0	0	0	8	0
Škoda auto, Mladá Boleslav	New BEV simulation interfaces	0	0	0	5	0
Škoda auto, Mladá Boleslav	New interfaces for autonomous driving	0	0	0	6	0
Škoda auto, Mladá Boleslav	Testing automation	0	0	0	9	0
Škoda auto, Mladá Boleslav	Automation of behavior on the Ethernet interface	0	0	0	23	0
EON Česká republika, s. r. o., Č.B.	LDS transition states analysis	0	0	0	5	0
AŽD, Praha	Creating an Emul-GUI application	0	0	0	6	0
Škoda auto, Mladá Boleslav	A feasibility study of brushless optical surfaces for fog lamps	0	0	0	12	0
Continental Automotive, Jičín	Analysis of intermetallic compounds	0	0	0	2	0
Mlejnek, Holice	Analysis	0	0	0	1	0

Peka, Praha	Development of SHZ headquarters	0	0	0	0	16
Datlowe Praha	Preparation of vocabulary and ontologies for modeling knowledge in business contracts	0	0	0	5	0
ATE Cheb	Development of an optical unit and a switch	0	0	0	0	8
ČTÚ Praha	Valuation of the 450 MHz frequency band	0	0	0	7	0
Porsche, Praha	Analysis and design of a robotic controller	0	0	0	11	0
ÚNMZ Praha	Work and activities connected with a metrology development task	0	0	0	11	0
ÚNMZ Praha	Work and activities connected with a metrology development task	0	0	0	9	0
PRE Distribuce, Praha	450 MHz band potential analysis	0	0	0	6	0
ÚNMZ Praha	Work and activities connected with a metrology development task	0	0	0	9	0
Škoda auto, Mladá Boleslav	Update HIL-SK26	0	0	0	45	0
BCG Praha	Consultation	0	0	0	5	0
Electrolux Praha	Measurements	0	0	0	4	0
ČMI, Brno	Production and development of 2 pcs of direct current source	0	0	0	13	0
EB Services, Tábor	Development and testing activities	0	0	0	112	95
GISAT, Praha	Extension of the functionality of a software module	0	0	0	8	0
Poličská stavební, Polička	Study assessment consultation	0	0	0	8	0
SÚRAO, Praha	Economic module updates	0	0	0	18	0
ČTÚ Praha	Technical audit of the Tarifon	0	0	0	2	0
Unicontrol, Praha	Modification of control software for TEST RIG UC	0	0	0	2	0
Divesoft, Praha	Device Development Head-up Display	0	0	0	9	0
Whalebone, Brno	SW for detecting simple DGA	0	0	0	3	0

Elektrizace železnic Praha, Praha	Measuring and control system	0	0	0	13	0
ČEZ, Praha	Consultancy - study	0	0	0	0	8
Škoda auto, Mladá Boleslav	Measurements in the DUPS substation	0	0	0	0	4
Mosa, Čížkovice	Experimental equipment for testing the basic parameters of acoustic transducers project number V-M10, Phase 1. - design of experimental equipment	0	0	0	0	6
IBPM Praha	Development of process SW	0	0	0	0	13
Porsche, Praha	SW components in the BigData project	0	0	0	0	4
Divadelní fakulta Praha	Development of a reservation system for loan management	0	0	0	0	1
Škoda auto, Mladá Boleslav	Signal and vibration processing	0	0	0	0	2
ČMI, Praha	Consulting activities	0	0	0	0	3
AŽD, Praha	Development of the Togglin demodulator	0	0	0	0	2
Artweld, Liberec	Magnetic field measurements	0	0	0	0	3
EB Services, Tábor	Development of data visualization tools	0	0	0	0	5
ÚNMZ Praha	Work and activities connected with a metrology development task	0	0	0	0	11
ÚNMZ Praha	Work and activities connected with a metrology development task	0	0	0	0	6
ÚNMZ Praha	Work and activities connected with a metrology development task	0	0	0	0	10
ÚNMZ Praha	Work and activities connected with a metrology development task	0	0	0	0	9
NÚKIB Brno	Uncertainty analysis in TEMPEST measurements	0	0	0	0	26
Aveco Praha	Production of rotary encoders	0	0	0	0	9
Jablotron Alarm, Jablonec n. Nisou	Professional expertise	0	0	0	0	4
UCEEB Buštěhrad	Behavior analysis of battery cells	0	0	0	0	3

Jablotron Alarm, Jablonec n. Nisou	Battery diagnostics	0	0	0	0	11
ABB, Praha	Diode capacity meter	0	0	0	0	5
Digiteq Automotive s.r.o., Praha	CAN FD Open Cores Support Linux Kernel Based Systems	0	0	0	0	12
RED HAT, Brno	Implementation of the research project	0	0	0	0	11
ATE Cheb	Warning sign	0	0	0	0	9
AŽD, Praha	Modeling, analysis and measurements of track circuit parameters	0	0	4	13	7
Škoda auto, Mladá Boleslav	Autonomous transport of FBU cars	0	0	0	0	118
Škoda auto, Mladá Boleslav	Development of non-acetate optical surfaces	0	0	0	0	34
Digiteq Automotive s.r.o., Praha	Realization of MEB GHIL	0	0	0	0	94
Škoda auto, Mladá Boleslav	Development of SW VRUT	0	0	0	0	91
Miterine Praha	Consultation	0	0	0	0	10
Muzeum Hlav. města Prahy	Educational application development	0	0	0	0	2
Ředitelství vodních cest Praha	Power supply system for electronic equipment	0	0	0	0	12
Avest, Praha	APOSEMAT Project Financial Contribution	0	0	0	0	45
Whalebone, Brno	Research and development of algorithms for detecting and blocking defective DNS traffic	0	0	0	0	8
Digiteq Automotive s.r.o., Praha	Moving and finishing HIL SK26	0	0	0	0	52
Škoda auto, Mladá Boleslav	Support for the HIL MQB AO test site	0	0	0	0	10
Škoda auto, Mladá Boleslav	Ethernet development	0	0	0	0	6
Porsche, Praha	Analysis of controlled system and definition of requirements	0	0	0	0	5
Škoda auto, Mladá Boleslav	Development work on a driving simulator	0	0	0	0	26

Muzeum Hlav. města Prahy	Educational application development	0	0	0	0	3
Valeo Rakovník	Navigation unit for robotic devices	0	0	0	0	26
Valeo Rakovník	RCW Trancker Development	0	0	0	0	4
TTsystems Praha	Study creation	3	0	0	0	0
Škoda Praha	Consultation	10	0	0	0	0
COPIAP, Praha	Solution of the NICME communication interface	2	0	0	0	0
Škoda auto, Mladá Boleslav	Testing automation	32	0	0	0	0
Tedom Třebíč	Model development	3	0	0	0	0
Merz Liberec	Consultation	12	0	0	0	0
ÚNMZ Praha	Work and activities connected with a metrology development task	8	0	0	0	0
Brema, Praha	Measurements	2	0	0	0	0
ÚNMZ Praha	Work and activities related to solving the task of developing metrology	8	0	0	0	0
ASICentrum Praha	Development and production	3	0	0	0	0
CESnet Praha	Time difference measurement	1	0	0	0	0
ÚNMZ Praha	Work and activities connected with a metrology development task	7	0	0	0	0
ÚNMZ Praha	Work and activities connected with a metrology development task	7	0	0	0	0
Aveco Praha	Production	10	0	0	0	0
Vodní dílo Praha	Proposal for software implementation	3	0	0	0	0
ZÚ Plzeň	Development of a process portal	7	0	0	0	0
Škoda Plzeň	Research in the field of control valves	5	0	0	0	0
Teplárenská, Č.B.	Professional expertise	8	0	0	0	0
Židovské muzeum, Praha	3D video sequence creation	15	0	0	0	0
CESnet Praha	Work on the project	5	0	0	0	0
T-Mobile Praha	Measurements	34	0	0	0	0
EGE, Č.B.	Thermal models	5	0	0	0	0

Eaton, Roztoky	A. Minaeva research support	5	0	0	0	0
Eaton, Roztoky	System development	5	0	0	0	0
ČEPS Praha	An assessment of diagnostic methods	6	0	0	0	0
Arvato, Stachov	Chip removal cutter	8	0	0	0	0
Kriminalistický ústav Praha	Search of mathematical models	10	0	0	0	0
ČEPS Praha	Network traffic security simulators	17	0	0	0	0
Škoda auto, Mladá Boleslav	Display synchronization	3	0	0	0	0
KES Vratimov	Joint testing	2	0	0	0	0
ČEPS Praha	Asymmetry calculation	4	0	0	0	0
ELTODO, Praha	Measurements	3	0	0	0	0
PREdistribuce, Praha	Identification of impacts	6	0	0	0	0
UK, Praha	Production of samples	3	0	0	0	0
Škoda auto, Mladá Boleslav	Consultation	9	0	0	0	0
Eaton Roztoky	Measurements	4	0	0	0	0
T-Mobile Praha	Measurements	3	0	0	0	0
Porsche, Praha	Study	3	0	0	0	0
ZU, Plzeň	Analysis	5	0	0	0	0
NBÚ Praha	Measurements	3	0	0	0	0
Undisclosed 67 clients	Undisclosed research titles	97	196	411	447	411
Small 717 contracts	Various titles	86	72	77	92	88
Total		472	731	928	1095	1356

Note: List and describe contract research work with the revenue for the calendar year in question.

3.3.2 Research work contracted by a foreign client

Client	Research title	Revenues (EUR thousand)				
		2014	2015	2016	2017	2018
iQnet Singapore	Real-Time Feature Detection and Matching for Specific Object Recognition	0	8	0	0	0
HERCO, Spain	Measurement of Magnetic Fields - Narda according to WSK Rev 2012-06-12	0	4	0	0	0
Newmont Technologies Limited, USA	Develop and test single-component fluxgate-finishing work	0	13	0	0	0
Vendavo, USA	Research work	0	20	0	0	0
Corning Optical Communications, Germany	Experiment to measure building-entry loss at 5-6 GHz as described in the Annex, a short report on the experiment	0	3	0	0	0
VENDA VO, INC, USA	Work, services and supplies	0	20	0	0	0
AMOT Western Way, GBR	Prototype of the iStat demonstrator	0	7	0	0	0
National Observatory of Athens, Greece	CTU-VARIO15 Observatory Magnetometer	0	15	0	0	0
VOLKSWAGEN, Germany	Adaptation of 802.11p standards in car-to-X enabled research vehicles	0	11	0	0	0
JOANNEUM RESEARCH, Austria	Reference procedure for adoption of software tools and digital products as ITU-R-	0	0	7	1	8
Logiline Einkauf GmbH, Germany	Magnetic field measurements in Mexico	0	0	7	0	0
STL Systemtechnik, Germany	Preliminary payment for project parts 1& 2 (20% of total project cost),	0	0	8	0	0
dpstar Thermo Control Electrol Sdn Bhd, Malaysia	Current Injection Testing of MC9S12ZVMC256	0	0	12	0	0
dpstar Thermo Control Electrol Sdn Bhd, Malaysia	Current Injection Testing of MC9S12ZVL128	0	0	5	0	0

PROFIBUS Nutzerorgnis-ation, Germany	Editor of the Sequence of Events (SoE) Guideline	0	0	9	0	0
dpstar Thermo Control Electrol Sdn Bhd, Malaysia	Current Injection Testing of MC9S12ZVMB64	0	0	9	0	0
Logiline Einkauf GmbH, Germany	Magnetic field measurements in Herrenberg	0	0	4	0	0
ABB, Switzerland	DLTS DPE	0	0	2	0	0
TEXAS INSTRUMENTS DEUTSCHLAND, Germany	Consultation for Kilby labs	0	0	11	0	0
ABB, Switzerland	Analysis of Silicon Power Diodes	0	0	4	0	0
FareTrade, France	Welding station analysis	0	0	0	6	0
PROFIBUS Nutzerorganis-ation, Germany	Plant-wide synchronization Guideline	0	0	0	9	0
Honeywell Dubai	RD Services	0	0	0	7	0
dpstar Thermo Control Electrol Sdn Bhd, Malaysia	Current Injection Testing of MC9S12VRP	0	0	0	9	0
Fare Trade, France	Evaluation of various valves	0	0	0	12	0
dpstar Thermo Control Electrol Sdn Bhd, Malaysia	Current Injection Testing of MC9S12ZVPM32	0	0	0	9	0
ABB, Switzerland	DLTS Analysis	0	0	0	2	0
Logiline Einkauf GmbH, Germany	Magnetic field measurements in Herrenberg Faurecia plant	0	0	0	4	0
IPN, Portugal	Analysis of 6 samples by HRTEM, including chemical composition and sample preparation by FIB	0	0	0	0	4
Khalifa University of Science and	Mohammed Bin Zayed international Robotics Challenge Sponsorship, payment No. 1 (50% of	0	0	0	0	127

Technology, Abu Dhabi	total sponsorship) as specified in Exhibit B of Contract No. 2020-MBZIRC-01					
Volkswagen, Germany	Development of an SW platform for HMI screens simulation design	0	0	0	0	19
IPPLM, Poland	Work on project	5	0	0	0	0
Volkswagen, Germany	Evolution of technology	2	0	0	0	0
dpstar Thermo Control Electrol Sdn Bhd, Malaysia	Sample testing	8	0	0	0	0
ABB, Switzerland	Analysis	2	0	0	0	0
AMOT, USA	Study	7	0	0	0	0
USM, Slovakia	App for rating a wine competition	3	0	0	0	0
dpstar Thermo Control Electrol Sdn Bhd, Malaysia	Sample testing	10	0	0	0	0
PROFIBUS Nutzerorganisation, Germany	Work on project	16	0	0	0	0
Undisclosed 26 clients	Undisclosed research titles	78	233	401	528	927
Small 19 contracts	Various titles	3	2	2	3	3
Total		135	335	481	590	1088

Note: List and describe contract research work with the revenue for the calendar year in question.

3.4 Revenues from non-public sources (besides grants or contract research)

3.4.1 Overview of revenues from non-public sources raised for the 2014–2018 reporting period

Revenue type	Revenues (EUR thousand)				
	2014	2015	2016	2017	2018
licenses sold	13	32	51	19	9
spin-off revenues	0	0	0	0	0
gifts	206	162	195	306	329
Total	219	194	246	325	339

Note: List funds for R&D&I from non-public sources, besides grants or contract research (e.g. licences sold, spin-off revenues, gifts, etc.) in each calendar year.

3.5 Applied research results with an economic impact on society

3.5.1 Overview of applied research results in the 2014–2018 reporting period

List and describe the results that have already been applied in practice, or that will realistically be applied, with an existing or prospective economic impact on society. Under “patents” and “licences sold”, list all the results; under other results list a *maximum* of five items. Unless otherwise specified below, the definition of a result must correspond to the definitions under the Methodology for Evaluating Research Organisations and Research, Development and Innovation Purpose-Tied Aid Programmes, Appendix No 4: Definitions of Types of Results.

Results	Year	Title
European patent		
EP 2786171	2016	Contactless microwave measuring system for measuring the distance of a reflective surface
EP 2811307	2017	System for vector measurement of the electromagnetic field intensity
EP3113582	2017	Stabilized and homogenized source of non-thermal plasma
EP2851647	2017	Microwave system with enhanced capability to detect, identify and localize moving targets
EP 3351441	2018	Device for increased safety during slow vehicle movement
EP2456578 (B1)	2016	Robot for cleaning and inspecting air ducts, and the control unit
American patent		
US9985982B1	2018	Method and apparatus for aggregating indicators of compromise for use in network security

US9923912B2	2018	Learning detector of malicious network traffic from weak labels
US9881413	2018	Illumination-guided example-based stylization of 3D renderings
US9995054	2018	Controlling patch usage in image synthesis
US9870638	2018	Appearance transfer techniques
US9292532	2016	Remote data storage
US9852523	2017	Appearance transfer techniques maintaining temporal coherence
US9443164	2016	A system and a method for product identification
US20180342504	2018	TRANSISTORS WITH OCTAGON WAFFLE GATE PATTERNS
US9374383B2	2016	Events from network flows
US8744169	2014	VOTING STRATEGY FOR VISUAL EGO-MOTION FROM STEREO
US9123145	2015	Temporal noise control for sketchy animation
US9101967	2015	Robot for cleaning and inspecting conduits, and the control unit
US9082005	2015	Smart Scribbles for Sketch Segmentation
US8912623B2	2014	Fast Recovery Diode
US8803192B2	2014	Bipolar Non-Punch-Through Power Semiconductor Device
US0232364A1	2014	Efficient Regulation of Capacitance Voltage(s) in a Switched Mode Multilevel Power Converter
Czech licensed patent		
Other foreign patents		
5781291	2015	Fast Recovery Diode
Licences sold		
US9905054	2018	Controlling patch usage in image synthesis
CZ304568	2014	Adaptabilní systém pro zvýšení rychlosti a spolehlivosti přenosu dat v paketové síti s optimalizací zpoždění (An adaptable system for increasing the speed and reliability of data transfer in a packet network, optimizing the delay)
CZ27701	2015	Systém pro lokalizaci zdrojů elektromagnetického záření (A system for localizing sources of electromagnetic radiation)

	2014	Softwarový rámec pro velké mapy (A software framework for large maps)
Significant analyses / surveys / studies		
Spin-off with a stake held by the evaluated unit		
Spin-off with no stake held by the evaluated unit		
Prototypes		
Varieties and breeds		
Other		

Note: “Licence” refers to a licence for a result of R&D&I in the broadest sense of the word (licences for patents, utility models, industrial designs; copyright licences for software and other works, and any other licences). For the purposes of this methodology, a “spin-off” is a judicial person established to commercialise knowledge, usually with the inclusion/transfer of the rights to this knowledge to such judicial person. List all instances of legal persons.

3.6 Significant applied research results with an impact other than an economic one on society

3.6.1 Overview of applied research results for the 2014–2018 reporting period with an impact other than an economic one on society

Result type	Name	Anticipated impact
Methodology, Functional sample	A method for precise automatic non-invasive sensing of a blood pulse wave	This method for precise automatic non-invasive sensing of a blood pulse wave and the device for implementing it increases the patient’s quality of life due to the reduced risk of inadequate treatment of hypertension and increased protection of organs affected by hypertension (subsequent cooperation with the Mayo Clinic - USA).
Functional sample	A stick for blind persons, and for use in sport	The intelligent interface of this stick for the blind serves for the design of a new Navigation Centre for control and navigation of the blind in a general outdoor area.
Book chapter	Complex network analysis in Old Kingdom society	Complex network analysis of the Egyptian Empire, resulting in the birth of cyber-Egyptology in the Czech Rep.

Software	Dronument: A system for documenting historical monuments, using a team of unmanned aerial vehicles	This aerial system has already been deployed for safe scanning of several historical sites in the Czech Republic and in Poland.
Software	SIMToolbox: a MATLAB toolbox for structured illumination microscopy	Open-source for processing data acquired by structured illumination microscopy well suited for fast live-cell imaging (modular set SIMToolbox for MATLAB).

Note: List and describe a maximum of five results (in line with the Definitions of Types of Results) that have already been applied in practice, or that will realistically be applied. These are typical results from disciplines in the humanities and social sciences, for which you should briefly describe their anticipated impact.

3.11 Recognition in the international R&D&I community

3.11.1 Participation of the evaluated unit's academic staff on the editorial boards of international scientific journals in the 2014–2018 reporting period

Name, surname and title(s) of the evaluated unit's member of staff	Title, publisher, city(-ies) and country(-ies) of origin of the scientific journal
Bohuslav Rezek, prof. RNDr. Ph.D.	Scientific Reports (Nature Research), Springer, London, UK
Jan Kybic, prof. Dr. Ing.	IEEE Transactions on Medical Imaging, Institute of Electrical and Electronics Engineers (IEEE), Piscataway, USA
Jiří Matas, prof. Ing. Ph.D.	International Journal of Computer Vision, Springer, London, UK
Jan Vobecký, prof. Ing. DrSc.	IEEE Electron Device Letters, IEEE, Piscataway, USA
Didier Henrion, prof. Ing. Ph.D.	Mathematics of Control, Signals, and Systems, Springer, London, UK
Didier Henrion, prof. Ing. Ph.D.	SIAM Journal on Optimization, SIAM (Society for Industrial and Applied Mathematics), Philadelphia, USA
Sergej Čelikovský, prof. RNDr. CSc.	IET Control Theory and Applications, Institution of Engineering and Technology, Stevenage, UK
Sergej Čelikovský, prof. RNDr. CSc.	Journal of the Franklin Institute, Elsevier, Cambridge, UK
Sergej Čelikovský, prof. RNDr. CSc.	International Journal of Bifurcation and Chaos, World Scientific Publishing, London, UK
Jiří Bittner, doc. Ing. Ph.D.	Computer Graphics Forum, Wiley-Blackwell, New Jersey, USA

Note: List a maximum of ten examples of academic staff's participation on the editorial boards of international scientific journals (e.g. editor, member of the editorial board, etc.).

3.11.2 The most significant invited lectures by the evaluated unit's academic staff at institutions in other countries during the 2014–2018 reporting period

Name, surname and title(s) of the evaluated unit's member of staff	Invited lecture title	Name of the host institution, conference or other event
Stanislav Zvánovec, prof. Ing. Ph.D.	Visible Light Communications	University of Central Florida
Miloslav Čapek, doc. Ing. Ph.D.	Optimization for electrically small antennas	KTH Stockholm
Jan Ruzs, doc. Ing. Ph.D.	Automated Analysis of Connected Speech in Parkinson's Disease	Movement Disorders Society - 2nd Speech and Swallowing in Parkinson's Disease School
Jiří Matas, prof. Ing. Ph.D.	Computer Vision	The 23rd Iberoamerican Congress on Pattern Recognition
Jiří Matas, prof. Ing. Ph.D.	Text detection in the Wild A.D. 2015	The 6th International Workshop on Camera Based Document Analysis and Recognition (CBDAR 2015)
Tomáš Werner, doc. Ing. Ph.D.	How Hard Is Solving the LP Relaxation of the Max-Sum Labeling Problem?	Workshop on Discrete Graphical Models
Zdeněk Hurák, doc. Ing. Ph.D.	Distributed noncontact (micro)manipulation by shaping force fields through arrays of actuators	University of California Santa Barbara, CCDC Seminar Series
Jan Sýkora, prof. Ing. Ph.D.	Wireless physical layer network coding	Winter School on Information Theory and Signal Processing for Internet of Things
Jan Holub, prof. Ing. Ph.D.	Smart acoustic sensor modelling and grid simulation	NATO, 2017 Modelling and Simulation for Autonomous Systems
Bohuslav Rezek, prof. RNDr. Ph.D.	Nanocrystalline diamond transistors for detection of cell morphology and activity	International Conference on Applied Photonics and Electronics (InCAPE 2017)

Note: List a maximum of ten examples.

3.11.3 The most significant lectures by foreign scientists and other guests relevant to the R&D&I field at the evaluated unit during the 2014–2018 reporting period

Name, surname and title(s) of the evaluated unit's member of staff	Lecturer's employer at the time of the lecture	Invited lecture title
Ping Sheng, prof.	Hong Kong University of Science & Technology, China	Metamaterials for sound absorption.
Mark J. Kushner, prof.	University of Michigan, USA	The challenges of transferring plasma produced chemical reactivity to solids and liquids
Shimon Sapir, prof.	University of Haifa, Israel	Acoustic speech analysis and classification methods for early detection and monitoring progression of dysarthria: The importance of speech tasks and the nature of neurological disease
Pieter Abbeel, prof.	University of California, Berkeley, USA	Motion planning and reinforcement learning in robotics

Gianni DiCaro, prof.	Carnegie Mellon University, USA	Human-swarm interaction and cooperation
Nejat Olgač, prof.	University of Connecticut, USA	Stability of LTI Systems with Multiple Delays, using the Bounds of their Imaginary Root Crossings
Ruzena Bajcsy, prof.	University of California, Berkeley, USA	Personalized model of kinematics and dynamics of physical activities
Bryan Kibble, prof.	National Physical Laboratory, UK	Mass from Energy? A Unit for a Quantum World
Stefanos Zafeiriou, prof.	Imperial College London, UK	From Lukas-Kanade to Mnemonic Descent and Deep Dense Shape Regression: A brief history of (deformable) image alignment.
Jan Peters, prof.	Technische Universität Darmstadt	Motor Skill Learning: From Simple Skills to Table Tennis and Manipulation

Note: Relevant solely for the R&D&I field. List a maximum of ten examples.

3.11.4 The most significant elected membership in foreign of professional societies relevant to the R&D&I field at the evaluated unit during the 2014–2018 reporting period

Name, surname and title(s) of the evaluated unit's member of staff	Name of professional society	Type of membership
Jiříček, Ondřej, prof. Ing. CSc.	International Institute of Noise Control Engineering	member of the Board of Directors
Muller, Zdeněk, doc. Ing. Ph.D.	Power and Energy Society CS Chapter; NC Cigre	chair
Knápek, Jaroslav, prof. Ing. CSc.	Česká společnost pro ekonomiku energetiky (Czech Society for Energy Economics) CZAEE, a national affiliate of the International Association for Energy Economics	chair
Šebek, Michael, prof. Ing. DrSc.	International Federation of Automatic Control (IFAC)	National Member Organization chair / General Assembly member
Hurák, Zdeněk, doc. Ing. Ph.D.	Czechoslovakia section of IEEE, Control System Chapter	chair
Pěchouček, Michal, prof. Ing. Ph.D.	International Foundation for Autonomous Agents and Multiagent Systems (organizer of the A* conference AAMAS)	member of the Board of Directors
Husník, Libor, Dr. Ing. Ph.D.	Audio Engineering Society (AES)	Chair of the Czech AES Section
Páta Petr, prof. Ing. Ph.D.	Česká a Slovenská společnost pro fotoniku (Czech and Slovak Society for Photonics) ČSSF	chair
Efmertová Marcela, prof. PhDr. CSc.	Společnost pro hospodářské a sociální dějiny České republiky (Society for Economic and Social History of the Czech Republic)	chair
Chomát Miroslav, doc. Ing. Ph.D.	IET Czech Republic Local Network	vice-chair

Note: List a maximum of ten examples.

SUMMARY LIST OF ADDITIONAL DOCUMENTATION IN MODULE M3

Document Title	Criterion	Location (HTML link)
TROPIC: Distributed computing, storage and radio resource allocation over cooperative femtocells	3.2	https://www.ict-tropic.upc.edu/
Integrated Satellite and Terrestrial Navigation Technologies Centre	3.2	https://starfos.tacr.cz/en/project/TE01020186
Centre of Advanced Photovoltaics (CAP)	3.2	http://www.cap.fel.cvut.cz/en/
Advanced sensors	3.2	https://www.fel.cvut.cz/en/aktuality/2013/senzory.html
V3C - Visual Computing Competence Center	3.2	https://starfos.tacr.cz/en/project/TE01020415
GridCut	3.5	GridCut
Multi-robot Systems	3.6	Cyber-Egyptology, Historical monuments documentation
IP protection and technology transfer at CTU	3.8, 3.9	http://evaluation-cvut.cz/files/H2020-Technologytransfer.pdf
Eyedeia Recognition	3.9	Eyedeia Recognition, s.r.o.
InQBay incubator	3.9	InQBay incubator
Discovery Award 2014	3.10	Discovery Award 2014
ESHO - Pyrexar Award 2015	3.10	ESHO - Pyrexar Award 2015
Longuet-Higgins Prize 2017	3.10	Longuet-Higgins Prize 2017
Eurographics Fellow 2017	3.10	Eurographics Fellow 2017
HONOS ALIT ARTES 2017	3.10	HONOS ALIT ARTES 2017
MBZIRC 2017	3.10	MBZIRC 2017
AI Awards 2018	3.10	AI Awards 2018
Physics Thursdays	3.12	Physics Thursdays
J. Ruzs	3.12	Ruzs
assoc. prof. Habala's video lectures	3.12	assoc. prof. Habala's video lectures