

CZECH POSITION WITH RESPECT TO THE THEMATIC AREAS OF THE SUCCESSOR OF THE 7TH FRAMEWORK PROGRAMME OF THE EUROPEAN COMMUNITY FOR RESEARCH, TECHNOLOGICAL DEVELOPMENT AND DEMONSTRATION ACTIVITIES, SUPPLEMENTED WITH SUGGESTIONS FOR INNOVATIVE ACTIVITIES AND COOPERATION BETWEEN THE PUBLIC AND PRIVATE SECTORS

From June 2010, the Ministry of Education, Youth and Sports coordinated the work of thematic groups whose task was to draw up a document that would depict the Czech Republic's priorities in research and development on the European level for the next programming period. That is, simply put, the priorities of the successor of the 7th Framework Programme of the European Community for Research, Technological Development and Demonstration Activities (7th FP), in the context of national research financing, in connection with structural fund programmes and experience with the 6th and 7th FP. Given that a tendency towards enhancing innovation activities was already clear last year, special attention was paid to innovation. The document produced by the groups was approved by the Minister of Education, Youth, and Sport (MEYS) as a background material for public discussion, which was opened at the website of the MEYS. The outcomes of the discussion have been integrated into the document and only chapters concerning priority areas are presented in the material that follows.

HEALTH

The priorities are given both in the European Union and in the Czech Republic by the Research and Development Programme of the Ministry of Health (RDP III), which states the basic goals that are to be reached. The European Union's strategy in general is based on the Millennium Development Goals defined by the UN, with three of the eight basic directions concerning health (No. 4 Health of Children, No. 5 Maternal Health, and No. 6 Combating HIV/AIDS). The European Union (Health Priorities and Cohesion Policy Objectives 2014-2020) will generally focus on promoting healthcare policy, particularly in the sphere of prevention, the health of the ageing population, the introduction of effective, high-quality and safe, but also economically sustainable processes and systems, on promoting care for the health of workers, on supporting new technologies, including "e-health", and improving the accessibility of healthcare, including cooperation across existing borders. The direction of development in the Czech Republic (RDP III) corresponds to those themes to a large degree. The proposed priorities can be summarised as the following areas:

- Prevention, early diagnosis, therapy and care for child patients: Chronic and infectious childhood diseases, such as diabetes, autoimmune disorders, genetically conditioned diseases, polygenically conditioned serious childhood diseases, including neoplasms, chronic respiratory disorders, including asthma bronchiale, and disorders of the locomotory tract. The issue of integrating child patients into society following the long-term treatment of serious diseases, including the specific aspects of healthcare for former chronic child

patients. Prevention and treatment of known types of addictions, and not only to addictive substances. In the Czech Republic, these issues are studied at a number of points (e.g., Charles University, 2nd Medical Faculty; Motol Faculty Hospital; Hradec Králové Faculty Hospital; Masaryk University, Brno Faculty Hospital – DN; Medical Faculty at Palacký University – Olomouc Faculty Hospital).

- Personalisation of medicine (in prevention, diagnostics, and the optimisation of the treatment of acute and chronic diseases), focusing on children, people in their productive age, and seniors, and focusing on the different genotypes and phenotype of patients: The question of personalised medicine has recently come to the forefront of interest of people working in bio-medicine. The reason is that in a number of cases of extended therapy and the prevention of chronic disease, the usual standard diagnostic and therapeutic procedures do not sufficiently respect the individual's specific profile. The consequence of the phenomena may be insufficient treatment, or under-treatment, on one hand, and disproportionate complications caused by the treatment, on the other. Generally, it is deemed necessary to apply to the "right" individual preventive educational and pharmaceutical procedures (e.g., in the case of increased cardiovascular risks or addictions, etc.) and that the right treatment is administered to the right patient at the right time, and best if in line with current pharmaco-genetic (pharmaco-genomic) knowledge, as differences are based, among other things, on the different genetic make-up of an individual and the current phenotype of bio-transformation enzymes and the target points of the treatment effects (epigenic influence). The issue of personalised medicine is a multidisciplinary one; it is manifest in all medical specialisations where the long-term therapy of chronic diseases is used – e.g., psychiatric, neurological, and oncological, and the search for the right methods and approaches to it must be the subject of cooperation between pre-clinical and clinical research. The development of personalised medicine, including modern pharmacotherapy, is closely related to the development of molecular biological methods. The broader application of these procedures is very desirable for effective and safe treatment. The integration of these findings will contribute to, among other things, the identification of the cellular targets of medications, bio-indicators of their desirable and undesirable effects, and rational pharmacotherapy. In the Czech Republic, these issues are studied at a number of workplaces (Charles University, 1st Medical Faculty; Medical Faculty of Masaryk University, Brno Faculty Hospital; CEITEC, Prague Psychiatric Centre, Masaryk Oncological Institute, Medical Faculty of Palacký University in Olomouc, State Medical Institute).
- The issue of the prevention, timely capture, and effective therapy of hemato-oncologic and oncologic diseases: Neoplastic diseases are among the most frequent causes of death, but the mortality rate can be significantly influenced by the timely capture of the disease. Therapeutic substances directly targeted

solely on neoplastic cells are more effective and fundamentally increase the patient's quality of life.

- The issue of neurodegenerative, neuromuscular, cerebrovascular and neurological diseases in general (related to the topic "Ageing of the Population"): The incidence of neurological diseases has increased significantly in recent years and its dramatic and continuous increase in the coming decades can be predicted. There are several reasons: the ageing of the population in developed countries, the gradually improving healthcare and social care, including better availability of healthcare; infectious diseases of an unknown origin (meningitis, encephalitis); and improved informedness of the general public about neurological diseases and treatments. An immense increase in the incidence of cerebrovascular incidents resulting in movement disorders and long-term cognitive disorders, which will significantly burden healthcare and social expenditures and will certainly have other effects of a general economic nature. The main group of diseases that deserve greater attention in relation to the ageing of the population are neurodegenerative brain disorders, in particular Alzheimer's disease and other neurodegenerative disorders (as well as secondary dementia) and Parkinson's disease. Other diseases include other extra-pyramidal disorders affecting movement ("movement disorders", such as essential tremble, dystonia), multiple sclerosis, epilepsy, traumas of the nervous systems and neuropathy and neuropathic pain. Generally, patients with movement disorders, cognitive disorders, affective and behavioural disorders, and neuropathic pain have a significantly influenced quality of life, employment, family life, and interpersonal relations. Scientific discoveries and treatment procedures leading to prevention, early diagnostics (e.g., by searching for specific markers) and, once the disease has developed, searching for specific and rational medical procedures (pharmacological but also non-pharmacological and specific surgical procedures) are an open challenge, both for researchers in neuroscience and clinical workers. The main research priorities include the search for diagnostic markers of neurodegenerative cerebral disorders, the study of other simultaneous changes in the brain participating in the development of the disease (e.g., an evaluation of inflammatory and vascular changes in the brain), and generally the study of markers for evaluating the progression of neurodegenerative disorders and the effects of treatment. These include, in particular, clinical markers, imaging, biochemical and genetic markers, as well as electro-physiologic and neuro-sonographic markers.
- Theoretical and practical approaches in the treatment of metabolic disorders and nutrition, in particular the treatment of obesity and metabolic syndrome as serious risk factors in the development of other chronic diseases (e.g., type 2 diabetes): Obesity – a serious civilisation risk factor in the development of other chronic disorders, obesity is the most frequently occurring metabolic disorder, which plagues not only adults, but increasingly also children. The

factors influencing the development of obesity and metabolic syndrome must be studied, both in the population as a whole and in individual risk groups, e.g., children with various chronic diseases.

- Prevention of cardiovascular diseases, research and application of modern methods and procedures, and the optimisation of palliative care; early diagnostics and the personalisation of cardiovascular disease treatment: Prevention must clearly dominate in cardiology, which means influencing how parents treat their children and also changing the social environment: eating habits, appropriate physical activity, drug addictions – smoking, alcohol, drugs. Another focal point of this programme must be prevention in adulthood: again, eating habits, exercise and not smoking, as well as sufficient dispensary care with the appropriate intervention activity. Another range of activities in cardiology should focus on preventing the occurrence of atrium fibrillation and chronic heart failure, which are becoming 21st century epidemics. Focusing on genetic disposition, initiating factors, lifestyle factors, and on preventing complications. Greater attention should be paid to atherosclerosis, in particular to early molecular diagnostics of its genetic causes and treatment. Transfer of knowledge about the effects of substances obtained on each level of study (in silico/in vitro/in vivo) targeted at increasing the safety of treatment and the possibility of extending the areas of indication. An aspect of equal importance in cardiology is care for the ill at the terminal stage of cardiovascular diseases, i.e., palliative care. Appropriate conditions for caring for the people thus afflicted have not yet been developed. In the sphere of the early diagnostics of cardiovascular diseases, the main issues will be the detection of new risk factors and the development of new imaging methods, including molecular imaging, that make it possible to diagnose cardiovascular diseases at very early stages and, in the optimum case, identify an occurrence before the first clinical manifestation of the disease appears. In the personalisation of care, the main issue will be the application of leading diagnostic and treatment methods that allow for highly individualised treatment. The combined outcome of improved prevention, early diagnostics, and the individualisation of treatment will be an improvement in the overall results of the treatment of CV diseases, improved quality of life, extension of the productive age, and also a better cost-benefit ratio of the treatment of CV diseases in the medium range.
- Research focused on modern procedures in treating serious conditions (polytraumas and multi-organ failure, sepsis): Polytraumas and septic conditions are presently the most frequent causes of death of patients in intensive care in developed countries. These treatments often result in the syndrome of multi-organ failure and account for a substantial part of treatment costs. A high level of mortality and subsequent morbidity remain a problem, which further increases the cost of treatment. It is therefore evident, and it is confirmed by the current direction of research, that through the mere

support of research in the early diagnostics of these conditions, and by supporting research of the effective treatment of organ dysfunction or the substitution of organ function, we can reduce the mortality in polytraumas and septic conditions, reduce the duration of hospitalisation in intensive care, and decrease the subsequent morbidity of those patients.

- Translation medicine: Research in translation medicine supports the co-operation of three key groups that form the core of modern medicine – academic workplaces, the healthcare sector, and the bio-pharmaceutical industry. Unique technologies in genomics, proteomics, metabolomics, high-capacity screening, pre-clinical development, imaging methods, and new possibilities in clinical testing with pharmacodynamic goals, give rise to the possibility of the development of new therapies and to a search for biomarkers of the diseases, which will be individual for each patient. Support for translation research in a broad medical context and across various disciplines will make it possible to translate the findings of basic research into tangible improvements in medicine. Translation biomedicine research is carried out at a high quality in the Czech Republic at many academic workplaces and in practically all university hospitals and in institutions directly managed by the Ministry.
- The issue of neoplastic diseases and the possibility of their prevention, diagnostics, and treatment: Neoplastic diseases are the second most frequent cause of death, with a dramatically increasing incidence, which is only partially due to the ageing of the population. The costs of prevention, diagnostics, and, in particular the treatment of malignant diseases grow year on year, with an uncertain vision of their long-term sustainability. Research should focus primarily on diagnosing tumours in early clinical studies, on identifying new therapeutic goals and biomarkers, genetically conditioned neoplastic diseases, the personalisation of treatment, identification of new medicines and treatment procedures, and study of less frequent neoplastic diseases. Research in this sphere should be the Czech Republic's priority, with a view to its occupation of top ranks in international statistics of the occurrence of a number of tumours, and also with a view to the existence of research conducted by Czech teams (Masaryk Oncologic Institute, 1st Medical Faculty of Charles University, Medical Faculty of Palacký University, Institute of Molecular Genetics of the Czech Academy of Science, Institute of Organic Chemistry and Biochemistry of the Czech Academy of Science, and others).
- Stem-cell research and other top-level biotechnologies (tissue engineering, xeno-transplants, etc.), iPS cells, cell reprogramming and the possibilities of their clinical use, in particular in the treatment of neurodegenerative diseases, sensual disorders, and diseases of the cardiovascular and locomotory systems. Research should also focus on genetic changes in stem cells related to ageing and therefore to prolonged exposure to mutagen factors that cause their

malignant transformation and therefore the occurrence of neoplasms, which are an increasing element of morbidity connected to the lengthening of human age. In the Czech Republic, these issues are studied primarily at the 1st and 2nd Medical Faculties of Charles University, Institute of Experimental Medicine of the Czech Academy of Science, Institute of Molecular Genetics of the Czech Academy of Science, Masaryk University Brno, and the Animal Production Research Institute.

- Reproduction ageing of the population: due to changes in lifestyle and the overall increasing of the average age of the population, people postpone reproduction to a later time. This shift leads to an increased occurrence of reproductive disorders and to changes in the quality of foetal cells. In effect, it leads to an increased use of assisted reproduction and to higher demands on techniques used in the examination of the quality of foetal cells. Research should focus on clarifying the molecular mechanisms of disorders occurring in foetal cells in relation to the increasing of the reproduction age and on improving techniques used in detecting foetal cell disorders.
- Relationship of the human organism and infectious and commensal microorganisms: resistance to antibiotics, chronic infections, immunodeficiency, chronic stimulation leading to neoplastic transformation.
- Prevention of infectious diseases in childhood and adulthood: for both age groups, infectious diseases are becoming a threat; new infections are occurring and old infections returning. There are a number of infectious diseases for which new vaccines and vaccination strategies have to be developed. In the Czech Republic, these areas are researched primarily at the State Medical Institute, at the Czech Academy of Sciences, Charles University in Prague, Hradec Králové and in Pilsen, and at university hospitals. All those institutions are involved in international cooperation, which is required for this type of research.
- Mental health of the EU population: includes research topics such as comparative studies of the occurrence of disorders in EU countries and an estimate of the need of care, a comparative analysis of systems of care for mental health (approaches to treatment, financing, approaches to evaluating efficiency), improved availability and efficiency of psychiatric care and increased quality of the life of persons with psychiatric disorders, restriction of the social marginalisation of persons with mental diseases, and neuropsychiatric disorders in old age. In the Czech Republic, these issues are studied primarily at the medical faculties of Charles University, Palacký University, and Masaryk University.
- Prevention of civilisation diseases on the basis of adverse changes in lifestyle.

AGEING

- Biological principles of ageing (in particular on the molecular and cellular level), prevention of ageing, extension of human age.
- Changes in the nervous system related to ageing, neurodegenerative diseases, Alzheimer's disease, and other neurodegenerative diseases related to cognitive function disorders, early diagnostics of the symptoms of dementia, risk factors of the occurrence and speed of progression of diseases, treatment.
- Changes in the human locomotory system during ageing, prevention of old-age changes in the locomotory system, treatment.
- Sensory changes caused by ageing, loss of hearing and eyesight, prevention, treatment.
- Age-related behavioural changes – motivation, decision-making, attention.
- Development of joint and bone replacements, optimal environment for mobility in old-age, hearing and sight replacements, development of special technologies for seniors.
- Specific aspects of diagnosing and treating seniors' diseases with a view to the intensity and side-effects of treatment (e.g., neoplastic and cardiovascular diseases, palliative treatment, etc.)
- Looking for optimum care for seniors, individual care, institutional care, safe homes.
- Specificities of oncologic and hemato-oncologic diseases in old age, optimised pharmaco and immunotherapy, early diagnostics, genetic foundation and impact of the environment (pollutants, infections,...).
- Demographic changes in the society, social changes and the future of the ageing population, impact of demographic change on life in Europe.
- Age-based discrimination, the problem of ageism (see the European Social Survey).
- Optimisation of medical care for the ageing population, safe pharmacotherapy, specifics of the cytostatic treatment of the ageing population, institutional and community forms of care, palliative medicine.
- Ageing and public healthcare, programmes for retaining physical and mental abilities in old age, psychology of the ageing population, intra-generational relations.
- Reproduction ageing of the population, prevention of foetal cell disorders, prevention of hereditary diseases and developmental defects.

The four underlined topics are considered to be of extraordinary importance. Those topics should be considered as priority topics for discussion about research topics in

the new strategic framework. The research of ageing cannot be reduced to neurodegenerative disorders, but must also focus on preventive strategies and the systemic impacts of demographic changes.

THE ENERGY SECTOR

Priorities in the energy sector can be divided into two levels – research and development activities and demonstration activities. Research and development aims at the development of new technologies, materials, and promising sectors – that is, the results of those activities are only manifest in the long-term. Demonstration activities, on the other hand, bring technologies closer to the market, allow for the pilot testing of developed technologies, and for their verification in practice.

There are four major priorities for CZ in the field of non-nuclear technologies:

- Development, increased reliability, and safety of electricity networks – the Smart Grids initiative;
- Technologies for emission-free energy generation (Clean Coal Technology);
- The development of traditional and modern electro-chemical sources of electricity; and
- The development of hydrogen technologies, including hydrogen production.

As for nuclear energy, basic research activities should focus on controlling a useable nuclear fusion. In nuclear fission, the main priorities are research, development, and demonstration activities in sustainable nuclear energy (e.g. development of the ALLEGRO high-temperature reactor, 4th generation reactors).

In addition to thematic priorities, horizontal themes must also be addressed in the energy sector:

- Targeted education and human resource development (capacity development);
- Increased participation of SMEs and industry in development and demonstration activities;
- Connecting the R&D of organisations with the private sector – taking advantage of the outcomes of research, targeting research in directions that are attractive for SMEs/industry.

NON-NUCLEAR ENERGY (for nuclear energy, see the chapter EURATOM)

Hydrogen technologies and hydrogen production

- Hydrogen production with lower costs – R&D, demonstration projects;

- Hydrogen generation by electrolysis from the excess electrical output from the load follow of nuclear and alternative sources. High-temperature electrolysis of water, using high-potential heat – R&D, demonstration projects;
- Use of hydrogen in electricity accumulation – demonstration projects;
- Technology of producing synthetic methane and other substances suitable for use as electricity carriers - R&D.

Renewable sources of energy

Biomass

- Use of biomass with a high efficiency in the production of electricity, heat, and biofuels – demonstration projects;
- Biogas technology for distributed energy – demonstration projects.

Geothermal

- Research of efficient use of geothermal heat for local CHS (central heat supply) systems and research of technically and financially acceptable systems for electricity generation – R&D, demonstration projects.

Secondary materials

- Development of technologies for the preparation and use of SAF (solid alternative fuels) from waste for heat-plant sources of CSH – R&D, demonstration projects.

TRADITIONAL ENERGY – demonstration projects

- Clean coal technologies;
- Development and use of clean coal technologies for low-energy coal – demonstration projects;
- Energy networks, including Smart Grids – R&D activities, demonstration projects;
- Development of components for energy grids, including material research;
- Development of grids (Smart Grids) and system integration that will allow highly-efficient use of the energy generated – R&D, demonstration projects;
- Application of Smart Grids in defined areas - Smart Cities, Smart Regions – demonstration projects.

Accumulation of energy

- Research and development of sources of accumulation, including the integration of accumulation into concepts for local energy and heat supply systems, with the possibility of cooperation with higher-order grids and in concepts for low-energy houses – demonstration projects;
- Energy savings – R&D activities, demonstration projects;

- Development of cost-effective approaches for energy savings throughout the chain – generation, transmission, use – R&D, demonstration projects;
- The use of “traditional” electro-chemical sources (with an acidic as well as alkaline electrolyte) for short-term and long-term storage of electricity – R&D activities, demonstration projects;
- “Modern” electro-chemical sources (Li-Ion, Li-Pol, super-condensators) and their use for the accumulation of electrical energy - R&D activities, demonstration projects;
- Development of new materials and substances for “traditional” as well as “modern” electro-chemical sources with improved properties (higher density of energy, useful life, conductivity, safety) – R&D activities.

AGRICULTURE AND FOOD AND BIOTECHNOLOGIES

The Czech Republic supports the relevant initiatives of Joint Programming and the creation of synergies in European agricultural research and research in the sphere of nutrition and health.

AGRICULTURE

Generally, new methods and procedures to ensure the sufficient production of high-quality foods, including water, are supported by CZ, as well as the mitigation of climate change. The main research areas are:

- Research, diagnostic procedures and the prevention of the dissemination of the originators of plant diseases and pest infestations;
- Infectious diseases of farm animals, medical prevention, welfare;
- Use of biomass, by-products, and other agricultural waste products in energy generation;
- Research in the area of biotechnologies of farm animals and plants, and research of the function of genes, research of genetic sources, use of farm animals and plants in the production of recombinant proteins;
- Research and the use of plant metabolites in the production of new, biologically active compounds;
- Sustainability and quality of life in rural areas, creating new jobs;
- Sources of water and their non-agricultural use, landscape development.

FOODS AND THE FOOD CHAIN

The area is an integral part of the agriculture topic (the so-called food chain “from field to fork”). Research should focus on deepening and expanding knowledge leading to the production of a broad range of high-quality and safe foods, thereby creating

the conditions for healthy nutrition for the population, and under the conditions of changing lifestyles and various civilisation phenomena. The main directions of research are:

- Food for healthy nutrition;
- Composition of food, indicators of quality, safety and authenticity;
- Modern food examination methods;
- Processing (organic) technologies and food handling.

ADVANCED TECHNOLOGIES

- Properties of hybrid and transgenic organisms, obtaining information about the role of genetic and epigenetic factors in the regulation of basic biological processes (cell differentiation, development of the individual);
- Preparation of plants with the required properties (tolerance to risk factors concerning the environment, resistance to pest infestation, specific useful properties);
- Preparation of high-performance production cell lines and organisms;
- Preparation of organisms for the biodegradation of environmental pollutants and waste from industrial production;
- Ascertaining factors that influence genome stability and the possibilities of their regulation, creation of stable genetically modified organisms (animals and plants) for agriculture and related sectors;
- Research and biotechnology of plant growth regulators for ensuring sustainable production of foods and non-food use;
- Finding new biocatalysers for chemical and pharmaceutical production;
- New production programmes using agricultural production not only in the food industry, but in particular in the chemical and pharmaceutical industry, will influence economic development and improve the competitiveness of the Czech economy;
- Development of new generations of vaccines using genetic methods.

ENVIRONMENT

In addressing environmental problems, the main goal is to support the sustainable development of society and to preserve it in all areas (the use of landscape and natural resources, protection of ecosystems and biodiversity, human environment, including cultural heritage, impact of the environment on man, agriculture, transport, the energy sector, industry, etc.).

- Protection, revitalisation, and sustainable use of resources – use of ecosystem services: comprehensive evaluation of the (long-term) impact of methods of

farming and the use of soil and water (underground as well as surface) on ecosystems and human health – using long-term data (monitoring) and historical sources (demographic, socio-economic, aerial photos, etc.).

- Protection of biodiversity and care for ecosystems – protection of the genetic variability of wild plants and animals, support for friendly farming methods that are close to nature and for non-productive functions in forests and in agriculture, reduction of the impact of farming on sources of water (quality and quantity), hydrological extremes and soil quality – sustainable farming.
- Comprehensive solution of sustainable use of landscape and revitalisation – in terms of food quality, water management, possibility for organism migration, impact of geofactors on the environment and on increasing water retention in landscape, and the protection of landscape from fragmentation.
- The impact of global changes, including climate change, prediction of impacts and adaptation measures, threats to environmental security, including economic and social aspects – modelling and prediction of the impact of the present and future situation on the basis of paleo-data, long-term monitoring of comprehensive ecosystems (LTER, BR, WFD, Natura 2000), protection of forest ecosystems, cultural soils and water management, including protection from diseases and pests. Prediction and protection from the impact of extreme meteorological phenomena and the risks for water ecosystems and farming in the countryside – floods, droughts, movement of contaminants, eutrophication. Social science research of the impact of adverse changes – mitigation and adaptation measures. Expanding the knowledge of new threats of imported germ carriers and of animal carriers of infectious diseases transferring them to man.
- Support for the development of environmental technologies for addressing problems with environmental security and the sustainable use of resources (for the issues described in points 1 to 4). This concerns primarily: waste management – its use, the protection of the atmosphere, hydrosphere, and soil from contamination, development of renewable resources, efficiency of biomass production, etc. Support should also be directed to technologies focused on chemical substance and waste management (including the mapping of contaminated areas), LCA.
- Support for the efficient monitoring of the condition of ecosystems using the European programmes LIFEWATCH, LTER-Europe, Natura 2000, Water Framework Directive and national networks such as water basin monitoring, the Elbe Project, etc. Including water (reservoirs, rivers – within basins), soil, and landscape (agricultural and forest) ecosystems, ensuring interoperability of systems and data accessibility and processing. Provide comprehensive information about the environment to public administration.

- Technologies for the protection of cultural heritage are cross-sectional and require an interdisciplinary approach (e.g., new materials and technologies, IT, natural disasters). The main direction of research are:
 - Preventive protection of cultural heritage;
 - Integration of cultural heritage into the urbanistic and natural environment;
 - Energy efficiency of historical buildings.
- Support for legislative drafting – protection of the environment, resource management, management of chemical substances and impact.
- Interconnection and sharing of data concerning the environment, its components, contamination, legislation... - creation of publicly accessible databases and information systems.

INFORMATION AND COMMUNICATION TECHNOLOGIES

Given the overlap of the needs of the Czech Republic and the priorities set out in strategic EU documents, the following key areas (challenges) have been identified for the application of the outcomes of research in ICT: e-Government, crisis management, e-Health, Ageing of the population and social inclusion, Productivity of production and services, and Knowledge, education and entertainment.

Key ICT disciplines have been defined:

- Internet and communication – Interactive digital communication, Technologies for Fixed and mobile optic networks;
- Software – Computer modelling and simulation, Processing and presentation of knowledge, Integration of knowledge, Systems in support of decision-making, Efficient development of reliable software systems with the use of components;
- Supercomputer technologies and their use in multidisciplinary modelling – Computing for Science;
- Chips, built-in computer systems and distributed systems – Telematic transport systems, Care for health and telemedicine, Coordination and cooperation in distributed systems;
- Intelligent environment and robotics – Systems with built-in intelligence, Intelligent man – machine interfaces, Computer vision and computer graphics, Industrial robotics, Intelligent machines and robots for man, Monitoring and diagnostic systems;
- Data and user security.

NANO-SCIENCE, NEW MATERIALS AND NEW TECHNOLOGIES

In the current development of Framework Programmes in the area of NMP, we can point to a favourable trend in the impact of the activities of technological platforms on the contents of sub-programmes and individual calls. At the same time, we cannot overlook that there are many areas of NMP where the Czech Republic can certainly improve its success rate. To that end, a better system of more intensive communication with candidates must be sought for the successful application of calls, as well as other possibilities of support for the preparation of specific entities for such cooperation. In terms of the structure of the planned strategic framework, it would be appropriate to revise the structure of sub-programmes and the contents of NMP calls, in order to eliminate the partial fragmentation from which the priority suffers. The main criterion for the programme structure should be the possibility of setting the strictest possible criteria for assessing the quality of the proposed projects in comparison with one another (the possibility of comparing the comparable), with a minimal restriction on the contents of the planned projects by the applicants. This approach will allow for transparent decision-making in the provision of support to individual proposals and simplify administration.

NMP is a promising sub-programme of the FP, in particular in connection with its focus on the practical use of research results by industry.

TRANSPORT

Strategy: The combination of knowledge with R&D capacity and their gradual integration are among the other significant results of the FP. Hence, the Czech Republic supports the continuation of the Framework Programme's programme in the theme of transport, in the same spirit with which it was implemented in the 6th and 7th FP.

For the new strategic framework, the size of budget for the given areas must be retained or even increased, with a view to the social importance of the area, which includes the significant role of the aviation industry and aviation research in the EU. Given the position and importance of air transport and its expected future development in the EU and worldwide, the Czech Republic would like to see the topic "aviation" be a separate part of the new programme.

In the Sustainable Ground Transport priority, the division of funds between Level 1¹ and Level 2² projects has never posed a problem. The Czech Republic therefore continues to support the balanced distribution of funds for addressing projects on Levels 1 and 2. It remains to be seen whether those levels will be defined in the new programme at all.

¹ Level 1 is a general level usually concerning three modes of ground transport. Proposed projects can focus only on a specific part of a described topic or one mode of transport.

² Level 2 is a specific level and its description is clear – the goal to be achieved is described as well as the process of resolution, including the expected outcomes. On level 2, the topic must be fully covered.

For the aviation priority, however, we propose an overall review of Level 3 project tools, in order for them to become fully functional, such as are the well-established Level 1 and Level 2 project tools. Level 3 projects should have their own budget outside of the overall budget for each Framework Programme call.

In terms of project tools, the Czech Republic promotes a balanced approach in the implementation of Level 1-, Level 2-, and Level 3-type project tools in the new programme.

In addition to the clearly positive contribution of transport to the increasing of prosperity and to ensuring the mobility of EU inhabitants, the adverse impact of transport on environmental components must be studied. The Czech Republic has worked on this topic intensively and hence continues to support R&D focused on restricting the adverse impact of transport on the environment and the health of the population and fully identifies with the EU's goals in this regard.

In terms of transport infrastructure, the Czech Republic supports R&D focused on reducing energy intensity and on studying the impact of climate change on the useful life of transport infrastructure.

The Czech Republic supports R&D focused on the modernisation of vehicles for integrated transport systems that will contribute to increasing safety and the use of alternative and, in particular, renewable sources of energy, and also in relation to the increasing of travel speed and passenger comfort.

ALTERNATIVE SOURCES OF ENERGY

Czech R&D initiatives in the theme of transport concerning alternative sources of energy focus on supporting the production and use of bio-fuels and other alternative fuels, including hydrogen, on introducing vehicles using alternative fuels, and on the development of alternative drives.

The area of alternative fuels and drives is very broad and will become the subject of intensive research in the upcoming period.

The electrification of transport, including an increased share of electrical tracks in rail transport, will significantly contribute to reducing dependence of liquid oil-based motor fuels. The onset of electric car use can be expected after 2013, in particular in cities, where travel distances are shorter. After 2012, a significant onset of hybrid vehicles can be expected, combining a combustion engine and an electro-engine. The Czech Republic's activities in this regard (the ČEZ programme) are fully in line with those trends and therefore the Czech Republic fully supports programmes such as the Green Cars Initiative, which was a part of the 7th Framework Programme, and projects such as RailEnergy and FELICITAS, which were successfully addressed in the 6th FP.

ROAD TRANSPORT

The intensive use of road infrastructure brings problems to its users in the form of congestion. The use of telematic and information means will therefore play an

increasingly significant role in the upcoming period. For that reason, the Czech Republic fully supports R&D in this field.

A significant aspect of the adverse impact of transport is the high accident rate in road transport. Although a major reduction has been achieved in recent years, the present situation is not satisfactory and the Czech Republic therefore continues to support R&D in this sector, in order to achieve a 50% reduction in the number of fatalities in 2020 as compared to 2010.

RAIL TRANSPORT

In rail transport, research will focus on supporting the implementation of the Technical Specifications for Interoperability (TSIs) related to the trans-European rail system and the gradual expansion of interoperability principles to regional, local, and urban public rail networks. This will cover proposed solutions of the so-called TSI open points in the ERTMS system (European Rail Traffic Management Systems) as well as research into new materials and technologies for the railway fleet, infrastructure, energy supply, IT and predictive diagnostics, with the overarching goals of reducing costs and increasing the safety of operations and passengers, i.e., to increase the attractiveness of rail transport for its customers. Another proposal for research will be to find a solution for using the Galileo system and the virtual verification of vehicles and infrastructure components and their interaction. It will also be necessary to carry on in addressing energy consumption reduction and the protection of the environment.

The Czech Republic will also participate in the preparation of the new programme in rail transport by participating in certain organisations and institutions of international organisations, such as TP ERRAC. Representatives of TP Rail Transport Interoperability participate as experts in the 7th FP ERRAC Roadmap project (European Rail Research Advisory Council, Coordinating, Creating Roadmaps, Evaluating and Prioritising Future Rail Research), whose main goals include proposing research topics in rail transport for the new programme.

For the next 10 – 15 years, the following agenda has been proposed, in line with the strategic research agenda of the ERRAC European Technological Platform:

- A price-advantageous maintenance of the railway infrastructure and a maintenance-free railway infrastructure;
- Reduction of the costs of assessing safety for railway facilities;
- Unique procedures for the testing of security equipment contributing to interoperability;
- Research into electro-magnetic compatibility.

COMBINED TRANSPORT

In terms of combined transport, the Czech Republic supports its development, with the application of progressive logistical approaches.

AVIATION

For the planned 8th Framework Programme, the budgets for the area need to be maintained or increased, with a view to the social importance of the aviation industry and aviation research in the EU. Given the position and importance of air carriage and its expected future development in the EU and worldwide, the Czech Republic supports the “aviation” sector again being an independent part of the new programme.

Strategic objectives in the aviation sector focus on the following main areas:

- Enhanced support by the Commission for General Aviation, Business Aviation, and regional air transport;
- Ensuring sufficient support by the Commission for the development of international cooperation with key players in European aviation;
- Enhancing the perception of aviation as a comprehensive transport system that includes both its own means of carriage and the ground infrastructure and related services that enable air carriage to function.

The future programme and its work programmes should include, according to the Czech Republic, the following research areas in aviation:

- Flight Physics;
- Aerostructures;
- Aircraft Avionics, Systems and Equipment;
- Propulsion;
- Flight Mechanics;
- Integrated Design and Validation;
- Air Traffic Management.
- Improving the Cost Efficiency of the Air Transport System;
- Efficient Manufacturing Technologies;
- Noise Abatement;
- Safety and Reliability.

AEROSPACE

EU Framework Programmes with the European Commission’s financial support are very important for the domestic as well as European aerospace industry. Aerospace research cannot be efficiently carried out without international cooperation and

without integration into European research structures. Framework Programmes support national development and international cooperation, help make research activities more efficient, and in a way harmonise the national approaches of the individual EU Member States to R&D.

Given the importance and increasing interest in space research and astronautics and their expected development of the EU and worldwide, the topic “astronautics” should be an independent part of the new strategic framework, with a slightly increased budget for specific areas.

Strategic goals in the new programming period:

- Development and use of space applications serving the objectives of European public policy and the needs of European companies and inhabitants, including environmental needs and the needs of development and global climate change;
- Develop natural sciences such as physics, chemistry, biology, astronomy and medicine by supporting research in aerospace and during space flights, which will allow for the obtaining of new findings and for increasing the knowledge level of Czech scientific research; support research and development in technical sciences, such as material engineering, nano-technologies, optics, thermodynamics, energy sources, electronics, and radio-technology, which bring the adoption of new technologies and methods that are usable in industrial practice;
- Create the conditions for the development of international cooperation by supporting networking and joint research and development teams, with the involvement of leading Czech and foreign research facilities.

The above-mentioned activities should be reflected in research in specific areas:

- Design and development of satellite experiments for researching the Sun and space weather, and for researching the properties of the ionosphere and magnetosphere of the Earth and other celestial bodies in the solar system;
- Development of methods and experiments for research into the biological and chemical composition of celestial bodies, in particular the Moon and Mars;
- Development of methods for studying the climatic parameters of the environment of the Earth (atmosphere, hydrosphere) using satellite systems;
- Development of methods and experimental equipment for research into material properties, focusing on compact substances and substances sensitive to electro-magnetic radiation;
- Development of a measuring methodology and research concerning detectors of elementary particles;

- Development of measuring methods, data processing and the creation of theoretical models of high-energy radiation, in relation to international programmes;
- Development of new methods and procedures allowing for the preparation of space crews for inter-planetary flights and for the prevention of health complications related to long-term weightlessness.

To support scientific research, it is also important to develop the conditions for technical development in terms of equipment engineering, which includes:

- New procedures for the designing and completing of electronic circuits, in particular with a view to their miniaturisation;
- Development of optic materials and their processing, with high demands in terms of precision;
- Development of highly precise and sensitive antenna systems working in gigahertz frequencies;
- Development of chemical processes leading to the creation of substances with new energy, heat, mechanical, and electric properties;
- Development of intelligent automated systems with an emphasis on reducing demands on their human operation.

Like other areas, astronautics is an area of computer equipment development, of digital data processing methods, including visualisation and the three-dimensional simulation of the phenomena observed. Furthermore, on top of the areas mentioned above, we recommend a horizontal focus of the new FP in its calls, with an emphasis on:

- Critical (i.e., key) technologies;
- Strategic connection with the sphere of defence and security;
- Support of GMES and GNSS applications.

SECURITY RESEARCH

Since the beginning of the 21st century, the Czech Republic has been confronted by new security threats – international terrorism, organised crime, the potential proliferation of weapons of mass destruction, regional conflicts, information security threats, financial market vulnerability, and others. The scope of such threats can be expected to increase with the increasing interconnectedness of the world. That is why it is necessary to initiate and support an extended concept of security as an integral part of human life and social development. The current rather organisational and technical approach to the development of security measures must be expanded with a systemic concept of security that will include socio-economic and cultural aspects. Therefore, areas focused on the development of methodologies, procedures, and security systems should be strengthened, as even the best technologies and

abilities can fail if the system of security risk prevention and elimination is not set in a suitable fashion. These systemic matters, including the active involvement of inhabitants and society in the ensuring of security, are also a sphere suitable for international cooperation in R&D and for joint projects that can be addressed on an international level in the successor to the 7th FP.

European security research priorities have been outlined by ESRI, which, in 2009, presented the European Security Research Agenda (ESRIA) for the next 20 years. ESRI sets the following 8 thematic areas in security research: security of inhabitants, security of critical infrastructures, security of borders, crisis management, outlooks and scenarios, CBRN security, situation preparedness and the role of aerospace, and the identification of people and property.

In terms of the general requirements for security research, it is clear that the areas defined in the European Security Research Agenda are significant for increasing security. In relation to the shifting of security research capacity in the Czech Republic and the needs of state administration in this area, areas have been identified which should be emphasised in the preparation of a new programme:

- Protection of inhabitants from terrorism and organised crime;
- Security of environmental services;
- Cybernetic security;
- Energy infrastructure security;
- Crisis infrastructure security in relation to persistent organic pollutants;
- ICT for crisis management, integrated rescue systems, and the identification of people (forensic genetics);
- CBRN security;
- Integrated rescue systems;
- Identification of people and property (biometric identification) (while respecting ethical principles);
- Outlooks and scenarios;
- Protection of the perimeter (border security is not one of our key priorities, but in a broader context, we see it as protection for facilities, buildings, and other areas).

SOCIAL SCIENCES AND HUMANITIES

- To finance key top-level databases and infrastructures serving for collecting high-quality internationally comparable data or ensuring access to existing data essential for conducting high-quality European SSH research.

- Inclusion of research topics supporting the cooperation of SSH and exact disciplines – an inter-disciplinary approach, which is the “trademark” of the FP, should be extended to exact disciplines.
- To promote small cooperation projects, which are more flexible than large projects and enable the integration of a large number of partners in the priorities, whose greater number also makes it possible to avoid the trap of a one-sided focus.
- To include in projects an analysis of the specific conditions arising from cultural history and tradition that are of fundamental importance in the application of the policies, mechanism, and strategies developed by the projects.
- Research and the development of the possibilities concerning effective access to extensive public SSH databases through Open Access; if the databases are confidential, use and make accessible mathematical models.
- Include in the main supported research topics the identification, analysis, and comparison of the compatibility, methodological relevance, and efficiency of diagnostic tools and intervention approaches and techniques in relation to persons with special educational needs and with medical handicaps from the globalisation point of view.
- To focus the programme’s strategy more specifically and more meaningfully on the research and comparison of institutional curricular policy in educational institutions in EU countries, including an evaluation of the general inclusive approach and consequences of the implementation of an equal opportunities policy, in the context of enhancing professional competence and social and professional inclusion.
- Focus research on identifying the main causes of, and analysing the main strategic tools for the elimination or inhibition of, the increasingly alarming state of interest in educational disciplines and professions focused on natural sciences across university educational systems in EU countries, in cooperation with primary and secondary-level educational institutions.

Topics identified:

- Methods for obtaining knowledge from data and their use in economic decision-making;
- Multidisciplinary support for management decision-making in a knowledge society;
- Public finance deficits – a threat for the upcoming decades;
- A common currency policy – an obstacle or incentive for the dynamic development of the economies of EU countries;

- Ageing of the population and life-cycle changes – consequences for age identity, the labour market, healthcare and social policy, and inter-generational communication;
- The economic and social sustainability of measures aimed at CO₂ emission reduction in the light of unforeseeable climate change;
- Ethical issues in biotechnological research, medicine, and healthcare policy (stem-cell research, work with information, risks of the occurrence of pandemics vs. the costs expended on their prevention and combat, etc.);
- National and linguistic identity, European identity, migration, immigration, and integration;
- Linguistic rationalisation in the European Union – teaching languages, teaching in foreign languages, obstacles and inequalities in language knowledge, linguistic rationalisation infrastructure;
- The quality, flexibility, universality and specificity of pedagogical competence in the educational system as the primary determining factors of the quality of preparation for professional and social inclusion in EU countries;
- The identification of the continuity, stability, and integrity of educational systems in a united Europe, and the identification of the evaluation of elements of exclusivity with respect to non-European systems, based on their historically enhanced tradition;
- Elements of emancipation and mobility in undergraduate, post-graduate, and life-long university education within the EU and its impact on changes in the pedagogical approach of academic workers and teaching methods, and in the internal management and modernisation of universities in direct contact with the consumer sphere;
- Changes in human behaviour in terms of the change of values, development of new habits, and ways of thinking due to new technologies;
- The consequences of media channel homogenisation, easier communication, new illiteracy;
- The social and cultural context of identity formation with a view to the regulation of the behaviour of entities (individuals, groups, organisations);
- Key well-being factors in the European context – general characteristics and specificities in individual countries;
- Prevention of civilisation diseases on the basis of changes in lifestyle;
- Economic research – preventing economic crises, creating development scenarios, political impact of project results; emphasis on research topics that support the transfer of knowledge from natural and technical sciences to economics (econophysics);

- Knowledge society – education, knowledge and gender, expert knowledge in everyday life;
- Gender equality issues – new forms of family / partner cohabitation, gender and the labour market;
- Governance and citizenship – citizen participation;
- Labour market – flexibility and uncertainty.

EURATOM – NUCLEAR RESEARCH

FUSION – R&D ACTIVITIES

- Participation in international efforts to prepare a use for nuclear fusion, focusing on the development of basic physical findings and activities related to ITER, HiPER – R&D.

FISSION – R&D ACTIVITIES, DEMONSTRATION PROJECTS

- Safety, useful life, management of fuel and waste;
- Development towards increasing the safety of the current reactor generation and their greater efficiency and useful life, together with improving the ways of managing nuclear fuel and waste and depositing waste in short-term and long-term stores – R&D, demonstration projects,
- Sustainable nuclear energy;
- Research and development of 4th generation reactors – R&D;
- Efficient use of nuclear fuel and minimisation of waste – R&D;
- Research and development of an ALLEGRO gas-cooled high-temperature reactor – R&D, demonstration projects.

INTERDISCIPLINARY TOPICS – R&D ACTIVITIES

- Radiation protection and impact of ionising radiation on health / environment;
- Research into the impact of low doses of ionising radiation on human health and the environment – R&D,
- Use of ionising radiation in medicine;
- Research in this area, focusing on radiopharmaceuticals, equipment, and methods of use – R&D.

STRATEGIC INDUSTRIES

The absence of a topic for strategic industrial disciplines has been one of the causes of the low rate of success of projects focused on innovations in industry and hence the low motivation of Czech and other entities to submit projects with that focus. The inclusion of a topic focused on supporting strategic industrial disciplines would be of great assistance to all European industry in the implementation of innovations with a

high added value, and thereby also to a rapid improvement of European competitiveness.

EUROPEAN RESEARCH COUNCIL

The autonomy of the ERC must be enhanced on the European level (in particular, this means the development of rules suitable for frontier research, which in many regards differs from research motivated by the needs of society, to which most of the Framework Programme budget is dedicated), with a simultaneous significant increase of its budget, because only then can the ERC meet the demands of frontier research, thereby significantly contributing to the maintenance and enhancement of the competitiveness of the entire ERA, on the worldwide scale. Hence, in spite of the differences in the ERC success rate between old and new EU Member States, the uncompromised emphasis of the ERC on the excellence of ERC grant recipients must be supported.

The Commission should commission an analysis of the significant differences in the success rate of countries in the specific programme Ideas, in particular in comparison with the new EU Member States (EU-12). It is also important to coordinate the ERC's work with other community programmes for the development of human resources in R&D, in particular with the specific programme "People" of the 7th FP (Marie Curie Action, MCA), such as to achieve the desirable synergies. It would also be necessary to get away from the subsidy system based on a structured budget, transferring to the system of "flat amounts" or total "price" of a project, and to restrict the current extended stay of certain projects on the back-up list.

The European Commission should strive for maximum transparency and the optimal flow of information towards Member States and the public at large, both by the timely publication of information in databases (CIRCA, E-CORDA) and by the provision of information about the membership of evaluation panels. The possibility of suggesting leading experts for the evaluation panels on the national level should be introduced, while maintaining a reasonable level of balance in the representation of the Member States. Given the overall low success rate of the ERC and the minimal representation of Czech experts in international ERC evaluation panels, the greatest possible number of leading Czech scientists would be involved in the project evaluation process, in order that know-how could be transferred in terms of the financing environment of top-level European research. A possible solution is the creation of a central database of experts for expert evaluation administered by the Ministry of Education, in which experts would be included on the basis of the recommendation of selected institutions, such as the Czech Academy of Science, Charles University, or the Czech Rectors' Conference. The administrator of that database would closely cooperate with the standing ERC committee that would develop an international database of experts in cooperation with the scientific council.

Success in competition for ERC grants is undoubtedly one of the most important indicators of the quality of a research institution. A significant increase in the success rate of Czech applicants and the attractiveness of Czech host institutions must therefore be supported and international standards must be followed in the evaluation of institutions and individuals, international peer review must be used more intensively in the evaluation of national projects, and competitiveness of Czech science must be purposefully developed by supporting research institutions that are excellent according to worldwide standards and in relevant scientific disciplines.

Czech universities and research institutions should be more open to the international environment and be active in looking for new, primarily young talents, and motivate their existing excellent researchers to further professional growth and provide them with an appropriate environment and the maximum possible support. This strategy will manifest itself in the longer term in a higher success rate in winning ERC grants.

HUMAN RESOURCES

The specific programme “People” is an effective tool for supporting researchers mobility and professional growth – it must be further developed and supported in the new programme.

The specific programme “People” should continue to cover all thematic areas without limitation (“bottom-up”) and all areas of the scientific career of researchers (from training networks for starting research workers, support for the professional growth of experienced research workers, to reintegration grants).

There is no systemic support for the growth of highly qualified scientific and technical workers (university-educated technical-operations workers) who technically ensure the functioning of individual research infrastructure, enable the work of, and/or constitute a part of, excellent research teams. That is why we propose creating new tools for supporting the mobility of those research and technical workers for European research infrastructures. Given the significance of training networks (ITN) for the education and circulation of brains within the ERA and the frequency of the use of this action in the specific programme “People”, it is necessary to increase the budget set aside for projects of this type. Given that the MCA now falls within the competence of DG Education and Culture, it is necessary to ensure complementarities with Community programmes for the development of human resources in R&D, and the goals of the specific programme “People” (the Marie Curie Action, MCA) must be structured such as to achieve the requisite synergies. At the same time, the steps of DG Research and DG Education and Culture must be coordinated and the status of doctoral students must be defined on the European level.

The COFUND scheme should continue, serving national, regional, and institutional schemes of scientific mobility.

The new programme should also include gender aspects of academic careers development in its policies and tools. Supporting women in science is necessary for

the development of science, research, and innovation and also for ensuring the equality of opportunities in the scientific environment. More than 50% of women study at universities in the Czech Republic, but few of them go on to do their doctorate and on to research. The EU needs male and female scientific workers for increasing its competitiveness, which is why it cannot afford to lose the high potential of qualified women. The development of new measures to develop the possibilities of career application for women in science, in particular, at the start of their career, and also with a view to the representation of women in decision-making, represents social innovation.

INTERNATIONAL COOPERATION

With a view to a change in the programme structure between the 6th and 7th FP, it can be expected that in the new programme, too, there will be an opportunity to submit projects of international cooperation according to the priorities defined in specific thematic groups (Health, Agriculture, Environment, etc.). International cooperation as such continues to be reserved for institutional cooperation and coordination in which primarily national providers and research and development programme administrators can participate. The specific focus of cooperation will then be determined in line with the Commission's political goals, such as the Europe 2020 strategy, the Innovative Union initiative, and the results of the discussions at the **Strategic Forum** for International Scientific and Technological Cooperation (SFIC). If the categories of SIC projects are retained in the proposal of the new programme, under which specific scientific projects will run, then support for general programmes concerned with institutional cooperation with third countries will likely continue to be outside of the scope of interest of most research institutions in the Czech Republic.

It remains to be considered whether the Czech Republic should specify medium and long-term concepts for the direction of international cooperation in research and development with a view to the priorities of EU Framework Programmes, such that these mechanisms could also be used for the benefit of research in the Czech Republic.

RESEARCH INFRASTRUCTURES

Priorities:

- CZ supports the continuation of the Research Infrastructure programme, in particular the scheme of integration activities from the 7th FP (projects such as I3 in the 6th FP) and an increase of its budget;
- In connection with research infrastructure, the retention of other framework programme tools – in particular support for excellent research based on cooperation, support for individual excellence, mobility, and career development, the development policies of the European Research Area, as well as specifically of tools for supporting the access of small and medium-

sized enterprises to the results of R&D and supplementary schemes, such as joint programming and projects such as ERA-NET; (in connection with the previous point) is important;

- Financing the scheme of transnational access to research infrastructures with a European dimension. The financing of “open access” from European resources, for projects from the ESFRI road map, will contribute to the sustainability of infrastructure projects;
- Drawing up an overview of national research infrastructure with a European dimension in the ESFRI; (in connection with the previous point);
- Financing the operational costs of ESFRI infrastructures in social sciences and humanities;
- Retaining support for the preparatory phase of the newly identified research infrastructures; support design studies of other pan-European research infrastructure, even outside of the ESFRI road map, in cases when there is a critical need and clear European added value;
- Financing the strategy for the building and development of large infrastructures in cooperation with non-EU countries (USA, Japan, Asia, and others) in connection with the need to look for interdisciplinary solutions to global challenges, securing financial and human resources and innovation opportunities;
- Enhancing international cooperation in large infrastructures in coordination with the activities of the ESFRI and the Scientific Forum for International Cooperation (SFIC); (in connection with the previous point);
- Introduction of systemic solutions for human resources involved in research infrastructures, which will include:
 - A scheme for supporting the growth and mobility of highly qualified scientific – operational – technical workers who technically ensure the functioning of unique research infrastructures, enable their functioning, and/or are members of excellent research teams;
 - A scheme for supporting and coordinating senior management workers in research infrastructures;
 - Improvement of the quality of joint human resource management (e.g., the Steering Group on Human Resources and Mobility) and examination of the possibilities of developing specific coordination activities, such as the establishment of the European Association for Human Resource Development for Research Infrastructures; (in connection with the previous point);

- Synergies with cohesion policy, structural funds, Framework Programmes, and the CIP programme, in particular in the preparation and construction of new pan-European research infrastructures;
- The execution of administrative measures in support of and for the development of SMEs. In this context, it is recommended that synergies with the CIP programme be examined.

REGIONAL ASPECTS OF THE STRATEGIC FRAMEWORK

The new programme should not neglect the regional dimension, which is supported in the 7th FP in the activities Regions of Knowledge and Research Potential. In particular, projects such as Research Potential represent an interesting opportunity for projects from structural funds (OP RDI), in terms of better integration in the European Research Area. Furthermore, due to their financial size, they can significantly support the sustainability of these projects.

INNOVATION AND PUBLIC AND PRIVATE SECTOR PARTNERSHIPS

Small and medium-sized enterprise would develop measures in the following areas for the development of their innovation activities:

- In terms of legislation, they consider the most suitable form of support to be a reduction of the tax burden and an increase in permitted deductible expenditure on R&D;
- In the administration of programmes, there is a requirement for maximum simplification of procedures and rules, and for the harmonisation of rules in various programmes;
- Access to financing for R&D&I must be facilitated (European and national programmes, venture capital, bank instruments), and companies also prefer contractual and flat-rate contributions to cost-based ones;
- In cooperation with universities and research institutes, companies would welcome greater flexibility from those organisations;
- In the new programme, Czech companies would welcome a greater scope of demonstration activities.

INNOVATION AND COOPERATION OF THE RESEARCH AND INDUSTRIAL SECTOR

Priorities:

- Support R&D projects which efficiently stimulate the cooperation of the public and corporate sectors in R&D&I, and whose focus and goals cover the entire innovation cycle; create programmes for supporting projects with a higher socioeconomic impact, where a transfer of knowledge into practice and its placement on the market will be consistently required (and supported).

- Carry on in supporting the schemes of the 7th FP, such as “Research for SMEs” and “Research for SME Associations” in the new programme as well, so that:
 - A more significant part of the budget (approx. ¾) should be devoted to “Research for SMEs” and ¼ of the budget to “Research for SME Associations”; where demonstration activities are a part of each project;
 - A programme for supporting the introduction of innovation in SMEs would not be used for addressing the plans of research organisations (for research organisations, participation in this type of project is attractive from the financial point of view, as their costs are fully paid in the present situation; on the contrary, due to the asymmetrical distribution of the Commission’s contribution, these projects represent a considerable financial burden for SMEs).
- Ensure the continuation of schemes focused on supporting the participation of research-oriented SMEs, which use national financing (EUROSTARS, EUREKA), while maintaining the thematic freedom in this scheme (bottom–up).
- Acceleration of selection procedures by means of single-level evaluation in both project types.
- Increase emphasis on the greater market application of research results; increase emphasis on demonstration (pilot) activities prior to project completion.
- Support the continuation of PPP activities (in spite of the relatively scarce European experience with PPP in R&D&I) and the harmonisation of the rules of PPP projects with standard projects in the future Framework Programme, which is required for simplifying participation in these projects.
- In the case of projects focused on innovation, transfer from financing based on costs to financing based on results, i.e., transfer to the financing of research projects on a principle similar to that according to which public contracts are chosen and awarded, i.e., selection of project proposals by public competition and the implementation of the research project on the basis of a contract concluded by the Commission and the researcher for a contractual price agreed in advance; the use of flat-rate contributions by the Commission to the maximum extent possible.
- Create a platform of support for small and medium-sized enterprises, where EU funds would be allocated directly on the regional level (NUTS II).

Overview of the Members of Thematic Working Groups

Health

Václav Hampl – Chairman during the first half of the work	Charles University Prague
Pavel Anzenbacher – PV ³	Palacký University Olomouc, Institute of Pharmacology
Judita Kinkorová – NCP ⁴	Technological Centre of the Academy of Sciences of the Czech Republic (TC AS CR)
Eva Syková	Institute of Experimental Medicine of the Academy of Sciences of the CR (AS CR)
Jaroslav Štěrbá - Chairman during the second half of the work	Masaryk University Brno - Medical Faculty
Marek Moša	SEVAPHARMA Inc.
Lenka Moravcová	Ministry of Health

Ageing of the Population

Josef Syka – Chairman	Institute of Experimental Medicine of the AS CR Sciences
Pavel Anzenbacher – PV	Palacký University Olomouc, Institute of Pharmacology
Judita Kinkorová – NCP	TC AS CR
Ladislav Rabušic – PV	Masaryk University Brno, Faculty of Social Studies
Michal Pacvoň – NCP	TC AS CR
Marek Blatný	Institute of Psychology of the AS CR
Eva Topinková	Charles University – 1 st Medical Faculty
Petr Wija	Ministry of Labour and Social Affairs

Energy Sector, including EURATOM

Zdeněk Stuchlík - Chairman	Silesian University Opava
František Hrdlička - PV	Czech Technical University Prague
Pavel Pavlo – PV	Institute of Plasma Physics of the AS CR
Milan Tichý – PV	Charles University Prague - Math and Physics Faculty
Ivo Váša – PV	Nuclear Research Institute, Řež
Ladislav Musílek - PV	Czech Technical University Prague
Zdeňka Šustáková - NCP	TC AS CR
Jiří Pospíšil	Brno University of Technology
Vladimír Wágner	Nuclear Physics Institute of the AS CR
Aleš Laciok	CEZ - R&D Coordinator
Luděk Janík	Nuclear Research Institute, Řež

Environment – Including healthy nutrition, agriculture

Nad'a Koníčková - Chair	TC AS CR
Bořivoj Šarapatka - PV	Palacký University Olomouc
Jana Hajšlová – PV	Institute of Chemical Technology Prague

³ PV – Member of the 7th FP Programming Committee

⁴ NCP – National Contact Point for the 7th FP

Zdenka Šustáková - NCP	TC AS CR
Viera Straškrábová	BC of the Czech AS CR – Hydro biological Institute
Bedřich Moldan	Charles University Prague – Charles University
	Environment Centre
Jan Frouz	Charles University Prague. Faculty of Science
Zuzana Boukalová	Vodní zdroje Inc.
Miloš Drdácý	Institute of Theoretical and Applied Mechanics of
	the AS CR
Ladislav Jeřábek	Ministry of Agriculture
Miroslav Koberna	Director of the Federation of Food and Drink
	Industries of the Czech Republic
Jana Klánová	Masaryk University Brno
Ladislav Steinhauser	University of Veterinary and Pharmaceutical
	Sciences Brno

ICT

Michal Pazour - Chair	TC AS CR
Jiří Kadlec – PV	Institute of Information Theory and Automation of
	the AS CR
Eva Hillerová - NCP	TC AS CR
Július Štuller	Institute of Computer Science of the AS CR
Vladimír Mařík	Czech Technical University, FEL
Ota Novotný	University of Economics, FIS
Martin Fařun	TC AS CR
Václav Jirovský	Czech Technical University Prague
Jiří Voříšek	Czech Society for Systems Integration

Social Sciences

Michal Pacvoň - Chairman and NCP	TC AS CR
Ladislav Rabušic - PV	Masaryk University Brno – FSS
Klára Plecitá	Institute of Sociology of the AS CR
Pavel Pudil	University of Economics Prague

ERC

Jan Hrušák - Chair	AS CR
Petra Perutková - NCP	TC AS CR
Jaroslav Koča – PV	Masaryk University Brno – CEITEC
Zdeněk Strakoš	Institute of Computer Science of the AS CR and the
	Math and Physics Faculty of Charles University
	Prague

Human Resources in Research

Táňa Perglová – Chair during the first half of the work	Ministry of Education, Youth, and Sport
Jiřina Fryčová – SGHRM	Ministry of Education, Youth, and Sport
Petra Perutková –NCP	TC AS CR
Tomáš Kostecký	Institute of Sociology of the AS CR
Anna Mittnerová - PV	Institute of Chemical Technology Prague
Jana Hakenová	Ministry of Education, Youth, and Sport

Viktoria Bodnárová	Czech Centre for Mobility EURAXESS
Jaroslav Jakubka	Ministry of Labour and Social Affairs – employment legislation
Zdeněk Přeslička	Ministry of Labour and Social Affairs – sickness and accident insurance
Andrea Veselá	Ministry of Labour and Social Affairs – migration
Libuše Chládková	South-Moravian Centre for International Mobility
Research Infrastructures	
Vladimír Nekvasil – Chairman	Institute of Physics of the AS CR
Jan Palouš – PV	AS CR
Lenka Havlíčková – NCP	TC AS CR
Naděžda Witzanyová – ESFRI	Ministry of Education, Youth, and Sport
Gabriela Vlčková – structural funds	Ministry of Education, Youth, and Sport
Josef Krása	Institute of Physics of the AS CR
Vojtěch Petráček	Czech Technical University Prague
International Cooperation	
Libor Daněk - Chair	Ministry of Education, Youth, and Sport
Michal Pacvoň – NCP	TC AS CR
Jan Šafanda	Institute of Geophysics of the AS CR
Jaromír Plášek	Charles University Prague - Math and Physics Faculty
New Technologies, New materials	
Ivan Wilhelm – Chairman	Government Commissioner for European Research
Karel Šperlink – PV	Association of Innovative Entrepreneurship CR, Confederation of Industry of the CR
Gabriela Zadražilová –NCP	TC AS CR
Pavel Chráska	Institute of Plasma Physics of the AS CR
Karel Bouzek	Institute of Chemical Technology Prague
Vilém Růžička	Elmarco - nano for life
Miloš Beran	Atok
David Lukáš	Liberec Technical University
Innovation, including the approach of the Czech Republic to PPP partnerships	
Karel Klusáček – Chair	Technological Agency of the Czech Republic
Petr Porák – PV	Ministry of Industry and Trade
Martin Škarka – NCP	TC AS CR
Lenka Havlíčková - NCP	TC AS CR
Karel Aim	Institute of Chemical Process Fundamentals of the Academy of Sciences
Petr Klement	VŠB - Technical University of Ostrava
Pavel Bartoš	FITE Inc.
Dana Váchová	TC AS CR
Karel Šperlink - PV	Confederation of Industry of the Czech Republic, Association of Innovative Entrepreneurship CR
Mirek Janeček	Association of Research Organizations
Zdeněk Kučera	TC AS CR

Tomáš Skuček -CIP5	Ministry of Industry and Trade
Space and Transport	
Jana Bystřická - Chair	Ministry of Education, Youth and Sports
Jan Kolář - PV	Czech Space Office
Ondřej Mirovský - NCP	TC AS CR
Petr Heinzl	Astronomical Institute of the AS CR
Zdeněk Němeček	Charles University Prague –Math and Physics Faculty
Václav Fencel -PV	Transport Research Centre Brno
Martin Škarka - NCP	TC AS CR
Karel Paiger	Aeronautical Research and Test Institute Inc.
Security	
Michal Pazour – Chair	TC AS CR
Pavel Danihelka	VŠB - Technical University of Ostrava
Blahoslav Dolejší	Ministry of Defence
Eva Hillerová	TC AS CR
Richard Hlavatý	Defence and Security Industry Association of the Czech Republic
Milan Holl	Association of Research Organizations
Václav Jirovský	Czech Technical University Prague
Helena Tomková	Ministry of Interior
Jarmil Valášek	Ministry of Interior - Population Protection Institute
Jan Vykoukal	Ministry of Interior
Coordination, implementation, redaction	
Naděžda Witzanyová	Ministry of Education, Youth and Sports
Lenka Havlíčková	TC AS CR
Nad'a Koníčková	TC AS CR

⁵ Gestor for Competitiveness and Innovation Framework Programme