

CETRA



**CENTRE FOR TRANSPORTATION
RESEARCH UNIVERSITY
OF ŽILINA**

CENTRE OF EXCELLENCE CETRA - TWO YEARS OF EXISTENCE

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1. Introduction

CETRA - Institute of Transport at the University of Žilina has been selected for support by the European Commission within the "Support for Research Infrastructures in the New Associated States" project within the EU 5th Framework Programme. The support is oriented and used towards organisation of international conferences, workshops, participation in the international conferences and workshops, publication of research results and long-term working stages of scientific staff at CETRA.

At present, after two years of project duration, it is possible to evaluate and reflect on the project activities and achieved results. Establishment and activities of CETRA gain importance in connection with the opening of the EU 6th Framework programme and its first calls for project proposals in the defined priority areas. Apart from the main task, co-ordination of approved CeTra and INTRANSNET projects, CETRA is devoting most of its activities towards successful inclusion of the University of Žilina in the preparation of new 6th FP project proposals in the transportation domain and inclusion in the emerging pan-European Networks of Excellence.

2. EU approach to definition and establishment of centres of excellence in Europe

European Union (EU) started to use the term Centres of Excellence (CE) in the period of 1999-2000. EU published the



document *Towards...* [5] in January 2000. In this document the establishment of unified European Research Area is envisaged. As a supplement to this report (*Towards...* [5]) many other supporting materials, concerning the concept of CE have been published.

The approach visible in the EU documents may be characterised by narrowing of the CE concept to research and technology development. The kernel document *Action...* [3] proposes following simple CE definition: "Centre of excellence is a structure, doing research and technology development on the state-of-the-art level and from the viewpoint of measurable scientific output (including scientific education) and technological innovations". Important parts of this concept are:

- "Critical mass" of highly qualified scientific and developers staff, transparent structure (mostly based on existing research structures),
- Ability to integrate similar research domains and associate complementary skills,
- Ability to maintain high-level exchange of qualified human resources,
- Dynamic task of connected innovation system (added value of knowledge),
- High level of international recognition and connection to research and industrial environment,
- Appropriate level of financial stability and conditions of existence (good base for investment in human resources and establishment of partner relations),
- Financial resources not limited by time factor or public decision.

The impact in the EU working paper (*Centres...* [6]) is put on the ability of the competent Centre to gain qualified international human resources. In this document also the fact that there does not exist any precise definition of the CE and that the CE designation is often misused. According to this document, for the real CE following factors are the most important:

- a) CE is capable of providing work positions for highly qualified research staff (it is capable of attracting “high calibre” researchers),
- b) These researchers are capable of developing innovative ideas and technologies (which may lead to breakthroughs in respective scientific disciplines).

In the document, there are some characteristics given, based on the research conducted in the US. They compare successful research institution (which nevertheless does not qualify for the CE designation) with the “true” Centre of excellence – see Table 1.

Characteristics of the Centre of Excellence (CE) Table 1

Some basic characteristics of successful organisations	
made significant groundbreaking discoveries (and could be described as CE)	carrying out worthwhile research (but not constituting CE)
Multidisciplinarity or diversity of disciplines	Excessive diversity or hyper-diversity of disciplines
Easy communication between groups and individuals	Strong differentiation between departments
Strong leadership	Hierarchical authority
	Bureaucratic co-ordination

Source: Centres... [6] with reference to survey conducted by prof. Hollingsworth

In addition to what is summarised in Table 1, the paper concludes that “adequate financial resources, good organisation and infrastructure, are all necessary but they are not sufficient. Centres of Excellence depend ultimately on their ability to attract excellent researchers.” As far as the innovative performance is concerned, importance of researcher mobility is also emphasised by the OECD.

Based on earlier propositions (e.g. in [4]), the European Union assigns importance to the following issues in its new framework programme:

- centres of excellence should be explored,
- CE should become renowned (impact of CE should be maximised),
- capable centres should be integrated into networks (of excellence),
- integrated projects should also help the birth of CEs.

Benchmarking problems for CE designation are explored in great detail in the article of Borsi and Kedro [2]. The resulting proposal for criteria is summarised in Table 2.

The project supporting research infrastructures in the new associated states is part of the 5th FP. Within the framework of this project European Commission has chosen and supports 34 Institutions, designated as Centres of Excellence. Duration of the project is three years. The centres are located in 11 of 12 new associated states. 9 of the centres is located in Poland, 6 in Hungary, 4 in Romania, 3 in Bulgaria, Czech republic, 2 on Cyprus, in Slovakia, Slovenia and Estonia and 1 in Lithuania. They cover 8 broader scientific disciplines – biology (11 Centres), information society technologies (6), physics (5), mathematics (3), technology (3), social sciences and economics (2), medicine (2) and environment (1). From 34 supported CE, 23 are located at the Institutes of Academy of Science, 9 at Universities and 2 at other institutions. More about project CeTra and the Centre of Excellence located at the University of Zilina may be found in the article *Skyva-Fabián* [7], information on the activities of the project and their execution may be found in [1]. Topical information on the whole project supporting the Centres may be found at <http://www.cordis.lu/inco2/src/coe.htm>.

3. Overview of the achieved results

The activities of the CeTra project, coordinated by the Institute of Transportation – CETRA, Centre of Excellence recognized and supported by the EC, are described in detail in the Periodic reports, sent to Brussels by the end of each respective half-year planning period [1]. We would like to use this opportunity to

Proposed benchmarks of being excellent and being a centre

Table 2

Typology of innovative R&D	Being excellent	Being a centre
<ul style="list-style-type: none"> - single disciplinary versus interdisciplinary R&D - R&D based on major infrastructure (e.g. CERN) - university-industry collaboration - industrial applied R&D (e.g. GE lab) 	<ul style="list-style-type: none"> - appears in bibliometry - patents filed - doctorate and post-doc positions offered and occupied - number of research personnel and visiting scientists - number and volume of commercial contracts - number of spin-offs - international co-operation - networking 	<ul style="list-style-type: none"> - critical mass of researchers (either in a central location or virtually linked) - international impact - relationship with the legal entity that sells the innovation - social recognition
Qualitative and quantitative benchmarks for knowledge generation / utilisation / diffusion		

Source: Borsi-Kedro [2]

present in graphical form, how the Centre manages to fulfil the above mentioned requirements on “Centrality” and “Excellence”. The graphs show the results of the first two years of the three year long project (December 2001-May 2002). The respective half-year periods are designated by their number 1-4.

Fig. 1 shows number of scientific staff from EU and associated countries accepted for long-term working stays at CETRA and financed by the project grant. It is clear that CETRA is quite successful (so far) in this kind of activity, which is given the utmost priority by EC in the CE projects. In the last two periods stays with duration much longer than minimum 1 month (required by EC) appear. In total there were 33 persons with total length of 52 person-months participating in this kind of activity.

The graph in picture 2 depicts numbers of incoming and outgoing persons, participating in short term visits, conferences and workshops financed under the project grant. Some trips were covered only partially by the project, thus requiring co-financing by the involved institutions or individuals.

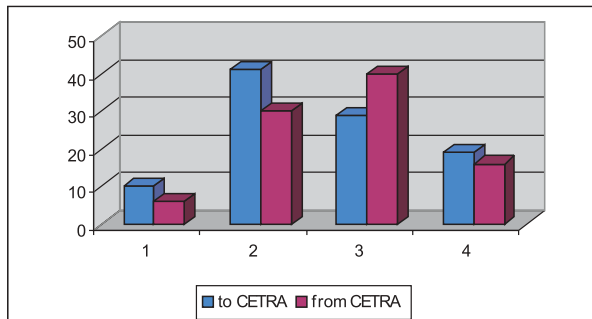


Fig. 2. Short-term stages of scientific staff supported by CeTra

Altogether there were 99 incoming persons and 92 outgoing persons. The countries of origin and destinations are shown in picture 3.

The project grant created the opportunity to support high number of international conferences and workshops held at CETRA. Altogether there were 13 conferences and 14 workshops fully or

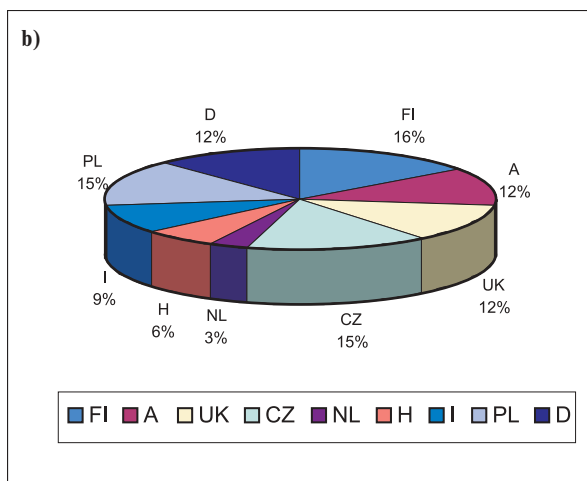
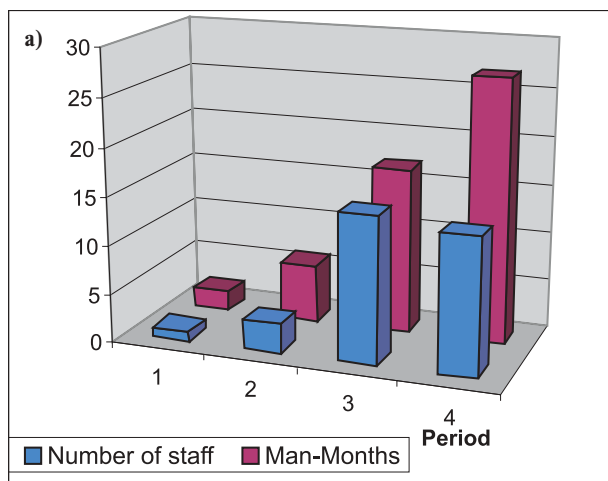


Fig. 1. Long-term stages of scientific staff supported by CeTra, according to (a) their numbers and (b) percentage according to country of origin

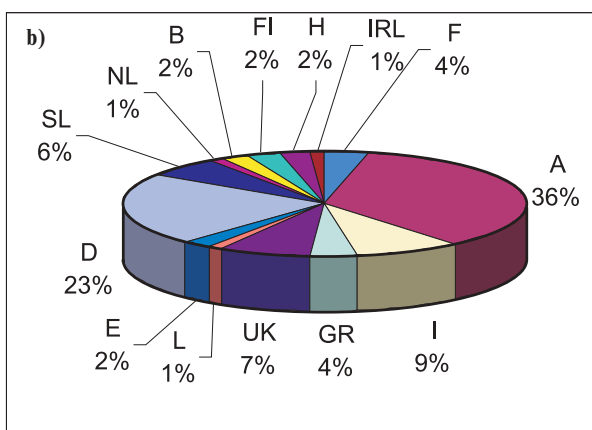
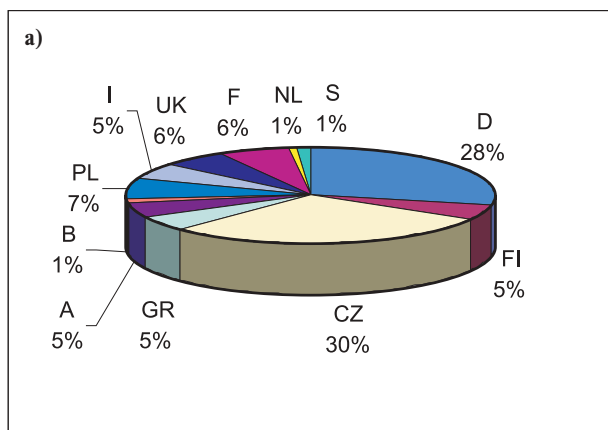


Fig. 3. Short-term stages of scientific staff according to (a) country of origin - incoming visitors and (b) destination - outgoing visitors

partially supported by the project. Their distribution in the past periods is shown in picture 4.

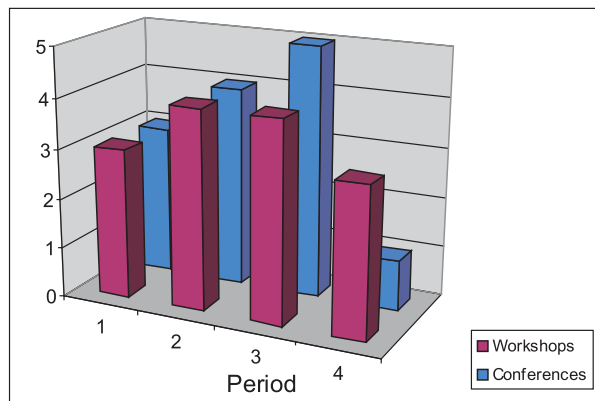


Fig. 4. Organisation of conferences and workshops supported by CeTra

In the *first period* there were held following conferences and workshops: Žel 2001, Elektro 2001, Quality 2001 - International Road Conference - Asphalt Pavements, Control and Simulation of Transportation Processes on a Microscopic Level, RTD on Development of Electric Traction Vehicles and Transport Production.

In the *second period* there were: Transcom 2001, Modernization of Railway Tracks, 4th National Productivity Forum, Transport in Urban Agglomerations, Radio Based Operation on Branch Lines, Safety Analysis of Interlocking and Signalling Systems, CEEC - Central European Educational Cycle for Designers and Technologists, 1st European Workshop on Material Flows Simulation.

In the *third period* there were: Žel 2002 - "Railways on the Edge of the 3rd Millennium", New Developments in the Field of Modelling, Control and Optimisation of Transport Processes, QUALITY - 2002: "The Technology of Roads Maintenance", Concrete and Concrete Structures, CEEC-Central European Educational Cycle for Designers and Technologists - 2nd part, Control and Simulation of Transportation Processes, Control and Management of Transportation Processes on Microscopic Level, Topical problems in Business and Road Transport.

In the *fourth period* there were: Modernisation of Railway Tracks, Aviation Training Safety Enhancement, Summer School of Fatigue of Materials, Traffic Effects on Environment.

Financial support for the project follows the path envisaged for all new 6th FP projects. Contracting institution (in our case the University of Žilina) receives an advance payment of approximately 40% of the commitment. The payment is made when the contract is signed by both parties (contractor and EC). The amount paid by the Commission as advance is to be considered as a "pre-payment" to allow a particular project to commence, but the advance amount shall need to be justified by costs submitted over the duration of the project. Given that 15 % of commitment must

be kept for the final payment, the costs claimed will be reimbursed only up to these 15 %. Only after the approval of final report, the final payment will be done, including eventually these 15 % of the initial commitment (even an amendment cannot change the initial amount of the grant). This scheme is certainly not very advantageous and only thanks to understanding and support from the University and financial support by the University and Ministry of Education, which helped to survive the Centre quite difficult moments and continue the project activities.

Apart from administration of the CeTra and another 5th FP project INTRANSNET (in the framework of the GROWTH programme) CETRA focuses its activities on preparation of involvement of University of Žilina in the 6th FP. This includes dissemination of the information on the 6th FP and preparation of the project proposals. With the CETRA character as Centre of Excellence the most prospective looks its incorporation in emerging Networks of Excellence.

4. 6th FP and networks of excellence

The most important parts of the 6th FP are integration of European research, restructuring of the European Research Area (ERA) and strengthening of its foundations.

The elementary principles of the new framework programme are oriented towards research in the chosen priority domains, co-ordination and simplification of bureaucratic processes and reaching of the structuring effect by co-ordination with other European, national and regional initiatives. Apart from traditional tools, known from the 5th FP initiatives, the main focus should be set towards implementation of the new tools as Integrated Projects and Networks of Excellence.

Networks of Excellence

The objective of the Network of excellence is to enhance gained level of excellence in concrete area of research by integration of critical mass of resources and expertise necessary for creation of top level European consortia of institutions. This consortium must form distinctive force in the respective research domain on the world level. Expertise should be used in the framework of network's joint programme of activities, which should be used for integration of the research capacity of the network participants and continuing improvement of the research activities.

Network of Excellence is a tool which should serve to strengthen the excellence by removing the existing scattering and separation of the European research. Main focus should be on development of permanent influence on the way, how the research in the respective research area is conducted. The fact that the investments are going into the consortia of excellent research workers should grant that the networks will improve conditions for further development of priority scientific disciplines, even if it is not their main mission. These networks should not behave as closed entities, increasing their own excellence within their partnership. The duty of each network is to disseminate excellence behind the

boundaries of the consortia with the use of dissemination activities and education of new scientific workers.

The network is conceived around the joint programme of activities - JPA. This programme contains activities which partners of the network should do together. Some of these activities are:

- Integration activities,
- Programme of jointly carried research,
- Excellence dissemination activities.

First calls for project proposals were published on 17. 12. 2002 and first proposals should be put forward in March or April 2003 (according with the concrete Calls). All information on 6th FP project proposals is available on www.cordis.lu/fp6, or on the National Contact Points web pages in the associated countries.

5. 6th FP and transportation research

As it has been shown, the priority research domains of the 6th FP do not explicitly mention transportation (apart from Aeronautics and Space research) and do not concentrate it to one priority theme. Similarly, as in the previous 5th FP, this research is scattered in different priority domains, for which the increase in efficiency, quality and safety of transport is inevitable. So we can find transportation oriented research themes in Information Society Technologies (IST), Sustainable Development, and Support for Research Infrastructures domains

The transportation sector is represented mostly by the following calls:

- New technologies and concepts for all kinds of surface transport (road, rail, water),
- Innovative technologies for design and production of products,
- Balance of various modes of transport and their integration,
- Safety enhancement in road-, rail- and water transport, congestion prevention.

Recently, in the whole Europe there is a lot of activity going on. Everybody who would like to step into the mainstream of the European research is trying to form consortia, capable of producing an answer to the recent first calls for project proposals within the 6th FP. CETRA is also wishing to continue with its role as research integrator and promoter and actively participate in preparation of Expression of Interest (EoI), which preceded the Calls and is recently involved in dissemination of the 6th FP ideas and preparation of participation in several Integrated projects and

Networks of Excellence. We hope that with the help of the University and co-workers in Departments and Faculties oriented towards transportation research our activities will lead to successful involvement in the 6th FP projects.

6. Conclusion

The Centre's of Excellence concept, as perceived by the European Commission, has been used for establishment and support of such research and development structures, as CETRA - Institute for Transport at University of Žilina. Natural expansion of this idea leads to the establishment of European Networks of Excellence, which are supposed to cover respective priority research domains, as defined by the European Commission. From the territorial point of view, they are supposed to include as broad as possible base of the top research establishments in the European Union and associated countries. Although the transport as such is not included in the priority domains, all kinds of transport are included in calls for project proposals in the defined domains. Start of the participation in the mainstream of the European research and becoming a partner in projects of the 6th FP is not simple. However, this goal should become an important part in the Development plans of all research institutions and in the work plan of all persons, responsible for research and development.

7. References

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