

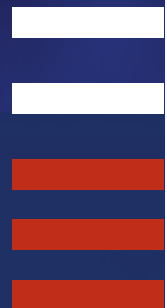
ANNUAL REPORT 2005



PUBLIC RESEARCH CENTRE  
HENRI TUDOR



[www.tudor.lu](http://www.tudor.lu)



**1 & 2** > Public presentation of the Annual Report 2004, under the presidency of Octavie Modert, State Secretary for Culture, Higher Education and Research (4th April 2005)  
**3** > Signature of a framework agreement between the Ministry of Economy and Foreign Trade, STATEC and CRP Henri Tudor, in order to reinforce the partnership between these three institutions in research matters : (from the left to the right) Dr Serge Allegrezza, Director of STATEC, Jeannot Krecké, Minister of Economy and Foreign Trade, and Jean de la Hamette, Chairman of CRP Henri Tudor's Board of Directors (10th October 2005) **4 & 5** > Lucien Lux, Minister of Environment, meets the researchers of the Resource Centre for Environmental Technologies (CRTE), a joint structure of the Ministry of Environment and CRP Henri Tudor (21st July 2005) **6** > CRP Henri Tudor certified ISO 9001:2000 for the implementation, management and steering of Research, Development and Innovation (RDI) projects : (from the left to the right) François Biltgen, Minister of Culture, Higher Education and Research, Dr Claude Wehenkel, President and CEO of CRP Henri Tudor, Jean de la Hamette, Chairman of CRP Henri Tudor's Board of Directors, Stefan Zerwes, Director of ESCEM, Yves Collet, quality manager of CRP Henri Tudor **7** > Filming of a round-table aiming at introducing new entrant employees in CRP Henri Tudor's company culture; the DVD is available on demand (info@tudor.lu, phone : +352 42 59 91 - 267) **8 & 9** > Conference "Entrepreneuriat, démographie d'entreprises : facteurs de succès", organised under the patronage of Jeannot Krecké, Minister of Economy and Foreign Trade (on picture 8), by STATEC, the Observatoire de la Compétitivité and CRP Henri Tudor (15th November 2005) **10** > In autumn 2005, first aid courses have been organised by the Red Cross Luxembourg and the Protection civile at CRP Henri Tudor; 35 employees have obtained the certificate **11** > Dr Serge Allegrezza nominated « Scientific Advisor » of the Centre, in particular with regards to the activities of the "Statistical and prospective studies of the knowledge economy" innovation platform and of the "Knowledge economy and innovation management" scientific and technological unit **12** > At 29JFK, Santa Claus and the Bogyman meet about a hundred « Tudor » children

1 | >



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**13** > Inauguration of the Kirchberg orientation table installed on the roof of the 29JFK building: (from the left to the right) Thierry Linster, architect of the 29JFK, Marianne Brausch, Fonds d'Urbanisation et d'Aménagement du Plateau de Kirchberg, Fernand Pesch, former President of the Fonds d'Urbanisation et d'Aménagement du Plateau de Kirchberg, Dr Claude Wehenkel, Patrick Gillen, President of the Fonds d'Urbanisation et d'Aménagement du Plateau de Kirchberg | **14** > magic moving pixel, 5th grown out « success story » of Technoport: (from the left to the right) Dr Claude Wehenkel, Hans Werner Eiden (magic moving pixel SA), Matthias Schmitt (magic moving pixel SA) | **15** > J-Way SA left Technoport as 6th « success story » and rejoined Technoport high-growth programme; picture: Jean-Marc Boueyrie, Director of J-Way SA | **16 & 17** > Jean-Louis Schiltz, Minister of Communications, and Paul Helming, Mayor of Luxembourg-City (on picture 17), meet during Bureautec 2005 researchers and entrepreneurs of Technoport | **18** > CRP Henri Tudor hosts the Master of Science in Technical Management of the American Embry-Riddle Aeronautical University (ERAU): (from the left to the right) Steve Gilbert (ERAU), Dr Claude Wehenkel, Dennis Grotrian (ERAU), Lucien Schummer (Cargolux International SA) | **19** > Science Festival 2005 (October 2005) | **20** > Signature of a collaboration agreement with the Ordre des Architectes et des Ingénieurs-conseils (OAI) aiming the consolidation of the training offer in environmental technologies and addressing architects and engineers: (from the left to the right) Joëlle Welfring, Manager of CRTE, Martin Lammar, President of the Ordre des Architectes et des Ingénieurs-conseils, Dr Claude Wehenkel (23rd September 2005) | **21** > Signature of a collaboration agreement between the University of Liège and CRP Henri Tudor: (from the left to the right) Fernand Wagner, President of the Association luxembourgeoise des Amis de l'Université de Liège, Willy Legros, Rector of the University of Liège, and Dr Claude Wehenkel (7th April 2005) | **22** > Seminar with the representatives of the National Research Fund (FNR) and of the Ministry of Research (July 2005) | **23** > LinuxDays 2005 (25th - 26th January 2005) | **24** > Round-table on competences management organised within the context of the annual management seminar (9th December 2005)

**13** | >



**14** | >



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## The corporate vision of CRP Henri Tudor is :

- To be at the service of innovation and entrepreneurship and to strengthen the economic and social tissue in the sense of sustainable development,
- To address the needs of companies, institutions and public organisms in the fields of research, technological development and innovation (RDI),
- To be a major operator of RDI, a leader on national and regional level, and a deeply involved actor in European and international co-operation,
- To be an autonomous, dynamic and efficient company of public interest.

## Founded in 1987, CRP Henri Tudor has developed in accordance with three founding principles :






- To be a "SME of public interest": CRP Henri Tudor is a public institution managed under private legislation,
- To be present in the "Innovation Chain": Applied research, technological assistance and consulting, publishing and training, awareness, entrepreneurship,
- To be resolutely "Partnership Driven": The overall partnership is at the very core of the activities of the CRP Henri Tudor.

## « En route vers Lisbonne »

Ten mobilising RDI programme proposals 2007-2013

| Activity sector:           | N.10<br>Sustainable Competitiveness | N.1<br>Aerospatial Technologies | N.2<br>Avionics and Integrated Transport | N.3<br>Co-operation for Construction | N.4<br>e-Delivery of Healthcare | N.5<br>Luxembourg Trusted E-Services | N.6<br>Innovative water management concepts and technologies | N.7<br>Recycling and valorisation of materials at their end of life | N.8<br>Sustainable Resources Management and Cleaner Production | N.9<br>Structural Integrity Assessment in Engineering |
|----------------------------|-------------------------------------|---------------------------------|--|--------------------------------------|---------------------------------|--------------------------------------|--|---|--|---|
| Building and Construction  |                                     |                                 |  |                                      |                                 |                                      |  |   |  |   |
| Distribution               |                                     |                                 |  |                                      |                                 |                                      |  |   |  |   |
| Education and Training     |                                     |                                 |  |                                      |                                 |                                      |  |   |  |   |
| Energy and Water           |                                     |                                 |  |                                      |                                 |                                      |  |   |  |   |
| Finance and Banking        |                                     |                                 |  |                                      |                                 |                                      |  |   |  |   |
| Materials Industry         |                                     |                                 |  |                                      |                                 |                                      |  |   |  |   |
| ICT                        |                                     |                                 |  |                                      |                                 |                                      |  |   |  |   |
| Industrial Production      |                                     |                                 |  |                                      |                                 |                                      |  |   |  |   |
| Health and Social Security |                                     |                                 |  |                                      |                                 |                                      |  |   |  |   |
| Tourism                    |                                     |                                 |  |                                      |                                 |                                      |  |   |  |   |

|                                     |   |                        |  |                     |
|-------------------------------------|---|------------------------|--|---------------------|
| Sectorial impact on competitiveness |  | Direct impact          |  | All sectors         |
|                                     |  | Concrete repercussions |  | Sectorial proposals |
|                                     |   |                        |  | Thematic proposals  |



Claude Wehenkel, CEO, President of the Management Board

Dear Partner,

We are delighted to present You our major achievements of 2005. From the beginning, in 1987, we were challenged to find an effective way of performing research and innovation activities in a very small country. In that respect, the CRP Henri Tudor has reached a high level of quality and maturity. International recognition based on scientific collaboration as well as on increasing interest for the innovation model that has been conceived and implemented step by step in the last twenty years.

Networking and partnership are our highest credo, hence a ubiquitous involvement of business partners and institutional partners in our projects is the best warranty against wasting public money. Nearly 70% of our income comes from contract research, a level that is only performed by the best of comparable public institutes in Europe. For the first time our income goes beyond 20 million Euros, partly as a result of the Lisbon policy of the Luxembourg Government. In addition, an impressive amount of contribution in kind has been invested by our private partners towards our research projects and other innovation related activities.

CRP Henri Tudor's commitment to do the best for You is summarised by the triplet Quality, Transparency and Accountability. At the end of 2005, the quality system set-up progressively over many years has been certified ISO 9001:2000. That means that client satisfaction, staff motivation and effective process management — the three basic pillars of modern quality systems — are constantly assessed and improved. Transparency is a self-evident obligation for a quasi-autonomous non-governmental organisation partly funded by public money. Accountability means that the relevance of our activities is measured by a comprehensive set of performance and impact indicators and by a careful dissemination of the results. All our research and innovation projects are followed by an external enquiry on client satisfaction and by an independent audit reporting direct outcomes and induced benefits.

At the institutional level an exciting long-term cooperation has been initiated between the University of Liège and CRP Henri Tudor. Under the personnel impulse of Rector Willy Legros and the Chairman of our Board, six thematic working groups have been set up. A first set of concrete collaborations has been launched in 2005, covering various domains such as composite nano-materials, e-learning, ICT security, water management, industrial property, economic intelligence and high-tech entrepreneurship.

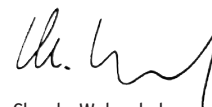
New ways for improved cooperation between the new University of Luxembourg and Luxembourg's three experienced CRP (3C&U Group) have been identified in 2005, even if the existing collaborations are already quite impressive. The results of this initiative will be presented in spring 2006.

At the occasion of the call for ideas and programme proposals issued by the National Research Fund (FNR), we finalised in May 2005 a long-term strategy document (2007-2013) for ourselves, which goes beyond the frame of FNR funding. The expected impact towards Luxembourg's main activity sectors of the ten mobilising programme proposals is shown in the table on the left: "En route vers Lisbonne...".

In 2005, the Luxembourg National Innovation System was analysed by OECD experts appointed by the Government. In parallel, major progress could be achieved by a better focusing of the strategies by the main players. After a first background study issued by the end of 2005, a complete OECD Country Report will be presented in spring 2006. Due to our long experience in innovation system design in a small country, we were naturally highly interested by this thinking process premiere.

The Innovation Hub concept that the CRP Henri Tudor is working on with partners from the USA and Malta, two extremely different countries indeed, began to turn into reality in 2005. Malta, as a small European Member State, is literally predestined to cooperate with Luxembourg in a vision of building bridges between Innovation Hubs of different parts of Europe. The same concept could presumably work with regions of larger countries. In this respect, we could experience first promising activities with innovation players of the New York and Montreal region.

Thinking the future is as important as producing excellent results in the present. Dear Partner, have a look at our Annual Report 2005: we are working for You!



Claude Wehenkel  
President and CEO

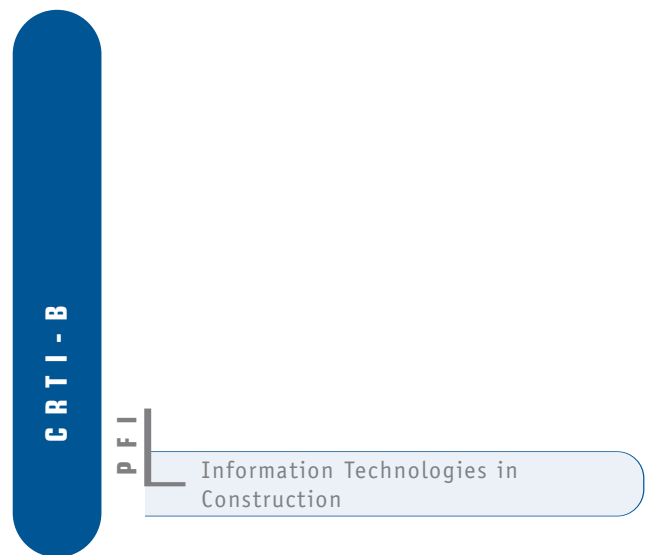
The **Public Research Centre Henri Tudor** is made up of eight departments:

|                    |  |
|--------------------|--|
| <b>LTI</b>         | Laboratory for Industrial Technologies and Materials         |
| <b>CITI</b>        | Centre for IT Innovation                                     |
| <b>CRTE</b>        | Resource Centre for Environmental Technologies               |
| <b>CR SANTEC</b>   | Resource Centre for Health Care Technologies                 |
| <b>CRTI-B</b>      | Resource Centre for Information Technologies in Construction |
| <b>SITec®</b>      | SITec® - "Lifelong Learning for Technological Innovation"    |
| <b>CVT</b>         | Technology Watch Centre                                      |
| <b>Technoport®</b> | High-tech business incubator (EC-BIC)                        |

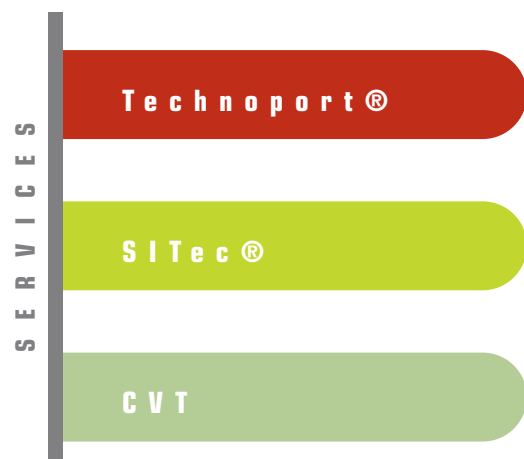
The Centre's departments are made up of:

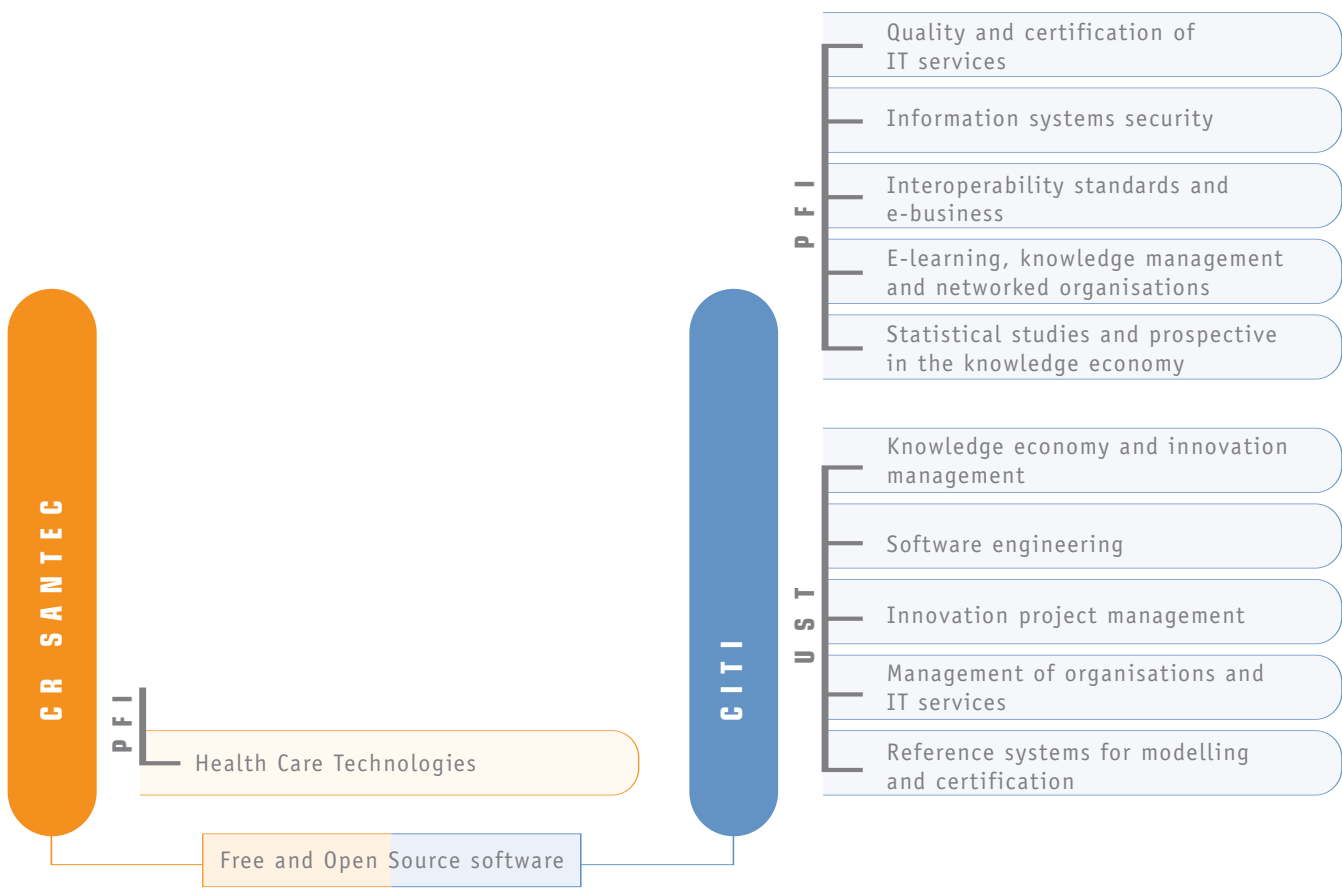
- **Innovation platforms (PFI)**  
who have a common national strategic objective, a large panel of partners and numerous multidisciplinary activities of research and transfer;
- **Scientific and technological units (UST)**  
A pronounced component of specialised research associated with RDI and valorization activities;
- **Innovation service units.**

Two innovation platforms are shared between a few departments:  
« Renewable energies » and « Free and Open Source software ».

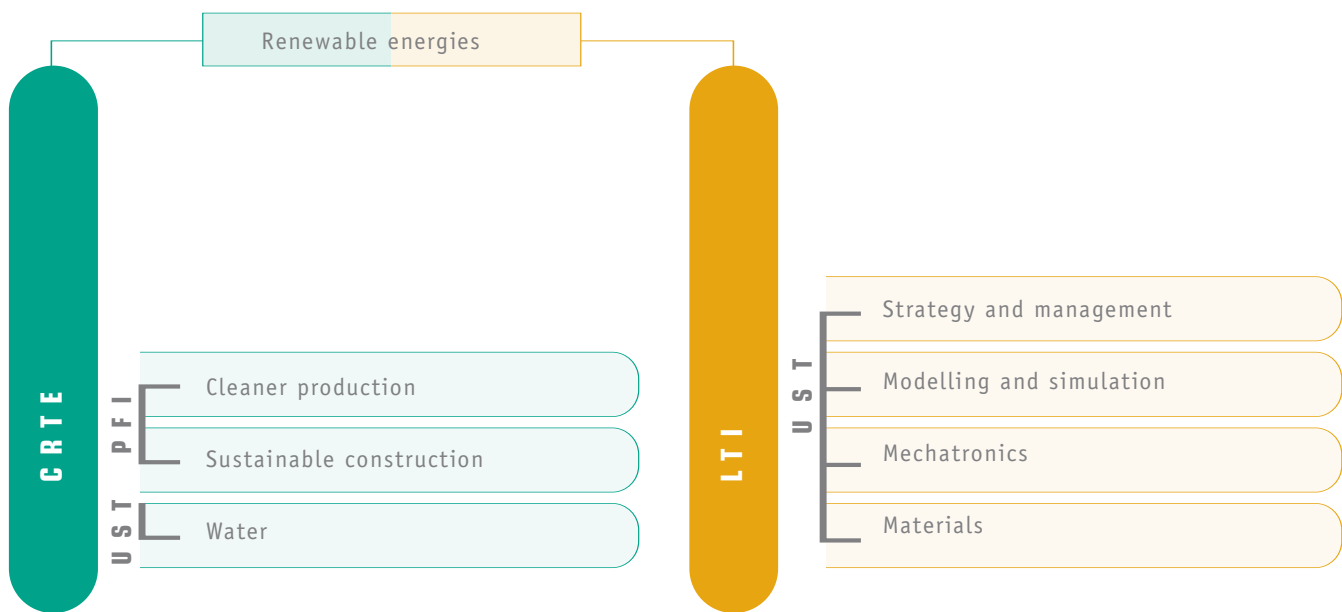


## PUBLIC RES





## E A R C H C E N T R E H E N R I T U D O R



**UST** : SCIENTIFIC AND TECHNOLOGICAL UNIT  
**PFI** : INNOVATION PLATFORM

# Key figures 2005 of CRP Henri Tudor

## Financial figures

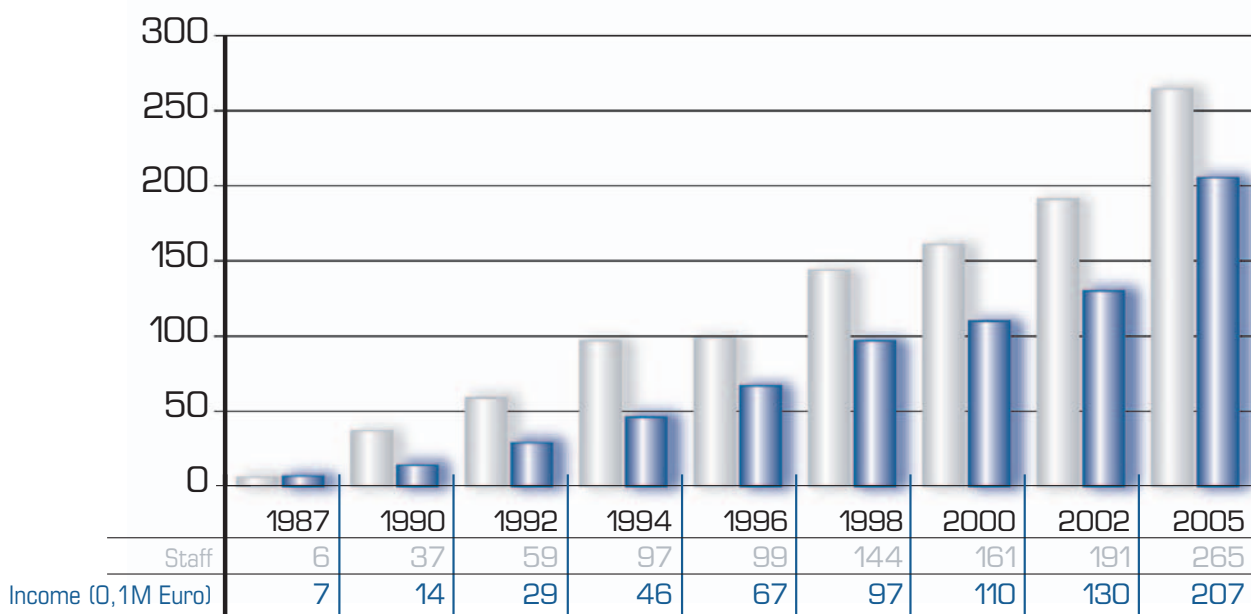
|                                     | 2005          | 2004          |
|-------------------------------------|---------------|---------------|
| Income (in Euro):                   | 20,679,202.15 | 19,514,156.76 |
| <i>of which:</i>                    |               |               |
| Grant for mission of public utility | 31%           | 27%           |
| Funding by contract research        | 69%           | 73%           |
| Budget for 2006 (in euros):         | 22,550,000    |               |

## Human resources

|  | 2005 | 2004 |
|--|------|------|
| Staff as at the end of the year:                   | 265  | 252  |
| <i>of which:</i>                                   |      |      |
| with a Ph D:                                       | 13%  |      |
| with a Master:                                     | 70%  |      |
| Graduates, secretaries, technical staff and other: | 17%  |      |

The mobility of researchers and engineers of the Centre contributes in a significant way to the transfer of competences and the spirit of innovation. In 2005, 34 persons found a attractive job mainly in the private sector, bringing the total to 309 since the Centre's creation.

## A Start-up of Public Interest: Staff and Income since 1987



## Research, development and innovation projects in 2005

In 2005, the CRP Henri Tudor took part in 118 projects (103 projects in 2004).

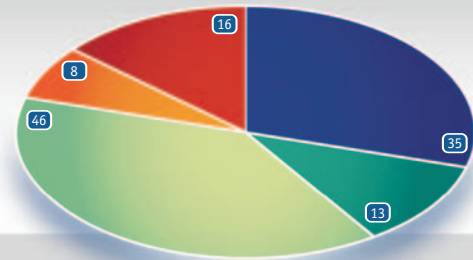
Among these 118 projects, 62% are conducted in direct partnership with companies or groups of companies, 52% in partnership with public departments and bodies and 44% in partnership with universities or research centres.<sup>1</sup>

Project results are various and numerous:

- An appending patent for a non-invasive heart monitoring apparatus and method (within the framework of the project LuHF "Luxembourg Heart Failure" co-financed by the Fonds National de la Recherche - FNR)
- 6 surveys conducted in the fields of patent practices, quality practices, small and new business development, web presentation of banking services and knowledge management
- 40 state-of-the-art reports draw up for partners' need or public dissemination
- 29 prototypes or tools developed with partners
- 54 methods and models designed or experienced
- The Mouvement Luxembourgeois pour la Qualité (MLQ) became fully autonomous and NOEMI Concept left CRP Henri Tudor as spin-off; both are hosted at Technoport.

<sup>1</sup> The total is higher than 100%, given the same project may involve partners of various types.

### CRP Henri Tudor's projects 2005 by type



35 European programmes

13 National Research Fund (FNR)

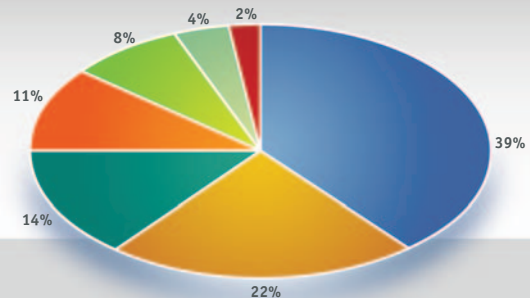
46 Projects co-financed by the Ministry of Research

8 Projects co-financed by ministries other than the Ministry of Research

16 Projects entirely financed by the private sector

Total : 118 projects

### CRP Henri Tudor's 118 projects by technology domain



39% Information technologies

22% Industrial technologies

14% Environmental technologies

11% Health care technologies

8% Lifelong learning and innovation

4% Technology watch

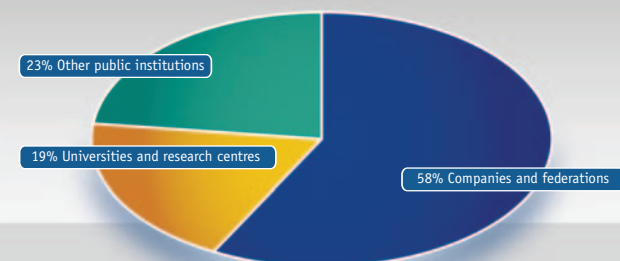
2% High-tech entrepreneurship

## Public/private partnership

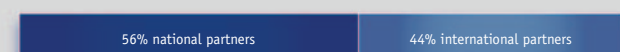
In 2005, 417 partners were involved in the Centre's projects.

### The 417 project partners of CRP Henri Tudor in 2005 (see p. 60)

#### by type



#### by origin





## European activities

30% of CRP Henri Tudor's projects are conducted within the framework of European programmes, in particular FP6, ESA, Leonardo, INTERREG, ERDF Objective 2, ESF Objective 3 programmes.

Within the 6th European R&D Framework Programme (FP6), CRP Henri Tudor is the co-ordinator of one Specific Target Research Project ("CASSEM", in composite and adaptive structure) and has active responsibilities in three Networks of Excellence:

- "INTEROP" in the field of information technologies interoperability
- "CMA" in the field of complex metallic alloys
- "GA<sup>3</sup>LEN" in the field of allergy and asthma health problems.

In 2005, 3 additional projects have been accepted within FP6 and will start in 2006 :

- PALETTE "Pedagogically Sustained Adaptive Learning Through the Exploitation of Tacit and Explicit Knowledge"
- ELU "Enhanced Learning Unlimited"
- DETECT - it2 "Dedicated Network of Incubators Detecting new FP7 Opportunities for SMEs through Connecting Existing Regional Clusters in Biotech, Renewable Energies and IST"

Two projects are ongoing within ESA Artes3 programme, in partnership with national companies Cybercultus and SES:

- SATnSURF "Innovative services for Internet content operation"
- IMSATV "Immersive Satellite Television"

One FP6 project has been conducted within the framework of the European Space Incubator Network (ESINET):

- NAVOBS "A Support Measure to Boost the Business Prospects of GMES and Telecom Satellites through Focused and Innovative RTD Work Involving SMEs".

The CRP Henri Tudor is a member of several European networks, in particular of the European BIC Network (EBN), European Space Incubator Network (ESINET), Gate2Growth Incubator Forum, European Research Consortium in Informatics and Mathematics (ERCIM, member of the Board of Directors and of 9 working groups), SC7, SC27 and SC29 ISO Sub-Committees (in the field of multimedia, information technologies and software engineering), founding member of the Mouvement Luxembourgeois pour la Qualité (MLQ).

From January to June 2005, two researchers of the Centre participated, on demand of the Luxembourg government, at the ad hoc working group "REACH" of the European Council.



## Scientific and academic activities

In 2005, CRP Henri Tudor's researchers published 64 scientific articles, 80% with a review committee. 33 were published in conference proceedings, 10 in scientific journals, and 2 are chapters of books, under press.

17 PhD students are trained within the Centre, in partnership with French, Belgian and Swiss universities: 7 in the field of materials structure simulation and modelling, 5 in information technologies and organisation, 2 in health care technologies, 1 in Supply Chain management, 1 in water cleaning technologies and 1 in technology watch.

41 engineers of the Centre have participated in university training in Europe, for a total of 765 hours representing 49 training courses. 9 of them provided 145 hours of training at the University of Luxembourg.

Two international master trainings are co-organised with partner universities:

- The Master "Informatique et Innovation" opened its 7th continuous session, gathering 40 attendees in the three ongoing sessions. 10 students graduated in 2005.
- The Master "Management et qualité des entreprises et services" opened its 2<sup>nd</sup> session, gathering a total of 33 attendees. 13 students of the first session graduated.

A Master in security of information systems will start in 2006.

Moreover, the Centre hosts the Master of Science in Technological Management (MSTM) of the American Embry-Riddle Aeronautical University (ERAU).

The Centre's engineers are members of 9 journal's review committees and of 3 juries of doctoral thesis. They attend 58 industrial or scientific committees or working groups, among them 7 evaluation committees and 4 normalisation ones.

## Training and dissemination activities

### Training

In 2005, CRP Henri Tudor organised 74 qualifying trainings gathering 1,418 attendees. Altogether, 98.5 days of qualifying training and 70 days of master training have been organised in 2005. Compared to 2004, the number of attendees to the qualifying trainings increased of 52%.

### Conferences

The Centre organised, in partnership with local and international partners, 10 conferences, attended by 915 people:

- "Dezentrale Abwasserreinigung und Regenwasserbewirtschaftung", 5th July 2005, in co-operation with Umweltberodung Lëtzebuerg Asbl (EBL), Mall Umweltsysteme, the City of Esch-sur-Alzette and with the financial support of the Fonds National de la Recherche (FNR)
- "Audit énergétique et Bilan Carbone - Présentation d'outils d'évaluation", 13th October 2005, organised within the framework of RIFE (Réseau transfrontalier d'Information et de Formation à la gestion de l'Environnement, regrouping partners of Luxembourg, Lorraine and Wallonia, and co-financed by the European Union)
- "Efficacité énergétique des installations frigorifiques en entreprise", 8th November 2005, organised within the framework of RIFE
- "The future of residual waste management in Europe", 17th - 18th November 2005, in co-operation with the international Association for Organic Recovery and Biological Treatment ORBIT
- "Entrepreneuriat, démographie d'entreprises: facteurs de succès", 15th November 2005, organised under the patronage of the Ministry of Economy and Foreign Trade, by STATEC (Service central de la Statistique et des Etudes Economiques), the Observatoire de la Compétitivité and CRP Henri Tudor
- "SPIRAL Days 2005: the annual rendezvous of IT professionals", 7th - 8th June 2005, in co-operation with SPIRAL "Le réseau des professionnels de l'IT" and CLUSSIL (Club de la Sécurité des Systèmes d'Information Luxembourg)
- "Logiciel et matériel, les clefs du succès informatique pour les PME", 6th October 2005, in co-operation with CASSIS (network of IT consultants), Chambre de Commerce du Luxembourg and Chambre des Métiers
- "Linuxdays 2005", 25th - 26th January 2005, in co-operation with the University of Luxembourg and Linux User Group Luxembourg (LILUX)
- "Six Sigma Day III", 28th June 2005, in collaboration with the Mouvement Luxembourgeois pour la Qualité (MLQ)
- "Corporate Governance", 25th April 2005, in collaboration with the Mouvement Luxembourgeois pour la Qualité (MLQ)

### Thematic events

80 thematic events with a total of 2,533 professionals, for a cumulated duration of 426 hours have been organised. Among these events:

- "La semaine de la Qualité", 7th - 11th November 2005, in collaboration with the Mouvement Luxembourgeois pour la Qualité (MLQ)
- "Quel référentiel de gestion de projet pour votre organisation", 28th September 2005, in collaboration with Service e-Luxembourg, PMI Project Management Institute, Quint Wellington Redwood, USIC (Unité de Stratégie Informatique de la Confédération Suisse) and SPIRAL
- "Knowledge management" working group, 7 sessions between March and November 2005, in partnership with 32 companies of the Grande Région
- "Panorama des référentiels sécurité IT", 8th December 2005, in collaboration with CLUSSIL, and in alignment with the activities of the ISO sub-committee SC27
- "REACH, une réalité proche. Quelles sont les obligations de cette future réglementation concernant l'enregistrement, l'évaluation et l'autorisation des substances chimiques ?", 13th December 2005, organised within the framework of RIFE
- "Theory of constraints" workshop, 8 sessions between January and July 2005
- "Nidagroup" workshop, 11th March 2005
- "Innovation in Intellectual Property Education", 17th October 2005, in partnership with the University of Bournemouth.

## Incubator activities

Six new companies have been accepted in the start-up programme of the high-tech incubator Technoport, out of which 4 within the incubator (CodaSystem, Noemi Concept, Mocom, Epuramat) and 2 externally via the Technoport Innovation Network (Flowing Content, Noctron). End December 2005, 27 companies were member of the Technoport Innovation Network, among them the 6 grown out "success stories" which represent a cumulated turnover of 16,870,000 Euro. (detailed incubator status on page 51)

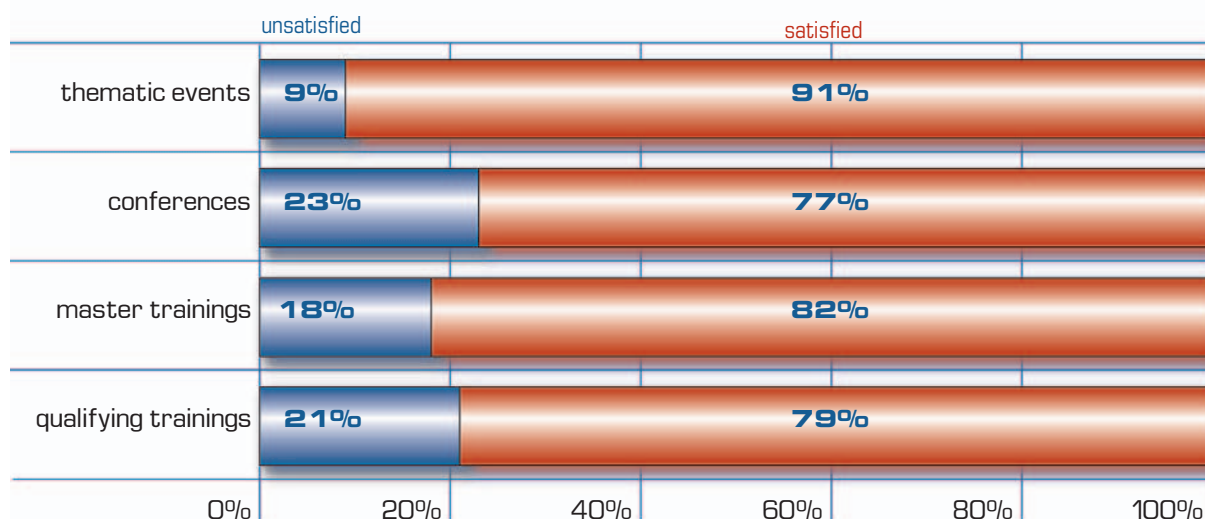
# Client satisfaction and quality

As of 2005, all activities - projects and services - are subject to a satisfaction survey among clients and partners.

**Client satisfaction contact :** Cécile Cavalade, phone: +352 42 59 91 - 303, cecile.cavalade@tudor.lu

## Zoom on the results of the trainings and events satisfaction survey 2005

At the end of each training or event organised by the CRP Henri Tudor, a satisfaction survey is proposed to the attendees. The following results show a high level of satisfaction, mainly for the more specialized products such as thematic events.



Percentage of satisfied attendees on a total panel of 1.293 surveys filled in

## Satisfaction measurement and improvement actions

In the year 2005, client satisfaction surveys were conducted among the partners of the projects closed during the previous year. External consultants have met 26 project partners and 20 commercial contract partners. 17 other partners have answered a survey on paper. The surveys results are positive (91% of the project partners, and 95% and 100% of the latter two participants were satisfied).

Results were presented to the project teams and to the Management board of the Centre. Numerous improvement actions were identified and included in the quality improvement plan.

For example, the partners interviewed underlined the employees' lack of global knowledge on the CRP Henri Tudor activities or context. To bridge the gap and to ease the integration of new researchers and engineers, a e-learning training has been developed in-house. It includes complete presentation of:

- the Centre's mission, activities and organisation,
- the national and European research context and main actors,
- the Grand-Duchy of Luxembourg.

"We have been able to cut 30% of our pipeline inventory, and according to this multiplying the assets' turnover of the distribution business. This results from an innovative Supply Chain model developed in collaboration with the Centre Henri Tudor."

Philippe Nicolas  
Vice-president of ARCELOR Négoce Distribution

"In partnership with the Service eLuxembourg, the intervention of the Centre on the project QUAPITAL has actively contributed to the design and formalisation of a project management referential for Luxembourg public administration. The CCME (Commission de Coordination pour la Modernisation de l'Etat) chaired by minister Claude Wiseler has given a very favourable agreement for the deployment of this referential (...)"

Pierre Schilling  
Chargé de Direction, Service eLuxembourg



# CERTIFICATE

The TÜV CERT Certification Body  
of TÜV Industrie Service GmbH  
TÜV Rheinland Group  
certifies in accordance with  
TÜV CERT procedures that



CENTRE DE RECHERCHE PUBLIC  
**HENRI TUDOR**  
www.tudor.lu  
29, avenue John F. Kennedy  
L-1855 Luxembourg - Kirchberg

has established and applies a quality management system for  
**Implementation, management and steering of  
Research, Development and Innovation projects.**

An audit was performed, Report No. **057059**.  
Proof has been furnished that the requirements according to  
**DIN EN ISO 9001:2000**  
are fulfilled.  
The certificate is valid until **2008-12-20**.  
Certificate Registration No. **01 100 057059**



*Ute Lagerot*

Ute Lagerot

TÜV CERT Certification Body of  
TÜV Industrie Service GmbH

Paris, 2006-01-18



TÜV Rheinland Group

www.tuv.com

In 2005, CRP Henri Tudor has been certified ISO 9001:2000 for the implementation, management and steering of Research, Development and Innovation projects.

# Zoom on the Departments

Some of the following activities and projects benefitted from the financial support of the National Research Fund, the European Regional Development Fund (ERDF) and the European Social Fund (ESF).

**Staff as at the end of the year:**

52

**Key competences:**

modelling and control of the Supply Chain, reference frameworks and management of organisations, constraint management, customer relationship management, company modelling, new forms of organisations, computational mechanics, data analysis, physical measurement systems, photovoltaics, automation, material trials and characterisation, metrology

**Activities:**

R&D, doctoral research, expert reports, technological assistance, ongoing post-graduate training, animation of innovation platforms, specialist services: material trials, metrology and calibration

**Units:**

- "Strategy and Management" scientific and technological unit
- "Modelling and Simulation" scientific and technological unit
- "Mechatronics" scientific and technological unit
- "Materials" scientific and technological unit

The LTI also participates in the "Renewable Energies" innovation platform.

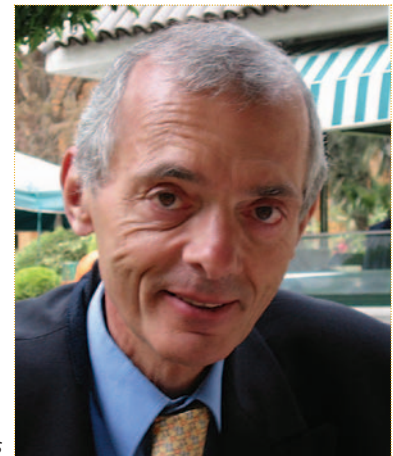
**Main partners :**

Arcelor, Guardian Automotive, Netzsch, Ceratizit, Service de l'Énergie de l'Etat (SEE – standards committees), Office Luxembourgeois d'Accréditation et de Surveillance (OLAS), Agence de l'Énergie SA (AEL), Mouvement Luxembourgeois pour la Qualité (MLQ), Vlaamse Instelling voor Technologisch Onderzoek (VITO) (see detailed list on [www.lti.lu](http://www.lti.lu))

**Contact :**

Pr Dr Jos Schaeffers, Director, [jos.schaeffers@tudor.lu](mailto:jos.schaeffers@tudor.lu)

phone: +352 54 55 80 – 1, [www.lti.lu](http://www.lti.lu)



*Pr Dr Jos Schaeffers*

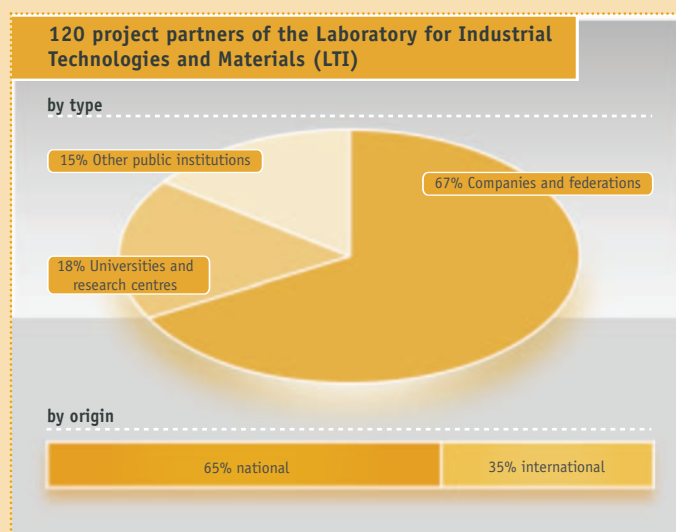
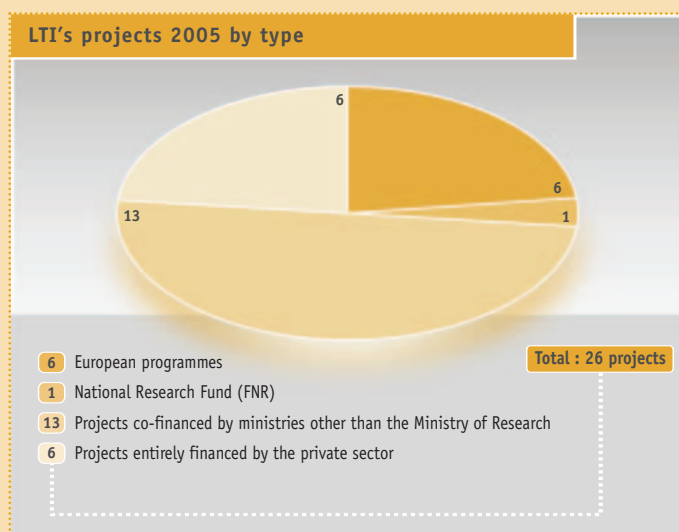
**Key facts 2005 of the department**

2005 has been a cornerstone for LTI's development :

- The reorganisation of the materials unit, started end of 2004, produced its first notable results in 2005: development of the activities in interdisciplinary material analysis, start-off of the physical and chemical analysis facilities, diversification of the competences and possibilities of the material testing team as proved by the reduction of the rate of standardised testing and the increase of tailor-made services, definition of an innovative concept for integrated material analysis within the framework of the project ICIMAT "Innovation dans la caractérisation intégrée des matériaux". The main objective of this project is to globally rather than locally focus material properties in case of an apparently very narrowing and specific problem on any material. This project is co-financed by five industrial partners.
- The "Modelling and simulation" unit has been, since the beginning of 2005, leader in a FP6 project dealing with the active control of structural vibrations (project CASSEM "Composites and Adaptive Structures: Simulation, Experimentation and Modelling").

- The project INNOMA “Innovative Management” provides high rates of return on investment to the participating industries. Within the framework of this project, LTI had the opportunity to start a first project in immaterial Supply Chain applied to the fund industry. The project was realised in collaboration with FETA.
- The university diploma in “Management and Quality of Enterprises and Services” jointly organised with the Facultés Universitaires Catholiques of Mons (FUCAM), the Ecole Supérieure de Management of Metz, the Ecole Nationale d’Ingénieurs of Metz and the University of Quebec at Trois-Rivières, has been recognised in 2005 as a Master degree starting in 2006, and has congratulated its first thirteen graduates in December 2005. The second promotion has been launched in January 2005.
- LTI raised its international scientific recognition in 2005 through 22 scientific papers published in international journals and conferences. The recognition by the professional world is demonstrated by its high self-funding rate through private funds (more than one hundred active clients in 2005).

## Key figures 2005



## Transfer and dissemination activities of LTI

|                          |   |
|--------------------------|---|
| Training                 | Qualifying training : 11 days of trainings; 179 attendees   |
|                          | Master “Management et qualité des entreprises et services”:<br>- 33 attendees following the 2 ongoing sessions ; 13 graduated students  |
| Scientific publications  | 22 scientific publications, including 9 articles in proceedings, 7 articles in journals   |
| Professional conferences | - “Corporate Governance”, 25th April 2005, in collaboration with the Mouvement Luxembourgeois pour la Qualité (MLQ)<br>- “Six Sigma Day III”, 28th June 2005, in collaboration with MLQ |
| Events                   | 18 events for a total of 72 hours and 642 attendees, including<br>- “La semaine de la Qualité”, 7th - 11th November 2005, in collaboration with MLQ                                     |



## Key facts 2005 for each unit

UST ▶

### **"Strategy and management" scientific and technological unit**

*The unit is aimed at developing and maintaining competences to improve companies' productivity and competitiveness through performances of the management system and companies organisation as well as the synchronisation of the Supply Chain.*

#### Key facts 2005:

- Development within the project EXIND 2 "Pilotage et conception de formations en stratégie de gestion industrielle et d'organisation" of an offer of productivity tools targeting the sector of services: 5S, 5S adapted to offices, flow management in the immaterial supply chain (latter being commercialised in collaboration with a company specialised in training tools)
- The "Mouvement Luxembourgeois pour la Qualité" left the LTI in September 2005 as spin-off of the laboratory and is now hosted at the Technoport
- Kick-off of the project CRM "Création d'une structure experte en CRM et accompagnement des entreprises" aiming at setting-up a task force in customer relationship management assisting companies in the implementation of such a management system
- Sustainability analysis to enhance productivity and business of small economic environments within the context of the project QUALITY PASS "Passeport pour la qualité pour les petites et très petites entreprises". Very small ventures often don't have the same access to quality tools and management methods than bigger companies. They however represent a consistent economic activity in a small country. The main objective of the project QUALITY PASS is to assist them to identify the parameters that are able to impact their competitiveness and sustainability
- Within the project COFAQ "Conception d'un service de formation et d'accompagnement pour l'amélioration de la qualité", setting-up of two clusters on quality management in the construction sector
- Within the project CELLULE MODELISATION "Création d'une cellule experte en modélisation / simulation / diagnostic des entreprises et stimulation de démarche qualité totale au Luxembourg", organisation of three workshops on enterprise-modelling attended by 80 participants and development of an enterprise flow model to analyse and select ERP-software
- Breakthrough of the INNOMA "Innovating in management" methodology based on the Theory of Constraints. So far, the methodology has been applied with a high rate of return on investment (productivity increase, lead-time reduction, operating expense reduction, work-in-process reduction, consistent freed capacity) in eight companies among them Goodyear, Ceratizit and FETA. 220 attendees from 69 different companies participated in workshops on this methodology.
- Six training courses were held on topics as diverse as the Theory of Constraints, AMDEC (Failure Mode and Effect Analysis): product or process, the statistical process control, design of experiment.
- A series of mini-guides on quality tools was disseminated by public subscription.

#### Contact:

Magalie Briquet, Unit Manager, magalie.briquet@tudor.lu



### **Results of the EXIND2 project**

Professional training in productivity tools of the immaterial Supply Chain

Succeeding to a first project of design and implementation of training activities on productivity tools for the manufacturing Supply Chain, the project EXIND2 aimed at adapting this training offer to the immaterial Supply Chain. Three sectors have been particularly targeted: the sector of services, the health sector and the financial sector.

In total, seven new trainings have been set-up: Statistical Process Control, Statistical Design of Experiment, Failure Mode and Effects Analysis (product and process), Functional Analysis, Inventory Management, Total Quality Management, Customer Relationship Management. Six trainings have been adapted to the needs of the immaterial Supply Chain: Hospital Inventory Management, Critical Chain Project Management, 5S in the office, 5S in the hospital, Supply Chain synchronisation in the service industry, TQM in the service industry.

More than 300 professionals attended the trainings and more than 60 companies participated at the thematic events organised in addition to the trainings.

Contact: laurent.bravetti@tudor.lu



### Results of the COFAQ project

Helping SMEs to access to quality

The project COFAQ “Conception d’un service de formation et d’accompagnement pour l’amélioration de la qualité” aimed at designing training and assistance services to improve the quality of SMEs. SMEs often don’t have the financial resources and the competences to improve the quality of their services as they would like to.

The project made possible the regrouping in two different clusters of eleven companies of the construction sector. Both clusters had as objective to make the participant companies conform to ISO 9001 standard. Each cluster benefited from appropriate training and personalised assistance given by specialised consultants. At the end of the project, six companies had reached their objective, three had reached it partially and two had left the cluster before the end. Three companies are now certified ISO 9001. Thanks to the cluster, the companies could reduce the costs of such an action by 20% and benefit from aid of six high qualified consultants.

The project has been conducted in collaboration with the Chambre des Métiers, Chambre de Commerce, Confédération Luxembourgeoise du Commerce (CLC) and the Mouvement Luxembourgeois pour la Qualité (MLQ). The results of the project in terms of methodology have been transferred to MLQ which will continue these clustering activities during the next years.

Contact: yves.collet@tudor.lu



### Results of the INNOMA project

Innovating in management

Launched end 2003, in partnership with GoodYear, Ceratizit, Glaverbel, Dexia, Arcelor Negoce Distribution, ProfilArbed Distribution, the project INNOMA had as objective to assist companies to enhance their productivity and competitiveness by the application of the Theory of Constraints in various aspects of their activities: performance measurement, operation, project management, Supply Chain, marketing, sales and strategy. The basic assumption underlying the idea of INNOMA is that despite the dependency on the economic environment’s parameters, there are plenty of leverages to improve a company’s competitiveness that are fully controllable by the company itself. INNOMA has been so far implemented in two major industrial companies. The results are remarkable:

|   |                                       |                               |
|---|---------------------------------------|-------------------------------|
| <u>Industrial operational management:</u> | Flow shop:                            | 30 % lead-time reduction      |
|   |                                       | 2M work in process reduction  |
|   | Job shop1:                            | 20% lead-time reduction       |
|   |                                       | 30% work in process reduction |
|   |                                       | 15% capacity increase         |
|   | Job shop2:                            | 50% lead-time reduction       |
|   | 80% work in process reduction         |                               |
|   | 25 % customer service level increase; |                               |

|  |   |
|--|---|
| <u>Service operational management:</u> | consistent customer satisfaction improvement (not yet quantified) |
|  | total elimination of stress in the production team                |
|  | operating expense reduction (overtime, hiring and firing)         |

|                                       |   |
|---------------------------------------|---|
| <u>Supply Chain and distribution:</u> | implementation of a new distribution concept    |
|                                       | 30 to 50% pipeline inventory reduction expected |
|                                       | investment savings of 10 Million Euro           |

Contact: jos.schaefers@tudor.lu



### Results of the TRANSQUAL project

A cross-border network to promote quality

Setting-up a cross-border network (Wallonia, Lorraine, Luxembourg) to promote quality, facilitate the implementation of quality projects, capitalize and transfer good practices in the field of quality management, was the objective of the project TRANSQUAL "Réseau transfrontalier de la qualité". The project was co-funded by the European Union (INTERREG IIIA WLL) and realised in collaboration with the Chambre de Commerce du Luxembourg, the Mouvement Luxembourgeois pour la Qualité Asbl (MLQ), the Chambre de Commerce et d'Industrie du Luxembourg Belge (CCILB), the Centre Wallon de la Qualité Asbl (CEQUAL), Performance et Progrès en Lorraine and the Chambre de Commerce et d'Industrie de Meurthe et Moselle. The network organised 26 conferences and thematic seminars brought together more than 185 institutions and companies. An Internet page publishing information and studies on the topic of good practices in quality management was created: [www.transqual.net](http://www.transqual.net)

Contact: [yves.collet@tudor.lu](mailto:yves.collet@tudor.lu)



### Results of the CELLULE MODELISATION project

A generic model to optimize the productivity of your company

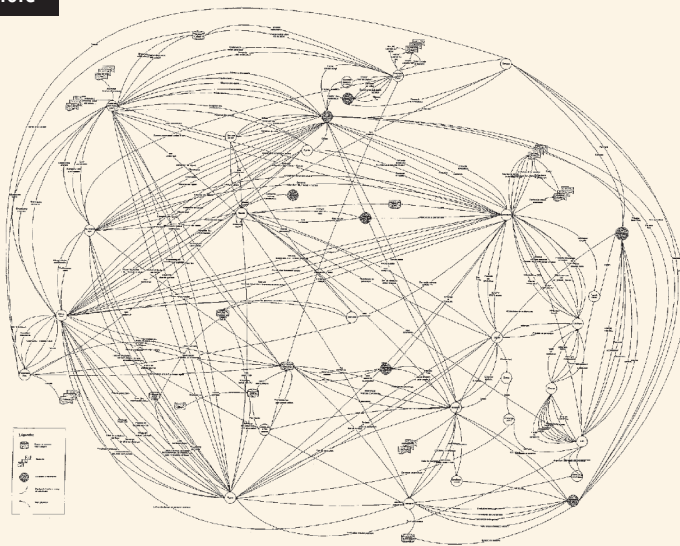
The project CELLULE MODELISATION « Création d'une cellule experte en modélisation / simulation / diagnostic des entreprises et stimulation de démarche qualité totale au Luxembourg », conducted in partnership with Goodyear, Glaverbel, SudGaz, ProfilArbed Distribution, Mouvement Luxembourgeois pour la Qualité (MLQ), Centre Hospitalier Emile Mayrisch (CHEM), had as set purpose to implement an expert team on modelling of industrial enterprises within the CRP Henri Tudor, to determine a state-of-the-art of the existing methods and tools and to develop methods and tools adapted to the Luxembourg context. Thus, most representative existing enterprise modelling models (CIMOSA, GRAI, APICS, EFQM, ARENA, WITNESS among others) and simulation tools have been assessed and a new generic model, combining the strengths of the different assessed models and adapted for large companies as well for SMEs, was designed and successfully experienced in several companies. Main impacts for the companies are:

- an increase of productivity
- the optimization of the information and the organisation flows.

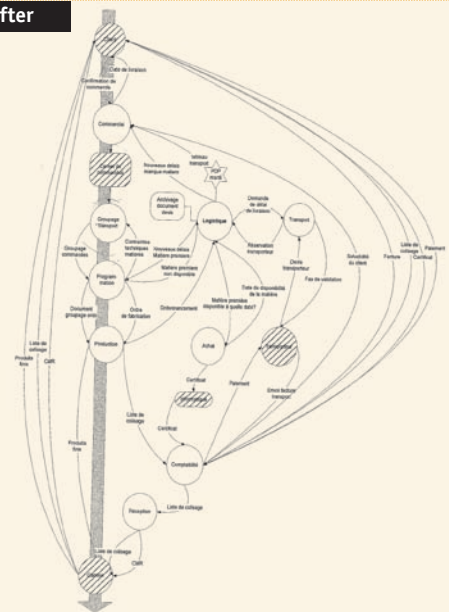
Due to the success of the application of the generic model in industrial processes, the project team explored the application of the generic model in sectors like health care and services. Moreover, a specific adapted reference framework was designed for the Prix Luxembourgeois de la Qualité and experienced by the Mouvement Luxembourgeois pour la Qualité (MLQ).

Contact: [david.evaristo@tudor.lu](mailto:david.evaristo@tudor.lu)

before



after



The flow cartography represents the functioning of a company of material or immaterial production and allows to analyse and to identify the potential increase of productivity. This simple and fast methodology, developed within CRP Henri Tudor, makes possible the diagnosis and the reorganisation of any type of company.



### Results of the NanoFem project

Characterizing mechanical properties at micro- and nano-scale through combined use of nano-indentation and finite element modelling

The NanoFem project aimed at developing a closed-loop identification procedure to determine elastic and plastic material parameters. The challenge was to identify the parameters of a nano-indentation model described by the finite element method.

After implementation of the finite element, routines necessary for numerical modelling of the indentation test, two parameter identification methods have been assessed for the case of a simple uniaxial tensile/compressive test: one based on a response surface analysis using neural networks, and one based on gradient-based deterministic numerical optimization. The comparison of the performance of both methods has led to the decision to continue the project using the numerical optimization scheme, as this method was deemed more reliable. In order to treat inhomogeneous, multiaxial stress states occurring in indentation testing, direct differentiation-based sensitivity analysis, required for gradient-based optimization, has been implemented into the in-house finite element code. The material parameter identification method relies on minimizing the difference between measured and modelled indentation curve by adjusting the material parameters. It has been tested on virtual pseudo-experimental input curves, produced by finite element modelling of the indentation test with known material parameters. The stability of the identification procedure has been investigated by superposing artificial white noise on the virtual input curves. The influence of the load history has also been investigated. It was found that for experimental data with noise levels below one percent, some material parameters can be identified rather accurately, like for example the Young's modulus. However, the yield stress and the isotropic hardening parameters are prone to very high errors. It was concluded that parameter correlation makes it difficult to perform material parameter identification through nanoindentation for highly sophisticated constitutive laws. This has also been corroborated by parameter identification performed on true physical nanoindentation curves. The conclusion is that simpler constitutive laws with less material parameters should be used with the indentation test.

Contact: [serge.gille@tudor.lu](mailto:serge.gille@tudor.lu)

UST ▶

### "Modelling and Simulation" scientific and technological unit

*The unit is aimed at providing companies with a centre of competences in computational mechanics and data analysis, and at assisting them to improve their products and their procedures.*

#### Key facts 2005:

- Kick-off of the European FP6 project CASSEM "Composites and Adaptive Structures: Simulation, Experimentation and Modelling" aiming at developing a vibration control technology to enable higher performance, less energy consuming and lighter weight structural systems. Vibration control technology involves reducing detrimental vibration in flexible structures by active and passive procedures
- The project VEIANEN "Viscous Effects Investigated by Applied Numerics and Experimental Nanoindentation" has been defined and submitted for funding at the Fonds National de la Recherche (FNR). The project will start in 2006
- In response to FNR call of programme proposals (May 2005), the unit has introduced a programme proposition on "Structural Integrity Assessment in Engineering"
- Organisation of the workshop Nidagroup (35 participants - 11th March 2005)
- The unit welcomed in 2005 several visiting scientists: Dr. Vsevolod Laptev, Postdoc, ERCIM grant (September 2004 - June 2005), Prof. Dr. B.V. Ratish Kumar, FNR grant, Indian Institute of Technology Kanpur (India) (May - July 2005), Prof. Dr. Lahcène Azrar, FNR grant, Université Abdelmalek Essaadi Tanger (Morocco) (July - December 2005); and three new PhD students: Boulaïd Boulkroune on the subject : Estimation de l'état et des paramètres et commande prédictive des systèmes non linéaires. Application à une station d'épuration (direction : Prof. Mohamed Darouach of the Centre de Recherche en Automatique de Nancy (CRAN) ; Yvon Tharrault on the subject : "Diagnostic de fonctionnement des systèmes linéaires par analyse en composantes principales. Application à une station d'épuration" (Prof José Ragot, Centre de Recherche en Automatique de Nancy (CRAN) and Olivier Gueguen on the subject "Modeling and Simulations of the Mechanical Behavior of Polymers: Effects of Strain Rate, Temperature, Pressure and Strain Induced Crystallization" (direction: Prof Said Ahzi, Université Louis Pasteur, Strasbourg I).

#### Contact:

Serge Gillé, Unit Manager, [serge.gille@tudor.lu](mailto:serge.gille@tudor.lu)

**“Mechatronics” scientific and technological unit**

*The unit aims at maintaining and developing skills in the field of process control in order to assist companies in better controlling their manufacturing procedures and in thus improving their productivity and their products.*

**Key facts 2005:**

- Development of a prototype to count and detect the position of objects sorted manually into a shelf and contributing to increase the productivity of hard mail retrieval in Belgium post offices.
- The unit has principally worked for the “Renewable energies” innovation platform (see page 46)

**Contact :**

Frank Minette, Unit Manager, frank.minette@tudor.lu

**“Materials” scientific and technological unit**

*The unit aims at developing and maintaining a materials test and control centre (materials clinic) with the aim of improving the productivity and competitiveness of companies through the improvement of products and procedures.*

**Key facts 2005:**

- Within the framework of the project SYNTHESE “Synthèse de nanocomposites”, co-funded by the European Union (ERDF - Objective 2) and realised in collaboration with the University of Liège, elaboration of nanocomposites by incorporating nanoparticles (nanoclays) in polymer matrix
- Within the framework of the project TRASU “Development of Innovative Surfaces by Means of Optimized Plasma Techniques and Technological Transfer to Industries”, co-funded by the Fonds National de la Recherche (FNR), development of new competences in atmospheric plasma processes. Siloxanes based and conducting polymer layers were deposited on galvanized steel for corrosion protection with a dielectric barrier discharge (DBD) reactor. Such a discharge is an innovative and versatile environmental friendly process as opposed to wet processes currently in use.
- Qualification of several components of Airbus 380 and first services for aeronautical industry
- Characterization of surface replica, DVD masterbatches, industrial non-woven polymer surface, thin copper foils surface, thin layers on steel and biological materials (microscopic shells) using topographical and nanomechanical techniques
- Kick-off of the project ICIMAT “Innovation dans la caractérisation intégrée des matériaux” aiming at innovating in the domain of sustainability analysis for materials and products and at improving the knowledge on ageing through theoretical and experimental research, combining and integrating diverse characterisation methods
- Thermal analysis on various industrial products’ materials (within the ERDF - Objective 2 project THERA “Création d’un laboratoire de caractérisation thermique et de vieillissement accéléré”)
- Accreditation of the dimensional, thermal (including characterization of climatic chambers) and electrical metrology by Office Luxembourgeois d’Acréditation et de Surveillance (OLAS) (initial audit)
- Within de framework of the European project (ERDF - Objective 2) METROLOGIE “Création d’un laboratoire national d’étalonnage accrédité”, the unit became member of EUROMET network
- Submission within the context of the FNR call of programme proposals (May 2005) of a programme proposal headlined “Recyclabilité”
- Welcome of two new post graduates

**Contact :**

David Ruch, Unit Manager, david.ruch@tudor.lu

**Staff as at the end of the year:**

94

**Key competences:**

innovation by Information and Communications Technologies (ICT) in private and public organizations as well as in the society, Business/IT alignment through enterprise and information systems modelling, foresight methodology, measurements of the impacts of ICT-based innovations, organisational and change management, ICT innovation lifecycle, ICT support to business value and organisation of knowledge, IT/trade alignment, assessment and improvement of processes, new IT governance management models, new forms of services management, operational risk management, conceptual modelling and ontologies, certification of IT products and services, quality referentials, security referentials, requirements engineering, business technology consultancy, project management, portfolio management, software procurement, mobile and distributed software architectures, software architecture and components, interoperability of information systems

**Activities:**

doctoral research, collective R&D, bilateral R&D, assessment and diagnostics, foresight and preliminary studies and pre-projects, technological and methodological assistance, innovation projects, ongoing training and expert advice, post-graduate diploma training, management of innovation platforms, professional meetings, conferences, professional and scientific publications, networking and clustering activities, working groups, spin-off projects

**Units:**Innovation platforms :

- "Quality and certification of IT services"
- "Information systems security"
- "Interoperability standards and e-business"
- "E-learning, knowledge management and networked organisations"
- "Statistical and prospective studies in the knowledge economy"

Scientific and technological units :

- "Knowledge economy and innovation management"
- "Software engineering"
- "Innovation project management"
- "Management of organisations and IT services"
- "Reference systems for modelling and certification"

The CITI supplies all the competences mobilized by the CRP Henri Tudor in the innovation platform "Information Technologies in Construction".

The CITI also participates in the shared innovation platform "Free and Open Source Software".

**Strategic partners:**

Service Central de la Statistique et des Etudes Economiques (STATEC), Commission de Surveillance du Secteur Financier (CSSF), Chambre des Métiers, Chambre de Commerce du Luxembourg, Chambre des Employés Privés (CEP-L), Association des Professionnels de la Société de l'Information (APSI), Service E-Luxembourg (SEL), Centre Informatique de l'Etat (CIE), Office Luxembourgeois d'Accréditation et de Surveillance (OLAS), Fédération des Industriels Luxembourgeois (FEDIL), University of Luxembourg, Ministry of Economy and Foreign Trade, Institut National d'Administration Publique (INAP), Club de la Sécurité des Systèmes d'Information au Luxembourg (CLUSSIL), Fonds National de la Recherche (FNR), Centre de Recherche Public Gabriel Lippmann (CRP GL), Centre de Technologie de l'Education (CTE), Luxinnovation, Commission Nationale pour la Protection des Données (CNPD), Luxembourg chapter of IT Service Management Forum (itSMF Luxembourg) (see detailed list of project partners on [www.citi.tudor.lu](http://www.citi.tudor.lu))

**Contacts:**

Pr Dr Eric Dubois, Director, [eric.dubois@tudor.lu](mailto:eric.dubois@tudor.lu)

Jean-Pol Michel, Director, [jean-pol.michel@tudor.lu](mailto:jean-pol.michel@tudor.lu)

phone: +352 42 59 91 – 333, [www.citi.tudor.lu](http://www.citi.tudor.lu)



Pr Dr Eric Dubois, Jean-Pol Michel

#### Key facts 2005 of the department

In 2005, the strategic partnership of the CITI was completely redesigned by the creation and the set-up of advisory committees “Comités d’accompagnement des plates-formes d’innovation”. The CITI 2004-2007 development plan was presented to about twenty major actors of the ICT innovation system in Luxembourg (see detailed list of strategic partners in the above section). In 2005, these actors participated in eight meetings of the advisory committee where the ICT innovation strategy for Luxembourg was evaluated and new orientations were suggested in order to launch new studies and R&D projects in 2006 and beyond.

In 2005, the CITI investigated three new sectors in order to evaluate the opportunity and the added value of new R&D investments. As a result, new projects have been initiated or will be initiated in 2006 in these three sectors: the sector of finance and related consultancy services, the sector of tourism, and the multimedia and telecom sector.

The European activities of the CITI evolved, both in a quantitative and qualitative way. Concerning FP6, Leonardo, ESA and Eureka programmes, in 2005, CITI was involved in more than twenty proposals with a good success rate, so that CITI participates in more than ten projects from these European programmes. With these European activities, CITI also helps local firms to be concretely involved in high-level European partnerships. In the context of European Structural Funds, in addition to local and interregional projects, CITI initiated a project (TINIS “Technological Innovation Network in the Field of Information Systems”) with new European entrant countries that represent a high potential for co-operation in the future.

Concerning the innovation activities, CITI strengthened its capacity to output innovative products and services. These new products and services are formally managed at the level of the innovation platforms. The CITI portfolio is made of about 25 products and services: packaged methodologies, open source software, labels and certifications associated with the topics of the innovation platforms “Quality and certification of IT services”, “Information systems security”, “Interoperability standards and e-business”, “E-learning, knowledge management and networked organisations” and “Statistical studies and prospective in the knowledge economy”.

Three examples are particularly representative for 2005. The toolset to develop electronic transactions, resulting from the FNR project EFFICIENT “E-business Framework for an Efficient Capture and Implementation of End-to-end Transactions”, has been extensively evaluated through different experimentations. In particular in the context of financial SWIFT messages and of technology transfer, actions have been initiated. As another example, set of high-level competences has been developed in project management and has been mobilized in the development of a new project management referential for public administrations. As last example is a spin-off created in 2005 to exploit the “NOEMI packaged methodology”.

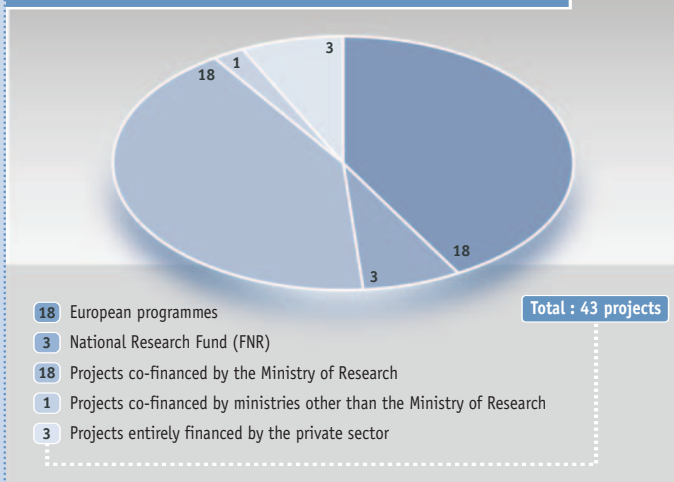
Related to this stronger orientation towards innovation products, CITI is now increasingly involved in international ISO normalisation workgroups related to Luxembourg’s potential ICT innovation niches like quality and security.

At scientific level, CITI maintained its visibility through publications in international scientific conferences and increased participation in its steering and programme committees.

Finally, reference made to transfer and dissemination activities, the 2005 results demonstrate that the CITI, through its SPIRAL network in co-operation with its associated networks CLUSSIL and ITSMF Luxembourg, has still strengthened its capacity of professional mobilisation.

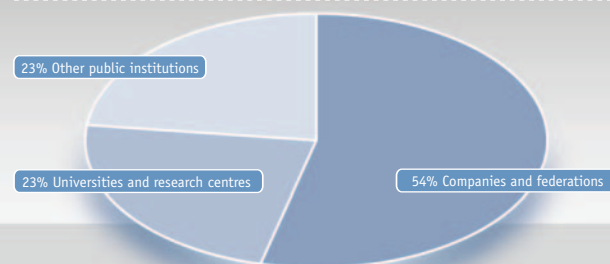
## Key figures 2005

### CITI's projects 2005 by type



### 194 project partners of the Centre for IT Innovation (CITI)

#### by type

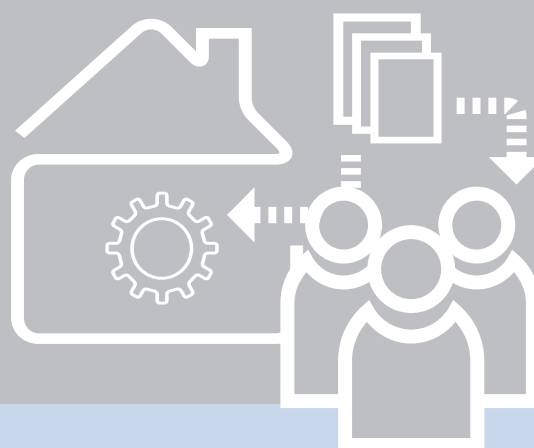


#### by origin



## Transfer and dissemination activities of CITI

|                          |  |
|--------------------------|--|
| Training                 | Qualifying training : 72 days of trainings; 540 attendees  |
|                          | Master "Informatique et Innovation" :<br>- 40 attendees to the 3 ongoing sessions; 10 graduated students this year   |
| Scientific publications  | 34 scientific publications, including 19 articles in proceedings, 2 book chapters  |
| Professional conferences | <ul style="list-style-type: none"> <li>- "Entrepreneuriat, démographie d'entreprises: facteurs de succès", 15th November 2005, organised under the patronage of the Ministry of Economy and Foreign Trade, by STATEC (Service central de la Statistique et des Etudes Economiques), Observatoire de la Compétitivité and CRP Henri Tudor</li> <li>- "SPIRAL Days 2005: the annual rendezvous of IT professionals", 7th - 8th June 2005, in co-operation with SPIRAL "Le réseau des professionnels de l'IT" and CLUSSIL (Club de la Sécurité des Systèmes d'Information Luxembourg)</li> <li>- "Logiciel et matériel, les clefs du succès informatique pour les PME", 6th October 2005, in co-operation with CASSIS (network of IT consultants), Chambre de Commerce du Luxembourg and Chambre des Métiers</li> </ul> |
| Events                   | 50 events for a total of 272 hours and 1,453 attendees, including <ul style="list-style-type: none"> <li>- "Quel référentiel de gestion de projet pour votre organisation", 28th September 2005, in collaboration with Service e-Luxembourg, PMI Project Management Institute, Quint Wellington Redwood, USIC (Unité de Stratégie Informatique de la Confédération Suisse) and SPIRAL</li> <li>- "Evaluation de la maturité des processus ITIL", 20th October 2005</li> </ul>  |





## Key facts 2005 for each unit

The CITI is organised in five scientific and technological units, with the principal task of contributing to innovation platforms. As a direct consequence of this organisation, the contributions made by scientific and technological units are documented in the descriptions of the innovation platforms. At scientific and technology unit level, only those activities which are documented are associated with their mission of guaranteeing international scientific visibility in their respective disciplines.



### **"Knowledge economy and innovation management" scientific and technological unit**

*The unit is aimed at providing the appropriate skills for innovation platforms and developing new skills in the following subjects: anticipation and measurement of the impact of ICT-based innovations, strategic control of innovation by ICT and enterprise modelling, organisational and change management, ICT support to business value and organisation of knowledge.*

#### **Key facts 2005:**

- Within the projects GEANCOTIC "Gestion anticipative des competences liées à l'innovation et aux Technologies de l'Information et de la Communication (TIC)", ABILITIC "Mise en place d'un dispositif interregional d'anticipation des competences liées à l'innovation et les TIC dans les métiers" and DOTIC "Mise en place d'une méthodologie opérationnelle de detection précoce des opportunités dans le domaine de l'innovation par les Technologies de l'Information et de la Communication (TIC)", formalisation of foresight methods applied to ICT-based skills and innovations
- Within the project e-FFICIENT "E-business Framework for an Efficient Capture and Implementation of End-to-end Transactions", formalisation of a method to represent and analyse value creation in business models. First study results based on this method were presented in international conferences
- The unit welcomed four PhD studentships on ICT appropriation and knowledge management
- Scientific validation of the unit's studies regarding ICT appropriation and knowledge management (paper for "Association Internationale de Management Stratégique")
- First experimentations of an analysis grid for assessing the performance of organisations in their IT investment policy
- Key contributions to the "E-learning, knowledge management and networked organisations" platform with a diagnostic and an evaluation model of Knowledge Management processes
- Contribution to several international workshops organised by the University of Liège, the Facultés Universitaires Notre-Dame de la Paix of Namur and the University of Nancy 2
- Completion of the first publication series on innovation networks management, best practices and tools (in press)
- Development of a method to build up a scorecard for managing changes in innovation projects
- Design of a method to facilitate organisational change and IT modernization for public administration (supported by e-learning)

#### **Contact:**

Jean-Charles Bernacconi, Unit Manager, [jean-charles.bernacconi@tudor.lu](mailto:jean-charles.bernacconi@tudor.lu)

**“Software Engineering “ scientific and technological unit**

*The unit is aimed at providing the appropriate skills for innovation platforms and developing new skills in the following subjects: interoperability of information systems, software architecture based on the assembly of components, co-operation and collaboration systems (workflow and groupware), software technologies oriented to multi-agents and mobile architectures*

**Key facts 2005:**

- Publication and presentation of an article on the topic of Efficient architecture at the 17th Conference on Advanced Information Systems Engineering (CAISE'05) (Porto, June 2005)
- Presentation of an Efficient demonstrator applied to Asia-Europe import-export B2B transactions at the final EA2 conference, Hanoi, March 2005
- Validation of the first release of the EU-South American e-business platform (developed within the project LINK ALL “Local-communities Insertion Network”) and demonstration stage to local actors, Argentina, November 2005
- First release and Sourceforge publication of the Anaxagora toolset for the “E-learning, knowledge management and networked organisations” innovation platform (April 2005)
- Participation at the definition of four Eureka/ITEA projects
- First release of the Opal tool in software procurement and organisation in March 2005 of dedicated training courses for IT professionals
- Development of activities in a new topic: “Software Development Quality”

**Contacts:**

Pierre Brimont, Joint Unit Manager, pierre.brimont@tudor.lu  
Olivier Marchand, Joint Unit Manager, olivier.marchand@tudor.lu

**“Reference systems for modelling and certification” scientific and technological unit**

*The unit is aimed at providing the appropriate skills for innovation platforms and developing new skills in the following subjects: conceptual modelling, computational knowledge, IT certification.*

**Key facts 2005:**

- Focus of the unit’s research topics on conceptual modelling in various application domains such as interactive multimedia object modelling, semantic web, collaborative learning, business modelling, knowledge modelling, and modelling standards in the construction sector
- Participation in two European FP6 consortia (PALETTE “Pedagogically Sustained Adaptive Learning Through the Exploitation of Tacit and Explicit Knowledge” and ELU “Enhanced Learning Unlimited”) and two Eureka projects (JULES VERNE “Modélisation appliquée au multimedia” and PASSEPARTOUT “Personnalisation de contenus interactifs”)
- Set-up of a strategic international partnership network on computer-based assessment including key international organisations, European research institutes and ministries, as well as world-leading industrial actors
- In connection with the Network of Excellence INTEROP, development of a research partnership on business value analysis
- Participation in University-Industry Working Groups on Computer-Assisted Business Process Design, ISO/IEC JTC1/SC7 and SC29 standardisation committee, ERCIM working groups on Semantic Web and Rapid Integration of Software Engineering techniques.
- Participation in about twenty R&D projects and in more than ten scientific publications
- ERCIM (European Research Consortium in Informatics and Mathematics) post-doctoral fellow in the area of knowledge and ontology alignment visualization

**Contact:**

Thibaud Latour, Unit Manager, thibaud.latour@tudor.lu

**“Management of organisations and IT services” scientific and technological unit**

*The unit is aimed at providing the appropriate skills for innovation platforms and developing new skills in the following subjects: “IT – Business” alignment, assessment of processes and efficiency of IT practices, new forms of IT organisation, management of services, operational risk management. quality referentials, referentials in security management, requirements engineering.*

**Key facts 2005:**

- Set-up of a Luxembourg standardization committee on Software and System Engineering (ISO sub committee 7) including the ISO/IEC 15504 standard (Process Assessment), the next standard ISO 20000 (Service Management) and a new initiative related to software life cycle profiles for Very Small Enterprises
- Development of skills in EBIOS (Expression des Besoins et Identification des Objectifs de Sécurité) method
- Participation and positioning within the EQN network consortium (European Quality Network) aiming at qualifying, certifying and disseminating job roles and process definitions related to Information Systems Quality in Europe
- High positioning and recognition at the national and international levels on the ISO/IEC 15504 standard with the organisation of the SPICE 2006 international conference in Luxembourg, the application on ITIL Service Management processes and on operational risks regarding Basel II agreements for modelling and assessment
- Increasing activities related to the ITIL best practices standard via itsSMF events and the ITIL Service Management process model, product of the R&D project AIDA “Assessment and Improvement Integrated Approach” and combining ISO/IEC 15504 structuring and ITIL process information
- Transfer to the economic actors of the competences for IT maturity assessment in SMEs (NOEMI assessment) and IT services mutualisation for SMEs (NOEMI organizational model) (NOEMI label and start-up creation)
- Positioning and competences development on identity management within the context of security policies in organizations

**Contact:**

Béatrix Barafort, Unit Manager, beatrix.barafort@tudor.lu

**“Innovation project management” scientific and technological unit**

*The unit is aimed at providing the appropriate skills for innovation platforms and developing new skills in the following subjects: management of innovation projects, expertise in business technology consultancy, risk management, assessment and improvement of processes associated with project management.*

**Key facts 2005:**

- Within the framework of CASSIS, organisation of conferences, training and coaching of consultants on a methodology of “Consultancy in Business Technology”
- Within the framework of the project GERAMO “Gestion des relations clients/fournisseurs dans les projets TIC”, validation of a methodology for COTS procurement in SMEs
- Development of competences in HERMES referential and implementation in a project management framework used by Luxembourg public administrations
- Development of skills in several project management methodologies, presented within the context of the conference “Quel referentiel de gestion de projet pour votre organisation?” which mobilised 150 professionals in project management (September 2005)
- Benchmarking using standard methodologies of the QUALINNOVE method for innovative projects (result of the project TOOLINNOVE “Systèmes et outils de gestion de projet – méthode QUALINNOVE”)
- Research and publication in portfolio management
- Active participation in the Centre’s internal project aiming at improving the Centre’s project management and targeting the certification ISO 9001:2000

**Contact:**

Norbert Vidon, Unit Manager, norbert.vidon@tudor.lu

*The innovation platform is aimed at developing the market for quality services in IT consultancy and promoting the quality of information systems of companies, in particular SMEs, and public departments.*

**Key facts 2005:**

- Set-up of the platform's advisory committee. This committee aims at suggesting new orientations to Luxembourg innovation strategy in quality and certification of IT services. The following institutions are members in this committee: ITSMF Luxembourg, Fédération des Industriels Luxembourgeois (FEDIL), Chambre des Métiers, Chambre de Commerce, SPIRAL network, CRP Gabriel Lippmann, CASSIS network, Commission de Surveillance du Secteur Financier (CSSF), Office Luxembourgeois d'Accréditation et de Surveillance (OLAS), and Service e-Luxembourg. The committee met three times in 2005.
- Launch of the CASSIS network regrouping 47 consultants, and development of an extended services offer: quick diagnostic for detecting IT opportunities in SME, IT strategy, software selection and IT maturity assessment (NOEMI project outcome). 49 consultants were trained and/or coached on these products.
- Presentation in May 2005 at a conference jointly organized by the Association des Banques et Banquiers Luxembourgeois (ABBL) and the association of risk managers, and attended by 240 people (non IT), on the outcomes of the joint R&D project CITI/CSSF on Bâle II GRIF "Gestion des risques IT dans le secteur financier – nouvelles approches méthodologiques"
- Participation in the in/outsourcing working group within a subcommittee of the CODEPLAFI (Comité pour le développement de la Place Financière)
- Within the project GERAMO "Gestion des relations clients/fournisseurs dans les projets TIC", development of a light diagnostic for detecting ICT opportunities in SMEs
- International recognition - including the ISO/IEC convener's one - of the quality and interest of the developments based on ITIL according to ISO/IEC 15504 (in the context of the project AIDA "Assessment and Improvement Integrated Approach")
- Central position within the ISO/IEC 15504 international community throughout several topics : operational risk, service management, accreditation, security, knowledge management, and project management
- Adoption (in January 2006) by the public administration of the deployment plan for the project management framework in Luxembourg public administrations. This plan is based on the project TOOLINNOVE "Systèmes et outils de gestion de projet – Méthode QUALINNOVE", a joint CITI/Service e-Luxembourg project
- Support to the set-up of the Luxembourg Chapter of the IT Service Management Forum (itSMF Luxembourg)
- Global success of the platform's events and working groups: project management (150 attendees), CMMI (52 attendees), requirement engineering working group (4 sessions)

**Contact:**

Bernard Di Renzo, Unit Manager, [bernard.direnzo@tudor.lu](mailto:bernard.direnzo@tudor.lu)

**“Information Systems Security” innovation platform**

*The innovation platform is aimed at improving the security of the information systems of companies, in particular SMEs, citizens and the public sector, and at developing the skills and the services market able to respond.*

**Key facts 2005:**

- Set-up of the platform’s advisory committee. This committee aims at suggesting new orientations to Luxembourg innovation strategy in information systems security. The following institutions are members in this committee: Fédération des Industriels Luxembourgeois, Chambre des Métiers, Chambre de Commerce, Université du Luxembourg, CRP Gabriel Lippmann, Commission de Surveillance du Secteur Financier (CSSF), Ministère de l’Economie et du Commerce extérieur, Centre Informatique de l’Etat (CIE), Commission Nationale de la Protection des Données (CNPD). This committee met three times in 2005. The advisory committee suggested new initiatives in relation with security international standardisation (ISO JTC1/SC27 Luxembourg), security certification, and survey and development of a national observatory of IT risks
- Through the project R2SIC “Research into the security of information and communication systems”, realised in partnership with the Ministry of Economy and Foreign Trade, the innovation platform provided an active participation in research topics and in security awareness and training related to the CASES (Cyberworld Awareness & Security Enhancement Structure) structure, and developed an ISMS PRM (Information Security Management System - Process Reference Model) and a specific maturity model to provide individuals concerned by security matters with tools to assess
- Kick-off of the project SIM “Secure Identity Management”, co-funded by the National Research Fund (FNR)

**Contact:**

Bernard Di Renzo, Unit Manager, [bernard.direnzo@tudor.lu](mailto:bernard.direnzo@tudor.lu)

**Results of the ACCESS-PME project**

A risk-based methodology for the design of secure IT systems

The main outcome of the project ACCESS-PME “Adoption de compétences interdisciplinaires pour le commerce électronique sécurisé des PME”, conducted within the SE-COM programme “Security and efficiency of new practices in e-commerce for all socio-economic actors” of the National Research Fund (FNR) in partnership with the University of Luxembourg and the companies Conostix and Aubay, is a risk-based methodology to design secure IT systems, starting from the business assets and goals of the IT system, and ending with a secure IT architecture fulfilling the goals and securing the business assets. The method has been adapted to the design of IT systems supporting financial services.

The proposed method can be easily tailored to the specific needs of any organisation.

- a) The starting point is the definition of all business assets concerned by the system. The business assets can be, for instance, strategic goals, information, work-processes, IT applications, or human resources. Each institution can use its method for eliciting its business assets.
- b) Goals and requirements (functional and non-functional, in particular security goals) are derived from the business assets and the strategic goals to implement and to secure. A goal-oriented analysis method is proposed in order to allow all stakeholders to understand easily the impact of the future system on their organization at the operational level.
- c) The derivation of security goals and requirements is based on a rigorous risk analysis. The risk analysis allows modeling (with diagrams) of the threats, vulnerabilities and business impacts, and a method for assessing the counter-measures allows to select the best solution and to assess the residual risk.
- d) Two extensible libraries are used to derive semi-automatically the adequate IT secured architecture. A library containing the basic security components: this library is organised by the security goals fulfilled by the components. This makes this library easily extensible. The second library contains architectural patterns and architectural guidelines that allow the composition of security components with applicative components in order to get the IT architecture. This latter library can be easily extended to specific needs.

The proposed method permits reusing knowledge of existing security standards so that one can be compliant to those standards. Moreover, custom security guidelines can also be integrated in this methodology.

The methodology can be used by service providers of SMEs, or by IT teams of international organisations for designing secured IT systems tuned to the ratio between the residual risks concerning the business assets and the costs of the security aspects of the system.

Contact: [bernard.direnzo@tudor.lu](mailto:bernard.direnzo@tudor.lu)

**“Standards of interoperability and e-business” innovation platform**

*The platform aims at deploying new models and tools beneficial to the evolution of the information systems of a company in terms of flexibility, performance and adaptation to the current and future needs of the business. The platform also has the objective of accompanying operational and technical changes associated with emergence of new services, made possible by the innovative application of ICT.*

**Key facts 2005:**

- Organisation in June 2005 of the traditional annual rendez-vous of the IT professionals “SPIRAL”. The 2005 edition, attended by forty participants, was dedicated to business/IT alignment
- Validation of the first release of the LinkAll platform and demonstration stage to local actors, (Argentina, November 2005)
- Presentation of the EFFICIENT methodology and toolset at the KCCI/ECIF conference “Blue Ocean Strategy in the Ubiquitous Age” (Seoul, December 2005)
- Presentation of the EFFICIENT methodology and toolset for the modelling and process animation of e-Government Services at the International Conference on e-Commerce (IADIS’05) (Porto, December 2005)
- Exploitation of the TED/XML technologies through the web portal [www.lifelonglearning.lu](http://www.lifelonglearning.lu)
- Launch and management of the TG5 (Task Group) "BP/IT alignment" gathering seven academic partners and the SIG (Special Interest Group) "Ontology of Interoperability" (five partners) within the context of the FP6 Network of Excellence INTEROP
- Launch of interoperability initiatives for a new sector (tourism) gathering ten local partners such as satellite operators, engineering service providers, telecommunication mobile operators and national tourism information providers. The project MobileTTE “Mobile Technology for Tourism Expansion” will be launched in 2006.
- Within the framework of the ERDF - Objective 2 project PARRAIN “Parrainage transfrontalier”, presentation of the RFID technologies at the CLUSSIF conference (Paris, September 2005)

**Contact:**

Pierre Brimont, Unit Manager, [pierre.brimont@tudor.lu](mailto:pierre.brimont@tudor.lu)

**“Statistical and prospective studies of the knowledge economy” innovation platform**

*The platform is aimed at developing a range of prospective analysis services and using them to observe, investigate and analyse the impact of technologies on innovation in Luxembourg, in order to anticipate new economic and social risks and opportunities*

**Key facts 2005:**

- Signature of a framework agreement between the Ministry of the Economy and Foreign Trade, STATEC and the CRP Henri Tudor, in order to reinforce the partnership between these three institutions in research matters. Within this framework, several research projects have been defined and launched in the fields of productivity, entrepreneurship and factors determining success in innovation
- Nomination of Serge Allegrezza, director of STATEC, as “scientific advisor” of the CRP Henri Tudor, in particular with regards to this innovation platform and to the “Knowledge economy and innovation management” scientific and technological unit
- Organisation of the first Luxembourg workshop on the topic of key success factors for entrepreneurship. The platform has been invited to present its results at the OECD (December 2005, Paris)
- New projects launched both at the national and interregional levels in the domain of foresight (applied to skills and technology oriented opportunities): GEANCOTIC “Gestion anticipative des competences liées à l’innovation et aux Technologies de l’Information et de la Communication (TIC)”, ABILITIC “Mise en place d’un dispositif interregional d’anticipation des competences liées à l’innovation et les TIC dans les métiers”, DOTIC “Mise en place d’une méthodologie opérationnelle de detection précoce des opportunités dans le domaine de l’innovation par les Technologies de l’Information et de la Communication (TIC)”

- Experimentation of a foresight method focused on key skills and key innovations for the topics of the following platforms: IT quality, IT security, e-learning and knowledge management
- New multimedia technologies and their usage have been identified in 2005 as a major foresight topic of the platform. Several related actions contribute to push these technologies in the industrial R&D agenda of local firms in relation with international key actors
- Realisation of a study on the opportunities with regards to the use of IDTV (Interactive Digital Television) and related fields in Luxembourg
- Successful presentation of an implementation of a new concept of interactivity based on MHP and MPEG-4 (handling of reactivity mechanisms and adaptive features) for multimedia objects to the EUREKA - ITEA authorities; this opened the door for new Eureka partnership activities
- Animation of high profile research partnerships with more than 17 major European actors in the multimedia projects framework.

**Contact:**

Jean-Charles Bernacconi, Unit Manager, jean-charles.bernacconi@tudor.lu



**Results of the project Jules Verne**  
Interactive Digital Television

The project Jules Verne "Modélisation appliquée au multimedia interactif" is a European project conducted within the EUREKA programme (ITEA cluster) in partnership with Philips Digital System Labs (NL), Philips Semiconductors (NL), Thomson Multimedia (F), Telvent (E), Cardinal (FIN), Institut National de Recherche en Informatique et en Automatique (INRIA) / Laboratoire lorrain de Recherche en Informatique et ses Applications (LORIA) (F), ARTEMIS / INT (F). The Jules Verne project aimed at addressing the issues of matching the capabilities of the interactive digital broadcast industry for content creation to the capabilities of future home terminals and networks. The specific contribution of the CRP Henri Tudor within this global Jules Verne project consisted in defining and demonstrating a methodology together with an object oriented technology for interactive contents creation purpose.

In collaboration with Cybercultus (a start-up of the Technoport), a conceptual model, named RAMO (Reactive and Adaptive Multimedia Objects) allowing interactive (reactive and adaptive) objects handling in multimedia scenes rendering has been formalized, modeled, developed and finally implemented in two different broadcasting standards: MPEG-4 and MHP.

The presentation of the Centre Henri Tudor achievements within the Jules Verne project during the final review of the project, issued in good remarks from the reviewers, qualifying the Centre's contribution as one of the major advancements of the Jules Verne project.

Several others activities have been achieved, in the context of Jules Verne project:

- A research activity oriented towards the exploration of the MAS – Multi Agent Systems technology, which technology implementation has been initiated in the Jules Verne project, has been investigated in the framework a PhD thesis results validation performed in collaboration with the LIASIT.
- A Web site, dedicated to the publishing of the results coming from the Jules Verne project and forthcoming multimedia oriented projects has been developed.
- A study aiming at identifying the opportunities and regional potentials for innovation and cooperation possibilities in term of interactive services has been conducted.

In the results list of the Jules Verne project, can also to be mentioned several publications.

Contact: patrick.blandin@tudor.lu

*The platform aims at increasing the take up of to the practices of e-learning, knowledge management (KM) and cooperation in companies, the public sector and networks.*

**Key facts 2005:**

- Set-up of the platform's advisory committee. This committee aims at evaluating Luxembourg innovation strategy in e-learning, knowledge management and networked organisations and at suggesting new orientations integrated in the Centre's strategic plan (Fourth Development Plan 2004-2007 – QPD). The following institutions are represented in this committee: University of Luxembourg, University of Liège, Association des Professionnels des Systèmes d'Information (APSI), Fédération des Industriels Luxembourgeois (FEDIL), Chambre de Commerce du Luxembourg, Chambre des Métiers, Chambres des Employés Privés (CEP-L), Service e-Luxembourg (SEL), Institut National de l'Administration Publique (INAP), Centre de Technologie de l'Education (CTE), Fortis, Ernst&Young, Paul Wurth, Arcelor. In 2005, this committee met twice.
- The platform has taken part in two new FP6 projects in knowledge management and e-learning: PALETTE “Pedagogically Sustained Adaptive Learning Through the Exploitation of Tacit and Explicit Knowledge” and ELU “Enhanced Learning Unlimited”
- The open-source "Computer-Based Assessment" TAO platform has been transferred to the University of Luxembourg. TAO is used as a support tool by the “Educational Measurement and Applied cognitive Science” research group. TAO was also successfully tested by the Centre de Langues. It was presented to various international institutions in order to be integrated into international calls for tender (i.e. school monitoring programmes)
- Release and demonstration of the e-learning open-source platform AnaxagoraV2.0.
- Experimentation and packaging of methodologies in change management and networking collaboration

**Contact:**

Luc Vandabeele, Unit Manager, [luc.vandabeele@tudor.lu](mailto:luc.vandabeele@tudor.lu)



### Results of the TAO project

An Open Source tool to create, manage and analyse your competences tests

The project TAO "Testing Assisté par Ordinateur" is the technical part of the project "Développement d'outils d'évaluation délivrés par Internet" of the University of Luxembourg (Faculty of Language and Literature, Humanities, Arts and Education). The aim of this project was to design a software tool allowing teachers to assess the scholar competences of the different teaching subjects of primary school. The project is set up by other more psycho-pedagogical work packages in which the Centre did not intervene.

The project team has done a survey of all existing tools before orientating itself towards the development of an open source software application using the technologies of the semantic web and an distributed architecture. On the basis of a detailed cahier des charges, a prototype has been developed. Headlined "TAO", the tool enables the creation, management, delivery and analysis of multimedia competences tests delivered via Internet and managed in a distributed way. The tool is structured in six independent modules: 1. evaluated persons; 2: groups of evaluated persons: classes, scholarship level, etc.; 3. multimedia questions composing the tests; 4: tests regrouping the different questions in a predefined way; 5. test delivery interface (developed within the framework of the project TAO2); 6. test analysis and results. The different parameters can be defined by the user himself and the setting-up of new evaluation tests does not need any IT development.

The success of the TAO prototype, unique advanced tool available in open source, has convinced the partners of the project to continue their collaboration in a second project TAO2 and several Luxembourg, French and German institutions already use the tool or intend to use it.

Contact: [thibaut.latour@tudor.lu](mailto:thibaut.latour@tudor.lu)



### Results of the RESINA project

How to maximise the benefits of innovation networks?

The project RESINA "Aide à la conception et à l'exploitation de réseaux d'innovation et d'apprentissage", conducted in partnership with AGORIA and SES, aimed at studying management practices of innovation networks. Today an increasing number of organisations and companies choose to gather in order to increase their potential of generating innovation for themselves. However, if by nature a network offers a high level of flexibility, reactivity and positive competitiveness, to maximise the chances for such a network to reach its goals, electronic and methodological tools have to support it from birth to maturity.

The project RESINA has formalized best practices of innovation networks in terms of strategy, knowledge management, collaboration work and motivation, and elaborated an interactive guide addressed to the co-ordinators of innovation networks and proposing a complete set of good practices, tools, checklists and methods supporting all the life cycle phases of an innovation network. It also contains a guideline to assist co-ordinators of innovation networks in the setting-up of a requirement book focusing on groupware's functionalities and their appropriateness to the needs of innovation networks. The guide can be consulted on [www.citi.tudor.lu/resina](http://www.citi.tudor.lu/resina).

Contact: [olivier.piro@tudor.lu](mailto:olivier.piro@tudor.lu)

A joint structure of the Ministry of Environment and of the CRP Henri Tudor

|   |   |
|---|---|
| <b>Staff as at the end of the year:</b> | 19  |
| <b>Key competences:</b>                 | environmental science and technologies, best available techniques, process engineering, environmental process modelling, sustainable management of material flows, environmental risk assessment, energy technologies   |
| <b>Activities:</b>                      | R&D, state of the art reports, advice on environmental strategy, support, training and advice in the field of environmental technologies, animation of environmental networks, life cycle assessment, chemical risk assessment, doctoral research   |
| <b>Units:</b>                           | <ul style="list-style-type: none"> <li>- "Cleaner production" innovation platform</li> <li>- "Sustainable construction" innovation platform</li> <li>- "Water" scientific and technological unit</li> </ul> <p>The CRTE also participates with the Laboratoire de Technologies Industrielles in the "Renewable energies" innovation platform.</p>   |
| <b>Strategic partners:</b>              | Ministère de l'Environnement, Ministère de l'Intérieur et de l'Aménagement du Territoire, Ministère de l'Economie et du Commerce extérieur, Administration de l'Environnement, Administration de la Gestion de l'Eau, Chambre des Métiers, Chambre de Commerce du Luxembourg, Fédération des Industriels Luxembourgeois (FEDIL), Fonds National de la Recherche (FNR), Ordre des Architectes et des Ingénieurs-conseils (OAI) |
| <b>Contacts:</b>                        | <p>Joëlle Welfring, Manager, <a href="mailto:joelle.welfring@tudor.lu">joelle.welfring@tudor.lu</a></p> <p>Dr Paul Schosseler, Manager, <a href="mailto:paul.schosseler@tudor.lu">paul.schosseler@tudor.lu</a></p> <p>phone: +352 54 55 80 – 600, <a href="http://www.crte.lu">www.crte.lu</a></p>  |

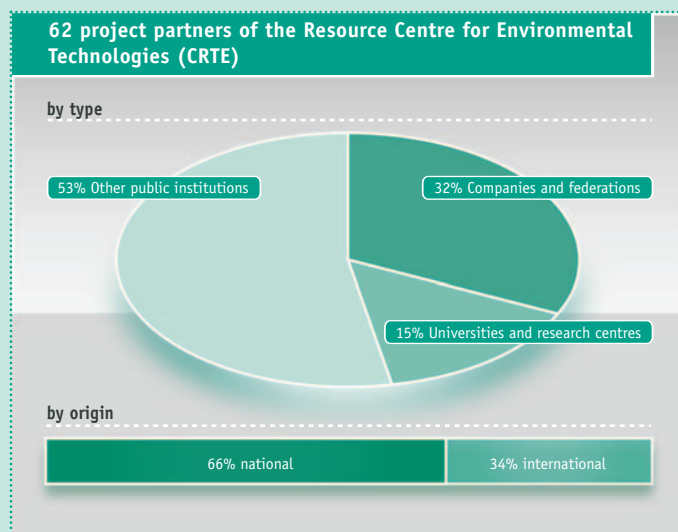
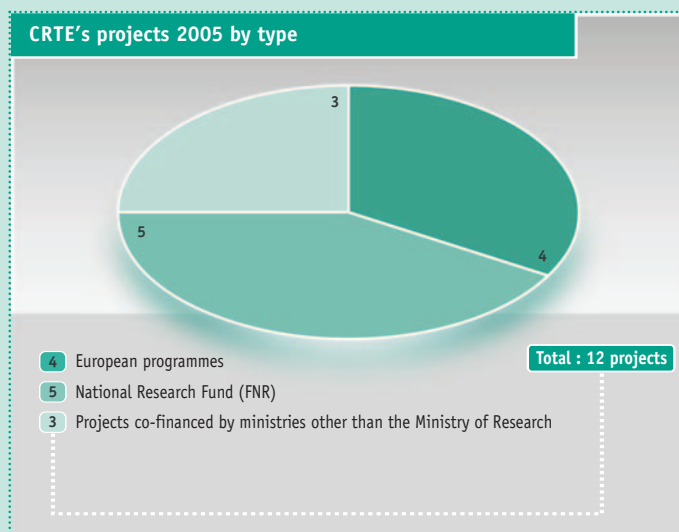


*Joëlle Welfring, Dr Paul Schosseler*

### Key facts 2005 of the department:

- Chairing of the Ad Hoc Working Group of the European Council on the regulation of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemical Substances (REACH) during the Luxembourg Presidency of the European Council (January – June 2005)
- Management of CRTE taken over by Joëlle Welfring and Paul Schosseler after the nomination of André Weidenhaupt as director of the Administration de la Gestion de l'Eau
- Organisation of the international conference "The Future of Residual Waste Management in Europe – Future Challenges Regarding Climate Change and Sustainable Material Flow Management" in November 2005, in collaboration with Orbit Association (D)
- Participation in the Oekofoire 2005 (September 2005) with a focus on water, cleaner production and renewable energies as main topics
- Organisation of awareness-raising activities during the Science Festival 2005 (October 2005) and the initiative "Firwat net Fuerscher?" (November 2005), both organised by the Musée National d'Histoire Naturelle (MNHN)
- Signature of a collaboration agreement with the Ordre des Architectes et des Ingénieurs-conseils (OAI), aiming the consolidation of the training offer in environmental technologies and addressing architects and engineers

### Key figures 2005



### Transfer and dissemination activities of CRTE

|                          |   |
|--------------------------|---|
| Training                 | Qualifying training : 10.5 days of trainings; 649 attendees   |
| Scientific publications  | 7 scientific publications, including 4 articles in proceedings, 2 articles in journals  |
| Professional conferences | <ul style="list-style-type: none"> <li>- "Dezentrale Abwasserreinigung und Regenwasserbewirtschaftung", 5th July 2005, in co-operation with Umweltberodung Lëtzebuerg Asbl (EBL), Mall Umweltsysteme, the City of Esch-sur-Alzette and with the financial support of the Fonds National de la Recherche (FNR)</li> <li>- "Audit énergétique et Bilan Carbone - Présentation d'outils d'évaluation", 13th October 2005, organised within the framework of RIFE (Réseau transfrontalier d'Information et de Formation à la gestion de l'Environnement, regrouping partners of Luxembourg, Lorraine and Wallonia, and co-financed by the European Union)</li> <li>- "Efficacité énergétique des installations frigorifiques en entreprise", 8th November 2005, organised within the framework of RIFE</li> <li>- "The future of residual waste management in Europe", 17th – 18th November 2005, in co-operation with the Association for Organic Recovery and Biological Treatment ORBIT</li> </ul> |
| Events                   | 9 events for a total of 56 hours and 330 attendees  |



## Key facts 2005 for each unit:



### "Cleaner production" innovation platform

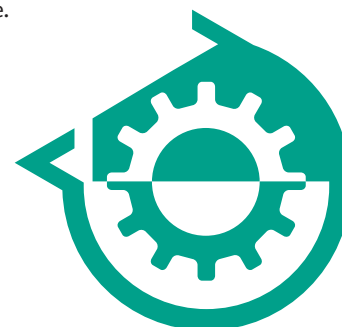
*The platform aims at reducing the environmental impacts of industrial, craft or local authority activities through a proactive and integrated approach for a sustainable management of material flows (renewable and non-renewable natural resources, raw materials, emissions into the air, water and soil, ancillary products and waste) and energies (electricity, heat, cold, renewable, alternative and non-renewable energies).*

#### Key facts 2005:

- Kick-off of the project ValorBoues "Quelles solutions au devenir des boues d'épuration dans la zone transfrontalière", co-financed by the Interreg III-A WLL (Wallonie, Lorraine, Luxembourg) programme of the European Commission
- Organisation of a vast programme of training and information sessions within the framework of the project RIFE "Réseau transfrontalier d'information et de formation à la gestion de l'environnement", also co-financed by the Interreg III-A WLL programme of the European Commission, on the following topics: environmental communication and crises management, environmental design, rational use of energy, REACH
- Realisation of two material flow analyses, through measurement campaigns, field tests and models, in collaboration with the Centre Hospitalier Emile Mayrisch (CHEM) and Ceratizit SA, leading to the proposals for improved waste and wastewater management. These activities were implemented within the project AGID "Analyse et gestion intégrées et durables des flux de matières et d'énergie en entreprise", co-financed by the European Fund for Regional Development (EFRD), Objective 2 programme.

#### Contact:

Joëlle Welfring, Manager of CRTE, joelle.welfring@tudor.lu



### "Sustainable construction" innovation platform

*The platform aims at contributing through its skills and expertise to the development in Luxembourg of sustainable construction, integrating the protection of the environment, spatial and urban planning the production and the utilisation of construction materials guaranteeing good environmental quality as well as the rational use of energy and water.*

#### Key facts 2005:

- Finalisation of the project LEITFADEN "Leitfaden für nachhaltiges Bauen und Renovieren von Gebäuden", realised in collaboration with the following partners : Administration de l'Environnement, Administration des Bâtiments Publics, Administration des Ponts et Chaussées, Chambre des Métiers, Fédération des Artisans, Groupement des Fabricants de Matériaux de Construction, Fédération des Industriels Luxembourgeois (FEDIL), Fondation Oeko-Fonds, Ordre des Architectes et des Ingénieurs-conseils (OAI), Ville de Luxembourg, Ministère du Logement
- Organisation, in collaboration with the OAI, of the third edition of the professional training courses for architects and engineers "Construction et Energie"

#### Contacts:

Joëlle Welfring, Manager of CRTE, joelle.welfring@tudor.lu

Bianca Schmitt, Project Manager, bianca.schmitt@tudor.lu

**“Water” scientific and technological unit**

*The scientific and technological unit aims a better management and understanding of water treatment processes and concepts, as well as the knowledge and management of pollutant flows and the risks related to chemical substances in the water cycle.*

**Key facts 2005:**

- Conference “Decentralized wastewater treatment and rainwater management – State of the art and outlook”, organised in collaboration with Umweltberodung Lëtzebuerg (EBL) and the City of Esch-sur-Alzette in July 2005 with 80 participants and co-financed by the Fonds National de la Recherche (FNR)
- Professional training over three days on modelling of wastewater treatment processes, organised in collaboration with the Association du Personnel des Stations d’Épuration Luxembourgeoises (APSEL) in November - December 2005
- Kick-off of the project CHEMRISK “The Development of a Drinking Water Contamination Risk Assessment and Management Strategy in Luxembourg – An Interdisciplinary Approach”, financed by the FNR within the Sécurité Alimentaire (SECAL) programme and realised in collaboration with the Administration de la Gestion de l’Eau, the University of Luxembourg and the Laboratoire National de Santé
- Co-chairing of the Member States Mirror Group (MSMG) of the European Water Supply and Sanitation Technology Platform (WSSTP) and set-up of a working group on water research in collaboration with the Public Research Centre Gabriel Lippmann and the Association Luxembourgeoise des Services d’Eau (ALUSEAU)
- Realisation of the experimental installation “Wasserwerkstatt” in collaboration with the Service National de la Jeunesse (SNJ, Centre Hollenfels) and financed by the FNR. The installation was exhibited at the Oekofoire (September 2005), the Science Festival (October 2005) and finally integrated into the environmental education courses at Hollenfels.

**Contact:**

Dr Paul Schosseler, Manager of CRTE, paul.schosseler@tudor.lu



Educational workshops organised during the Science Festival 2005



Experimental installation “Wasserwerkstatt” realised in collaboration with the Service National de la Jeunesse (SNJ, Centre Hollenfels) and financed by the FNR

|   |  |
|---|--|
| <b>Staff as at the end of the year:</b> | 21   |
| <b>Key competences:</b>                 | <ul style="list-style-type: none"> <li>- Advanced IT for health care (hospital and medical systems, departmental applications, electronic health care record (administrative, medical and care sections), clinical expert and decision-support systems, security of systems and of data, medical databases)</li> <li>- Communication (networks, Intranet, Extranet, telemedicine and home care, mobile and wireless computing, interfacing and communication between applications)</li> <li>- Clinical engineering (medical equipment, logistics and organisation, quality assurance, coding systems, clinical pathways)</li> <li>- Public health (market studies, requirements studies, cost-benefit analyses, analyses of the advantages and disadvantages for society as well as analyses of the utility and efficiency of new systems and/or new methods)</li> <li>- Medical and bio-medical image processing</li> </ul> |
| <b>Activities:</b>                      | R&D, doctoral research, technological assistance and consulting, university and ongoing post-graduate training, awareness and dissemination, incubation of RDI activities, documentation and information centre, technological, scientific and regulatory watch  |
| <b>Unit:</b>                            | <p>The CR SANTEC is the “Health Care Technology” innovation platform.</p> <p>The CR SANTEC also participates with the CITI in the “Free and Open Source Software” innovation platform.</p>   |
| <b>Strategic partners:</b>              | Luxembourg hospitals and doctors, Ministère de la Santé, Ministère de la Sécurité Sociale, Direction de la Santé, sickness funds ( <i>see detailed list of partners on <a href="http://www.santec.tudor.lu">www.santec.tudor.lu</a></i> )  |
| <b>Contact :</b>                        | <p>Pierre Plumer, Director, <a href="mailto:pierre.plumer@tudor.lu">pierre.plumer@tudor.lu</a>,</p> <p>phone: +352 42 59 91 – 250, <a href="http://www.santec.tudor.lu">www.santec.tudor.lu</a></p>  |



Pierre Plumer

## Key facts 2005

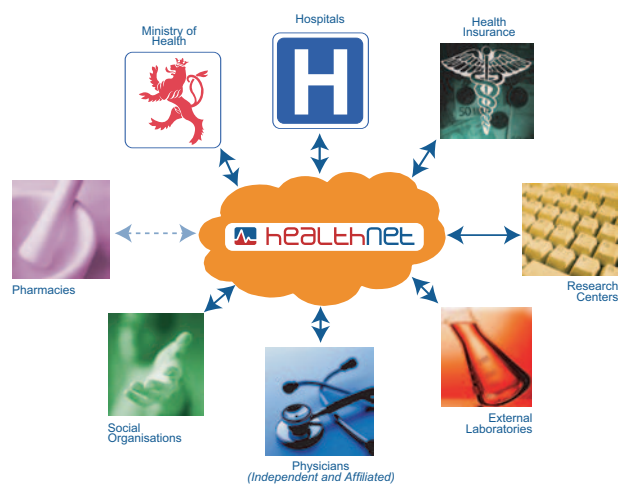
After ten years of research and development, the HealthNet project has finally gotten a legal basis for its exploitation. A “Groupement d’Intérêt Économique – GIE”, consisting of four members (Ministère de la Santé, Union des Caisses de Maladie, Entente des Hôpitaux Luxembourgeois and Association des Médecins et Médecins-Dentistes) was created on August 19th and a European call for offering was launched on December 23rd.

In 2005, the CR SANTEC has been accepted as an official collaborating centre within the European Network of Excellence (NoE) GA<sup>2</sup>LEN “Global Allergy & Asthma European Network” for the development of an electronic allergy patient record in the frame of the project MensSana “Mobile Expert and Networking System for Systematical Analysis of Nutrition-based Allergies”. A first session of the steering committee, including attendees from GA<sup>2</sup>LEN, took place on the 1st of June in Luxembourg.

2005 was also marked by CR SANTEC’s first active participation at MEDICA, the world’s largest medical and biomedical fair. CR SANTEC’s application to present two major FNR projects, MensSana and LuHF “Luxembourg Heart Failure” at the scientific part of the fair, was evaluated positively and accepted.

The project OPTIMAGE “Quality Control for Optimal Medical Images” produced the 1st prototype of a software system to assess and control the image quality of radiological modalities as easily and as quickly as possible (constancy tests). The prototype currently includes modules for the quality control of Xray and Computer Tomography (CT) Level A and B. It was tested at major Luxembourg hospitals and at the Brüderkrankenhaus Trier. Modules for MRI (Magnet Resonance Imaging) and Digital Mammography are in planning.

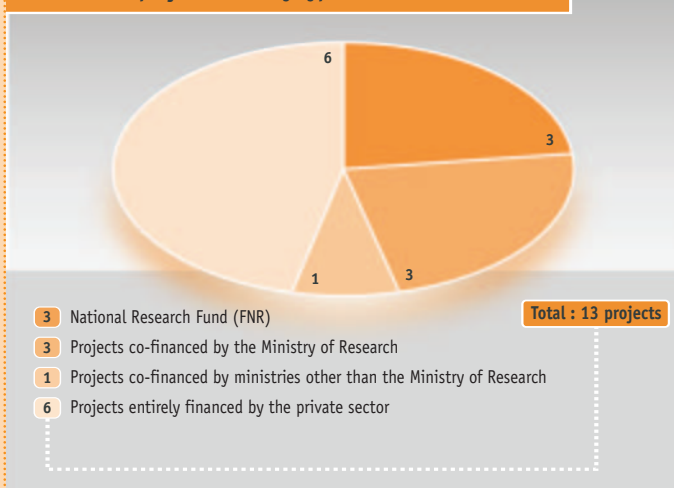
Finally, two major projects were launched in 2005, namely CARA “Carnet Radiologique électronique”, jointly with the Ministère de la Santé, and GECAMed “Gestion de Cabinets Médicaux”, jointly with the Association des Médecins et Médecins Dentistes (AMMD) and a group of general practitioners. CARA intends to analyse the possibilities and workflows of an automatic index containing all relevant patient-related radiological examinations. GECAMed aims at developing an open-source software for the complete management of doctor’s practices, based on innovative approaches and workflows.



HealthNet, the communication platform for health care professionals, got in 2005 a legal basis for its exploitation

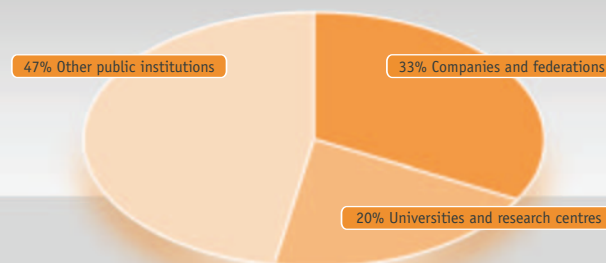
## Key figures 2005

### CR SANTEC’s projects 2005 by type

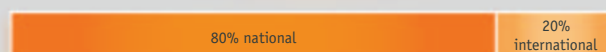


### 15 project partners of the Resource Centre for Health Care Technologies (CR SANTEC)

#### by type



#### by origin



**Staff as at the end of the year:**

The CRTI-B employs no specific staff. The secretary is taken in charge by the Chambre des Métiers. Normalisation work is done by panels of professionals and projects are carried out by partners including the departments of the CRP Henri Tudor

**Key competences:**

- Strategic direction of innovation by Information and Communication Technologies (ICT) in the construction sector
- Anticipation of the impact of ICT on the construction trades
- New modes of coordination and collaboration in the construction sector
- Standards of electronic exchanges in the construction sector
- Interoperability of information systems
- Assistance in the implementation and management of the innovation project in the construction sector
- Standardisation of contractual and technical clauses

**Unit:**

The CRTI-B is the "Information Technologies for Construction" innovation platform

**Strategic partners:**

Ministère des Travaux Publics (MTP), Administration des Bâtiments Publics (ABP), Administration des Ponts et Chaussées, Ordre des Architectes et Ingénieurs-conseils (OAI), Chambre des Métiers, Fédération des Industriels Luxembourgeois (FEDIL), Fédération des Artisans (detailed list of all partners at [www.crtib.lu](http://www.crtib.lu))

**Number of RDI projects:**

1 (project co-financed by the Ministry of Culture, Higher Education and Research)

**Contacts:**

Michel Brachmond, Deputy Director of the Chambre des Métiers,  
Secretary General of the CRTI-B, [michel.brachmond@cdm.lu](mailto:michel.brachmond@cdm.lu)

Laurent Grein, Vice-Chairman of the CRTI-B, [laurent.grein@tudor.lu](mailto:laurent.grein@tudor.lu)  
phone: +352 42 59 91 – 333, [www.crtib.lu](http://www.crtib.lu)



*Michel Brachmond*



*Laurent Grein*



**Staff as at the end of the year:**

8,5

**Activities:**

- Post-graduate continuous vocational training:
  - at academic level, in-class and/or distant learning, in co-operation with the University of Luxembourg and/or other European and American universities
  - at qualifying level, in-class and/or distant learning (inter-company courses, specializing cycles, custom tailored training courses)
  - specific skilling programmes for the unemployed
- Dissemination activities (conferences, workshops, workgroups)

**Strategic partners:**

University of Luxembourg, Embry-Riddle Aeronautical University (ERAU), Ordre des Architectes et des Ingénieurs-conseils (OAI), Institut National d'Administration Publique (INAP), different professional chambers, Association Luxembourgeoise des Ingénieurs Industriels (ALII)

**Contact:**

Bernard Lambeaux, Manager, [bernard.lambeaux@tudor.lu](mailto:bernard.lambeaux@tudor.lu),  
phone: +352 42 59 91 - 300, [www.sitec.lu](http://www.sitec.lu)



*Bernard Lambeaux*

**Key facts 2005**

2005 was marked by a complete re-organisation of the piloting and diffusion of the Centre's training activities thus strengthening SITec® department's premium mission to serve as sole corporate channel of the development and marketing of training activities.

Overall boost of training activities

- increase of 19% of the hourly volume of the Centre's inter-company qualifying training activities
- marked increase of 57% of the number of attendees at the Centre's qualifying training activities
- increase of 25% of tailor-made courses

Development of the training offer in environmental technologies

In addition to the two international conferences headlined: “The future of residual waste management in Europe” and “Dezentrale Abwasserreinigung und Regenwasserbewirtschaftung”, SITec® has organized in co-operation with the Resource Centre for Environmental Technologies (CRTE) two new training cycles:

- the cycle “Construction and Energy” built on twelve modules and conceived in co-operation with the Ordre des Architectes et des Ingénieurs-conseils (OAI)
- the cycle “Modélisation von Kläranlagen” (modelling of purification plants), in partnership with the Laboratory for Industrial Technologies (LTI) and the Association du Personnel des Stations d'Épuration Luxembourgeoises (APSEL).

More than one thousand professionals attended these conferences and cycles.

Strengthening of the co-operation efforts in lifelong learning between the Ordre des Architectes et des Ingénieurs-conseils (OAI) and CRP Henri Tudor

Both partners decided to join their efforts in the field of training offer for architects and consulting engineers. This co-operation was started two years ago throughout the common organisation of a training cycle “Bauen und Energie”.

During the next few years the scope of those training courses will be widened to a series of topics on sustainable construction.

New domain : Training programme in aerospace technologies

In 2005, CRP Henri Tudor and Embry-Riddle Aeronautical University (ERAU) initiated preparations to deliver a comprehensive professional training programme (consisting of 23 modules) to assist Luxembourg and European Aerospace companies in maintaining and advancing the experience and qualifications of the aerospace workforce within the EU.

The academic training activities of the ERAU at the Technoport Schlassgoart in Esch-sur-Alzette started in January 2005 with the first session of the “Master of Science in Technical Management”.

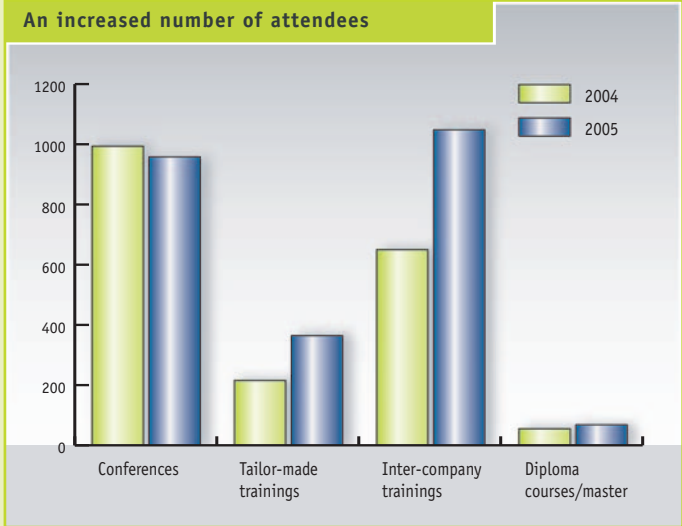
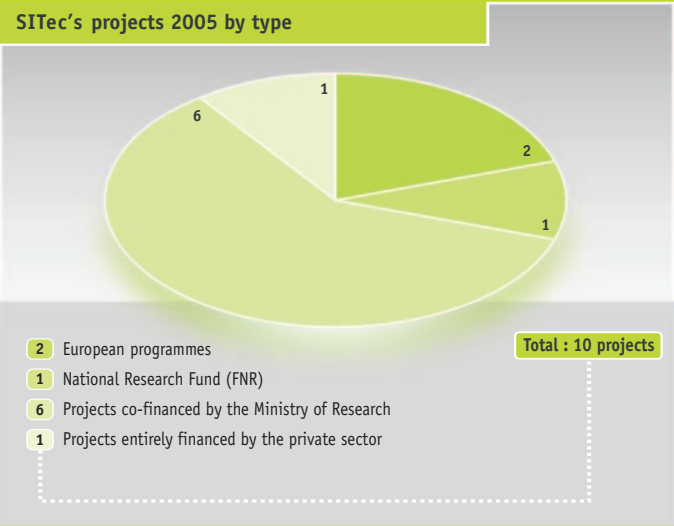
Development of academic lifelong learning products

- Launch in January 2005 of the second promotion of the Master in “Management and quality of companies and services”, a co-operation between the Ecole Supérieure de Management of Metz (ESM), the Ecole Nationale d’Ingénieurs of Metz (ENIM), the Facultés Universitaires Catholiques of Mons (FUCaM), the University of Quebec at Trois-Rivières (UQTR) and the CRP Public Henri Tudor
- Start of the seventh promotion of the Master “IT and Innovation” co-organised since 1999 by the Facultés Notre-Dame de la Paix of Namur, the University of Nancy 2, the University of Luxembourg and the CRP Henri Tudor
- Design of a Master’s degree in “Management of Information Systems Security” in partnership with the University of Luxembourg

Organisation of six national and international conferences

- “Entrepreneuriat, démographie d’entreprises: facteurs de succès”, 15th November 2005, organised under the patronage of the Ministry of the Economy and Foreign Trade, by STATEC (Service central de la Statistique et des Etudes Economiques), Observatoire de la Compétitivité and CRP Henri Tudor
- “SPIRAL Days 2005: the annual rendez-vous of IT professionals”, 7th - 8th June 2005, in co-operation with SPIRAL “Le réseau des professionnels de l’IT” and CLUSSIL (Club de la Sécurité des Systèmes d’Information Luxembourg)
- “The future of residual waste management in Europe”, 17th – 18th November 2005, in co-operation with the Association for Organic Recovery and Biological Treatment ORBIT
- “Dezentrale Abwasserreinigung und Regenwasserbewirtschaftung”, 5th July 2005, in co-operation with Umweltberodung Lëtzebuerg Asbl (EBL), Mall Umweltsysteme, the City of Esch-sur-Alzette and with the financial support of the Fonds National de la Recherche (FNR)
- “Six Sigma Day III”, 28th June 2005, in collaboration with the Mouvement Luxembourgeois pour la Qualité (MLQ)
- “Linuxdays 2005”, 25th – 26th January 2005, in co-operation with the University of Luxembourg and Linux User Group Luxembourg (LILUX)

**Key figures 2005**



**Trainings and events organised by CRP Henri Tudor in 2005**

| Activity                                 | Number of organised activities | Cumulated hourly volume | Cumulated number of participants |
|--|--------------------------------|-------------------------|----------------------------------|
| Conferences                              | 10                             | 101 hours               | 915                              |
| Professional meetings and working groups | 80                             | 426 hours               | 2,533                            |
| Inter-company trainings                  | 44                             | 555 hours               | 1,050                            |
| Tailor-made trainings                    | 30                             | 234 hours               | 368                              |
| Diploma courses/Masters                  | 2                              | 563 hours               | 73                               |

A joint structure of the Ministry of Economy and Foreign Trade and the CRP Henri Tudor

**Staff as at the end of the year:**

7

**Key competences:**

scientific and technology watch, competitive intelligence, scientific and technical documentation, information research, information analysis (bibliometry, text-mining), dissemination of information, standardisation, standard and regulation watch, intellectual property

**Activities:**

specialised services (scientific and technology watch services, competitive intelligence services, standard and regulation watch services), organisational assistance (implementation of a competitive intelligence or technology watch organisation), doctoral research, joint R&D, consulting, continuous post-graduate training

**Strategic partners:**

Ministry of Economy and Foreign Trade – Intellectual Property Department, Office Luxembourgeois d'Accréditation et de Surveillance (OLAS), European Patent Office (EPO), World Intellectual Property Organisation (WIPO) (*see detailed list of project partners on [www.veille.lu](http://www.veille.lu)*).

**Contact:**

Dr Serge Quazzotti, Manager, [serge.quazzotti@tudor.lu](mailto:serge.quazzotti@tudor.lu),

phone: +352 54 55 80 – 600, [www.veille.lu](http://www.veille.lu)



*Dr Serge Quazzotti*

**Key facts 2005**

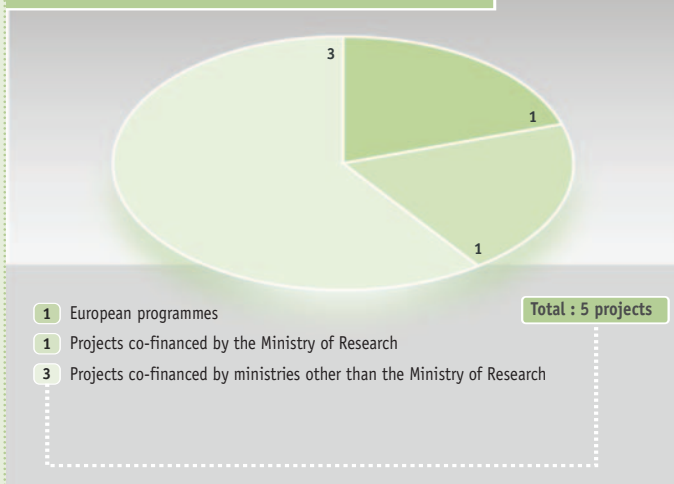
- Launch of a e-learning platform on Intellectual Property. This e-learning platform is the result of the Leonardo project DIPS “Distance learning Approach Applied to Enhance Introduction of Intellectual Property Rights in Management Strategies of Enterprises” which mobilized, under the coordination of the CVT, partners of Luxembourg, Spain, France, United Kingdom and Portugal. The platform is available in French, English and Spanish on [www.dips-project.org](http://www.dips-project.org)
- Organisation of different awareness activities in the field of intellectual property during the Science Festival 2005 (October 2005) and within the framework of the initiative “Firwaat nèt Fuerscher?” (November 2005).
- Overall increase of the demand for watch services. In 2005, 180 reports have been delivered against 145 in 2004. The increase was remarkably high for services in standard and regulation watch (increase of income of 53%).

**CVT's service activities in 2005**

| Watch services offered by CVT             | Number of requests satisfied |
|---|------------------------------|
| Technology and competitive watch services | 52                           |
| Standards and regulations watch services  | 74                           |
| Other services                            | 54                           |
| <b>Total</b>                              | <b>180</b>                   |

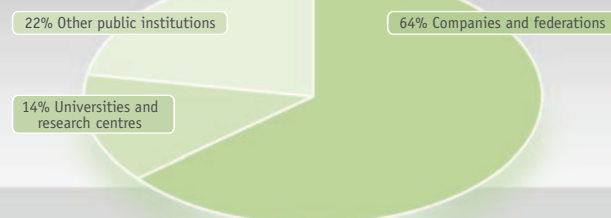
## Key figures 2005

### CVT's projects 2005 by type

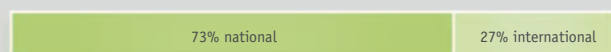


### 37 project partners of the Technology Watch Centre (CVT)

#### by type



#### by origin



### Results of the DIPS project

A e-learning training in intellectual property for enterprises

The project DIPS "Distance learning approach applied to enhance introduction of intellectual property rights in management strategies of enterprises" is a project financed within the framework of the European programme Leonardo Da Vinci and regrouping, under the co-ordination of the Technology Watch Centre (CVT), a joint structure of the Ministry of the Economy and Foreign Trade and CRP Henri Tudor, a vast range of partners of Luxembourg, Spain, France, United Kingdom and Portugal.

The project is based on the observation that most existing training programmes on intellectual property rights are targeted at lawyers and cover essentially the legal aspects, so that mostly SME's staff doesn't feel concerned. The project DIPS aimed thus at designing a e-learning training allowing people with different professional backgrounds to familiarise with the basics of intellectual property rights in order to benefit from this training.

The e-learning course is currently available in three languages (English, French, Spanish). It is structured in three distinct parts of a total of 60 hours of training: intellectual property rights, intellectual property as a source of information, evaluation and exploitation.

More information on [www.dips-project.org](http://www.dips-project.org) or contact [cyrille.dubois@tudor.lu](mailto:cyrille.dubois@tudor.lu)

Learning Management System: Welcome

Université du Luxembourg

Navigation menu:

- DIPS
- Courses
- Activities
- Tools, Tools
- Home

New decision

| Mon | Tue | Wed | Thu | Fri | Sat | Sun |
|-----|-----|-----|-----|-----|-----|-----|
| 01  | 02  | 03  | 04  | 05  | 06  | 07  |
| 08  | 09  | 10  | 11  | 12  | 13  | 14  |
| 15  | 16  | 17  | 18  | 19  | 20  | 21  |
| 22  | 23  | 24  | 25  | 26  | 27  | 28  |
| 29  | 30  | 31  |     |     |     |     |

e-learning platform DIPS

**Staff as at the end of the year:**

3,25

**Activities:**

- Management and development of an incubator for innovative technology-based companies
- Awareness, coaching and training for the creation of innovative technology-based companies (idea development and business plan)
- Assistance, coaching and training in business development strategy for innovative companies (business development plan, marketing communication and sales strategy, branding)
- Recommendations to promote and foster innovative technology-based entrepreneurship in Luxembourg

**Strategic partners:**

Senior Partners of the Technoport: City of Esch-sur-Alzette, Broadcasting Center Europe (BCE) – an RTL Group Company, ARBED – ARCELOR Group

Public and institutional partners: Innovating Regions Network (IRE), Business and Innovation Centre Kaiserslautern, Promotech Nancy, TechnologieZentrum Ludwigshafen / BIC Rhein-Neckar-Dreieck, Wallonia Space Logistic

Technoport is a member of the European BIC Network (EBN) and the European Space Incubator Network (ESINET), an associate member of the Gate2Growth Incubator Forum and an affiliated member of the International Association of Science Parks (IASP) (list of all the partners at [www.technoport.lu](http://www.technoport.lu)).

**Number of RDI projects:**

2

**Contact :**

Diego De Biasio, Manager, [diego.debiasio@tudor.lu](mailto:diego.debiasio@tudor.lu)  
phone: +352 54 55 80 – 1, [www.technoport.lu](http://www.technoport.lu)



*Diego De Biasio*

**Key facts 2005**

2005 confirmed the very good results of 2004 with a record of new contacts applying for the Technoport. The three programmes developed by Technoport to support the creation and development of innovative and technology-oriented companies proved to fit the needs of the entrepreneurs.

The shared workspace of the **Pre-commercial programme** has been completely renewed and can now host from 8 to 12 future entrepreneurs at once. This investment was necessary after the great success of this on-site support scheme. Thirteen company projects decided to sign up for this free-of-charge 4-months programme in 2005. This programme is perfect for individuals focused on completing a business plan, feasibility study or proof of concept. It equips them with an onsite professional work environment (including office space, personal computer and IT infrastructure) and access to the networks and management team of the incubator.

**Six new companies** have also been accepted in the **Start-up programme**, out of which 4 within the incubator and 2 externally via the Technoport Innovation Network.

#### Hosted at Technoport:

- CodaSystem (www.codasystem.com)
- Noemi Concept (www.noemi-concept.com)
- Mocom (www.mocom.lu)
- Epuramat (www.epuramat.com)

#### Within the Technoport Innovation Network:

- Flowing Content (www.floatingcontent.com)
- Noctron (www.noctron.com)

The number of **success stories** of Technoport increased to six with the official grown-out of J-Way SA in September 2005. The company joined the **High-Growth programme** and remains thus in the Technoport Innovation Network.

In terms of new services offered to the companies, Technoport developed different priorities:

#### Business development services:

Based on the experience in the field of coaching technology-based companies, Technoport decided in 2005 to work on the implementation of a new marketing and sales support structure within the incubator. The mission of this structure will be to deliver tailor-made services to entrepreneurs to help them increase their commercial impact. Six main services have been identified: Commercial action plan; marketing/sales plan; target market opportunity study; partnership opportunity study; pricing; branding and marketing communication. Technoport will develop partnership collaborations with existing external service providers in specific areas for delivering these services. This structure will now be tested on two pilot projects beginning of 2006.

#### Workshops:

Following the positive experience in the delivery of thematic business development workshops in 2004, Technoport decided to continue this activity throughout 2005. Two new specific workshops have been held during the 1st semester 2005: the first one on "Sales Techniques and Commercial Planning", and the second one on "Pricing and Distribution". In total, 17 entrepreneurs – representing ten companies - participated in these "one-day" events. The feedback from the participants was very positive with following average evaluations (maximum 10): 8,45 for the content of the workshop and 9,3 for the trainer. These workshops have been developed with an external partner and under the "creative commons" framework.

#### Financing:

The Technoport continued to support the development of the Luxembourg Business Angel Network in 2005 but also to foster its collaborations with other national financing actors like Mangrove Capital Partners, BGL Investment Partners and the Société Nationale de Crédit et d'Investissement (SNCI). Several direct contacts had also been made with foreign Venture Capitalists to promote the companies of the incubator. These actions will be developed in 2006.

#### Mobility of students in start-ups and research:

Technoport successfully submitted a Leonardo mobility project end 2005, which was mainly based on the recent positive collaborations with the ESADE Business School of Barcelona. Technology-based companies often have specific business development issues that they can't always address on time and/or effectively due to a lack of financial or human resources. Long internships can thus help the companies to achieve their specific milestones by addressing such issues. The projects aims thus at:

- Offering hands-on internships in collaboration with technology based companies
- Favours transfer of competences and increasing the awareness of career opportunities within technology based companies among highly qualified trainees
- Reducing red tape for entrepreneurs to access qualified profiles.

This project includes following partners for 2006: the ESADE Business School (Barcelona, Spain); the University Carlos III (Madrid, Spain); the IT department of the Facultés Universitaires Notre-Dame de la Paix of Namur (FUNDP - Belgium) and the Joseph Fourier University of Grenoble (Laboratory LSR-IMAG - France).

#### Infrastructure:

Several infrastructure investments have been done during 2005 to improve the work environment of the hosted companies. The most important are certainly the broadband Internet connexion and a secured server room for start-ups. This investment was co-financed through the European Objective 2 project PEATS "Projet d'extension et d'amélioration de l'infrastructure et des équipements du Technoport", which ended on 31st December 2005.

## Workshops 2005

|                         |  |
|-------------------------|--|
| Subjects                | Branding<br>Sales techniques and commercial planning<br>Pricing and distribution |
| Number of attendees     | 23 entrepreneurs of 13 companies   |
| Cumulated hourly volume | 37 hours   |

## Thematic events 2005

|                           |   |
|---------------------------|---|
| Topics                    | Software patent: the European directive<br>In search of VC financing? What lessons to learn?<br>Microsoft Luxembourg Mobility Day 2005<br>WiMax and Mobile Virtual Network Operators – MVNO |
| Total number of attendees | 135 attendees   |

## Incubator Status as at 31st December 2005

|  |  |
|--|--|
| New contacts 2005  | <b>64</b>  |
| Files under analysis at the end of December                                  | <b>11</b>  |
| Available office space for start-up  | <b>1.600 m<sup>2</sup></b>   |
| Occupation rate  | <b>74%</b>   |
| Planned exists in 2006   | <b>2</b>   |
| Companies member of the Technoport Innovation Network                        | <b>27</b>  |
|  | <i>On-site</i> <b>15</b>   |
|  | <i>Success stories</i> <b>6</b>  |
|  | <i>Joining externally</i> <b>6</b>   |
| Average tenancy period   | <b>3,7 years</b>   |
| Cumulated turnover (80% of responses)  | <b>+19 M Euro</b>  |
| Number of persons employed in the Technoport Innovation Network              | <b>+195</b>  |
| New jobs created in 2005   | <b>53</b>  |
| University internship positions in 2005                                      | <b>20</b>  |
| PhD thesis in 2005   | <b>3</b>   |
| Inter-companies collaborations   | <b>14</b>  |
| Collaborations with the CRP Henri Tudor (R&D projects)                       | <b>14</b>  |
| Fairs  | <b>Systems '05 (October 2005 - Munich)</b><br><b>Bureautec '05 (September 2005 - Luxembourg)</b> |
| Number of files accepted by the Board of Directors since 1998                | <b>36</b>  |
| Collaborations stopped in 2005<br>(Composys, Techadvantage, DoubleA, Lux-IT) | <b>4</b>   |

# Technoport Innovation Network



## Grown out success stories

|              |              |              |              |              |              |
|--------------|--------------|--------------|--------------|--------------|--------------|
|              |              |              |              |              |              |
| exit in 2000 | exit in 2002 | exit in 2003 | exit in 2004 | exit in 2004 | exit in 2005 |

## Companies hosted at Technoport (in alphabetical order)

|  |  |  |  |  |
|--|--|--|--|--|
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

## External companies

|  |  |  |  |  |  |
|--|--|--|--|--|--|
|  |  |  |  |  |  |
|--|--|--|--|--|--|



## CYBERCULTUS

First Luxembourg-based start-up to create spin-out at ESI (European Space Incubator)

**Date of entry to the Technoport:** June 2002

**Number of employees end 2005:** 5

**Field of activity:** Interactive solutions with media convergence

**Product:** RAMO % concept (Reactive & Adaptive Multimedia Objects)

eBSA®, iTV suite for immersive TV applications

eBSA®, suite for immersive culture and tourism applications

**Target markets:** Culture & tourism industry, museums & galleries, tour operators, leisure centres, media & broadcasting industry, TV channels, broadcasters, publishers

**Geographic coverage:** International

**Reference:** Musée Albert Kahn, RTBF, Instituto Latinoamericano de Museos, European centre for eco agro tourism, Artequest Travel, Egnatia Epirus Foundation, Philips, Thomson

Cybercultus has been accepted at Technoport in June 2002. The company's main mission is to provide new interactive solutions with media convergence (PC based Internet, Interactive TV, mobile devices). The e-Business Solutions for the Art industry (eBSA®) Expo Suite of Cybercultus is software capable of generating 3D virtual exhibitions for museums, galleries, tourism centres, etc. The software is designed to allow organizations, associations, and institutions, to promote natural and cultural heritage on-line using advanced immersive technologies. Simple user interfaces for non-specialists allow authorized staff to specify the look and feel and the content of a 3D expo and to have it published on different media such as CD/DVD or WEB. The eBSA® RAMO libraries of Cybercultus provide a range of intelligent multimedia objects capable of advanced interactivity. Such objects are capable of behaving autonomously and of reacting according to their surrounding context. They allow virtual worlds to behave closer to reality and to make the man/machine interaction much more natural.

The latest interactive TV show application being developed by Cybercultus opens new possibilities to viewers by converting the TV set to a virtual extension of their home living space. The DVB-MHP (Digital Video Broadcast Multimedia Home Platform) open standard is used to produce these iTV applications. By combining advanced immersion and interactivity solutions, Cybercultus is capable of providing its customers with highly intuitive and user-friendly content applications.

**Last accomplishment:** 2005 was an important year for Cybercultus, which was able to launch, as first Luxembourg based technology-company, a new venture at the ESI, the European Space Agency Incubator located at Noordwijk. The InnerTV spin-out company intends to industrialize and market state of the art immersive technology for the TV industry, relying on background research results. The technology is particular suited to iTV satellite broadcast and open-air transmission. An ESA co-financed project named RTI-TVS (Real Time Immersive TV Show) has helped generate the first demonstrator/prototype of such advanced immersive technology. The technology has been successfully tested using live satellite broadcast and must now be industrialized. InnerTV will be backed by the expertise, financial and logistic support of the ESA to achieve these missions.

*Contacts: Cybercultus SA, 66, rue de Luxembourg, L-4221 Esch-sur-Alzette  
phone: +352 26 54 56 - 1, fax: +352 26 54 56 - 24, www.cybercultus.com, info@cybercultus.com*

*Inner TV EMZ, ESA/ESTEC, Keplerlaan 1, 2200AG Noordwijk ZH, Holland*



RTI-TVS (Real Time Immersive TV Show): Innovative features: Viewer immersion and participation in TV quiz shows through virtual representations



## CodaSystem

Who has done what, when and where !

**Date of entry to the Technoport:** March 2005

**Number of employees end 2005:** 8

**Field of activity:** Integrated solutions of digital proofs creation

**Product:** Codamobile, CodaFix

**Geographic coverage:** France, Benelux

**Reference partners:** HP, Canon, BenQ, Siemens, Itronix, Rollei, Haicom, Nokia, Tango, Orange, Bouygues Telecom, SFR, SafeNet, CDC Zantaz, DataCenter Luxembourg

**Reference clients:** Aquila, Dynaxium, Graniou, Bellin, GSE, CITADIS, AREA Provence-Alpes-Côtes d'Azur

CodaSystem is backed by Cap Decisif, a technological early-stage venture-capital fund. All technological development activities of CodaSystem are hosted at Technoport in Esch-sur-Alzette.

CodaSystem has developed and commercializes the first software capturing and certifying digital pictures. The pictures are geo-localized (via satellite), time and date stamped, tattooed and signed by the authors. Service providers can use such pictures to have a legal justification of their services or as a control mechanism when outsourcing activities. The software allows any professional to prove what has been done, when and where, by means of a single encrypted and secured picture. Clients can benefit from the convenience of digital documents (pictures, sound, video), while avoiding any risk of divulgation to non-authorized third parties or modification of the content. The only alternatives to these digital proof pictures to date are heavy and costly certified or official statements and reports. The incriminating evidence of Codamobile's pictures has been certified by several legal and technical audits and is based on the total control of the production, encryption, archiving and diffusion process, and the conformity to the most advanced rules and norms concerning the signature, the exchange and the electronic storage of information. CodaSystem uses only existing professional standards like jpeg for photos and IP for data transmission. The technology works on latest-generation cameraphones (smartphones), PDA phone or a regular laptop PC with additional digital camera.

**Last accomplishment:** CodaSystem's Codamobile solution was awarded the 2005 Trophy for the most innovative product for the private sector at the French National Federation of Trusted Third-Parties "Dematerialisation 2005" convention held in Paris on December 6th and 7th. The panel of trusted third parties and security experts recognised the pioneering unique features of CodaSystem's solution as well as its practical and functional character.

Contact: CodaSystem SA, 66, rue de Luxembourg, L-4221 Esch-sur-Alzette

phone: +352 54 55 80 - 476, fax: +352 54 55 80 - 477, [www.codasystem.com](http://www.codasystem.com), [contact@codasystem.com](mailto:contact@codasystem.com)



from the left to the right : Jean SAPHORES, President of the FNTC ; Harris Monteiro Da Silva, Business Development Manager for Trusted Services of Atos Worldline and Frédéric Levaux, President of CodaSystem

# “Renewable Energies” Innovation Platform

## Staff as at the end of the year:

The innovation platform employs no specific staff. Activities and projects are carried out by two departments of the CRP Henri Tudor: the Resource Centre for Environmental Technologies (CRTE) and the Laboratory for Industrial Technologies (LTI)

## Key competences:

renewable energy systems, photovoltaics, solar-heating, biomass, rational use of energy, cooling systems, sensors, data acquisition, data analysis, measurement systems, automation systems

## Activities:

R&D, technological and methodological assistance, assessment and diagnostics, preliminary studies and pre-projects, innovation projects, professional and scientific publications, management of innovation platforms, expert reports, animation of working groups

## Strategic partners:

Agence de l'Energie SA (AEL), Centre Hospitalier Emile Mayrisch (CHEM), Institut für Angewandtes Stoffstrommanagement (IFAS), Agence de l'Environnement et de la Maîtrise de l'Energie (ADEME), Institut für Zukunftssysteme (IZES), Administration de l'Environnement, Ministry of Environment, Ministry of Economy and Foreign Trade, Ministry of Culture, Higher Education and Research

## Number of RDI projects:

4

## Contacts:

Frank Minette, Unit Manager, frank.minette@tudor.lu, Bianca Schmitt, Project Manager, bianca.schmitt@tudor.lu

## Key facts 2005

The project RELIES “Réseau luxembourgeois pour l'information sur l'énergie solaire” consists of the development of a web site for information on solar energy in Luxembourg with a special focus on photovoltaic (PV) systems. In 2005, the web site has obtained a new graphical design and the programming of the basic structure has been finished. The editorial part on photovoltaics in general was finished and a beta version, similar to the version presented on Oekofoire 2005, is about to be published. The statistical data concerning power and energy yield from PV systems in Luxembourg were analysed and put into graphs to be more representative. Furthermore the legal framework for PV systems in Luxembourg has been adapted to the current state. The Relies project is co-financed by the European Regional Development Fund (ERDF).

The project PV-Lab “PhotoVoltaic Laboratory” provides an outdoor test facility for photovoltaic devices that are composed of a wide range of different technologies. It combines a long-term monitoring system with a 50 kW<sub>peak</sub> PV generator with a reference test field for PV module characterisation under real operating conditions. In 2005, the 50 kW<sub>peak</sub> PV generator was completely installed and has been operating with its full capacity since July 2005. The interfaces for implementing the measurement technique are prepared. The measurement devices are purchased and partly installed. Different additional electric equipment has been developed and passed successfully the state of functional prototyping. The reference test field mounting support for PV modules is installed. The PV-Lab project is co-financed by the European Regional Development Fund (ERDF).

The measurement campaign realised within the framework of the project ANIA “Analyses et gestions des impacts environnementaux et de la consommation énergétique d'installations frigorifiques dans le secteur agro-alimentaires”, and concerning the energy consumption of entire supermarket cooling systems at four different locations, started in 2005. The first results were analysed and discussed during meetings with the external partners. A close contact with specialised refrigeration technicians led to a more practical approach of the project. The evolution of the project could thus be defined more in detail, in order to prepare the analysis phase planned for 2006. This phase will cover the following subjects:

- The raw energy consumption of the cooling systems
- Their global warming effect
- The energy efficiency of several technical measures

In autumn 2006, the final conclusions will be presented.

The project RUBIN “Regionale Strategie zur nachhaltigen Umsetzung der Biomasse-Nutzung”, which started in December 2005, aims at developing a regional strategy for the sustainable production and use of biomass. The project, co-funded by the European Commission (Interreg IIIA Deutschland-Luxemburg (DeLux), involves the German Institute for Applied Material Flow Management (IFAS) at the Fachhochschule Trier (Germany) and the municipality of Reinsfeld (Germany). Furthermore, a complementary project in the Interreg IIIa DeLor programme is carried out in order to enlarge the participating regions to Lorraine (France) and Saarland (Germany). Partners are the Environment and Energy Agency of France (ADEME) and the Institute for Future Energy Systems (IZES, Germany).

# “Free and Open Source Software” Innovation Platform

## Staff as at the end of the year:

The innovation platform employs no specific staff. Activities and projects are carried out by two departments of the CRP Henri Tudor: Centre for IT Innovation (CITI) and Resource Centre for Health Care Technologies (CR SANTEC)

## Key competences:

Free and Open Source Software (FOSS), intellectual property, FOSS networking, FOSS business models

## Activities:

realisation of surveys in the field of FOSS, RDI projects, technology watch, training in the field of FOSS, clustering of FOSS initiatives in Luxembourg, participation at international conferences and exhibitions, sensitization of decision makers in industry and politics, organization of conferences, seminars, round tables & think tanks, accomplishment of road shows in domains of FOSS, professional and scientific publications

## Strategic partners:

Association des Professionnels de la Société de l'Information (APSI), Centre d'Excellence en Technologies de l'Information et de la Communication (CETIC), Club de la Sécurité des Systèmes d'Information Luxembourg (CLUSSIL), Centre de Technologie de l'Education (CTE), Fachhochschule Trier, GNU/Linux User Group Luxembourg (LiLux), ASC, Audaxis, Broadcasting Center Europe - an RTL group company, Cetrel, Conostix, CONSEN (EEIG) Euro-Group, Fujitsu Siemens Computers, HP Luxembourg, IBM, Intech, Neofacto, Oracle, Plan-Net, Sun Microsystems, Telindus

## Number of RDI projects:

2

## Contact:

Ortwin Donak, co-ordinator of the innovation platform, [ortwin.donak@tudor.lu](mailto:ortwin.donak@tudor.lu), [www.libre.tudor.lu](http://www.libre.tudor.lu)

## Key facts 2005

- Preparation and realisation of the 3 days event LinuxDays including workshops, presentations and fair in January 2005
- Setup of the advisory committee of the platform. The official kick-off meeting was in November 2005
- Preparation and realisation of the Journée du Libre targeted on small and medium enterprises (SME) in April 2005
- Publication in July 2005 of a position paper regarding the EU directive on software patents
- Launch of an internal project to evaluate the potential of migrating to the OpenOffice suite within the CRP Henri Tudor
- Participation in the preparation of two EU project proposals, the first one in information and communication technologies (ICT) for elderly and cognitively challenged people, the second one in ICT for trans-European networked organisations
- Participation in the Science Festival 2005 with educational workshop tracks in October 2005
- Launch of the enterprise application integration project FreeGate “An Open Source System Integration Solution for Small and Medium Enterprises – Requirement Specification and Marketing Strategy” in November 2005



Linuxdays 2005



## Results of the ODETTE project

Reusing Free and Open Source software

The project ODETTE "Objets distribués, confrontation des facteurs techniques, méthodologiques et organisationnels contribuant à l'industrialisation des composants logiciels métiers" aimed at increasing the performances of companies by improving their software reuse practices via Free and Open Source.

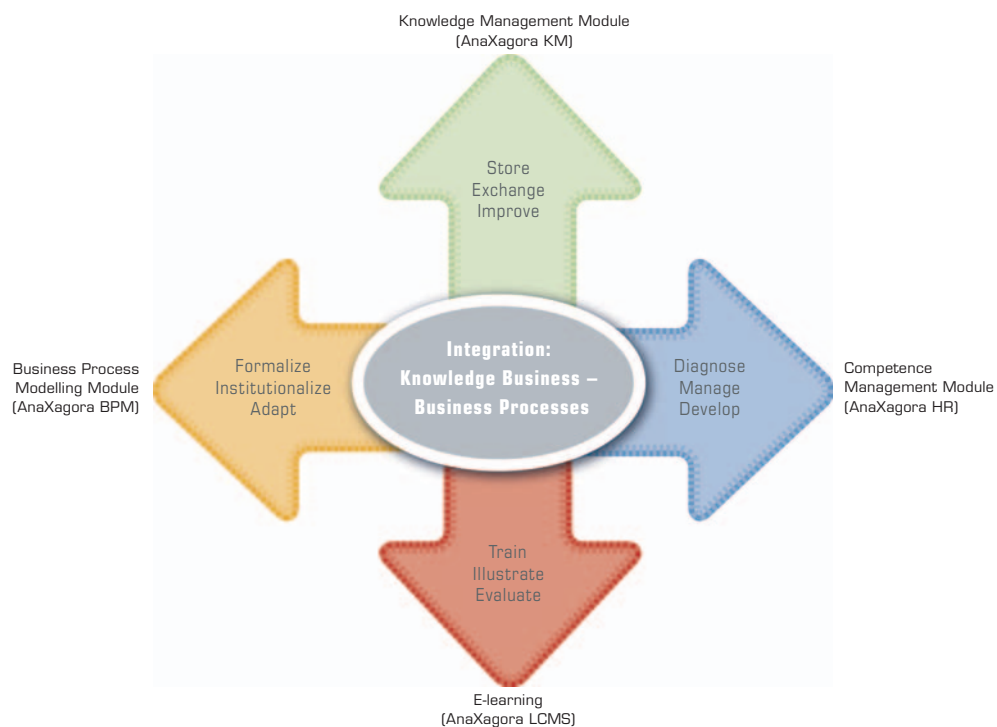
After initial studies in the field of software reusability in general, it was found that most of the brakes preventing software reuse had to do with intellectual property problems. Since Free and Open Source software solve these problems, they are considered to encourage software reuse, and therefore the project goals were re-oriented to take specifically into account Free and Open Source Software (FOSS).

An important result of the ODETTE project is a methodology guide on how to make a Free/Open Source project (available in French). This guide covers the different phases of a project, from the definition to the development and support.

More specifically about software reuse, a state of the art of software reuse in FOSS presents specific aspects to software reuse in the case of Free and Open Source projects. In order to show the importance of FOSS for software reuse, the project team analysed different technical metrics that could be applied to FOSS projects in order to measure the quantity of reuse in these software.

In order to acquire competences in the field of Free and Open Source projects and software reuse, and also to apply and test counsels given in the Methodology Guide on FOSS projects, the project team participated in the development of the Open Source platform AnaXagora integrating different modules (BPM module, KM Module, LCMS Module and HR Module) in order to create a complete change management platform for businesses.

Contact: [sophie.ramel@tudor.lu](mailto:sophie.ramel@tudor.lu)



The open source platform AnaXagora

# Main RDI projects of CRP Henri Tudor in 2005

## Laboratory for Industrial Technologies and Materials (LTI)

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### "Strategy and management" scientific and technological unit

- BTPGES "Création d'un ensemble de pratiques de gestion de performance dans le secteur de la construction", lahcene.harbouche@tudor.lu
- CELLULE MODELISATION "Création d'une cellule experte en modélisation / simulation / diagnostic des entreprises et stimulation de démarche qualité totale au Luxembourg", david.evaristo@tudor.lu
- COFAQ "Conception d'un service de formation et d'accompagnement pour l'amélioration de la qualité", yves.collet@tudor.lu
- CRM "Création d'une structure experte en CRM et accompagnement des entreprises", laurent.bravetti@tudor.lu
- EXIND2 "Pilotage et conception de formations en stratégie de gestion industrielle et d'organisation", laurent.bravetti@tudor.lu
- HOSPIMOD "Génération d'un modèle d'organisation des systèmes hospitaliers", david.evaristo@tudor.lu
- IMPEE "Innovative Multi-Product Engineering Environment", renaud.camuzat@tudor.lu
- INNOMA "Innovative Management", jos.schaefers@tudor.lu
- MLQ "Mouvement Luxembourgeois pour la Qualité", yves.collet@tudor.lu
- QUALITY PASS "Passeport pour la qualité pour les très petites et petites entreprises", remi.fabbri@tudor.lu
- REBAMO "Méthode d'aide à l'ingénierie ou ré-ingénierie des entreprises par la modélisation", david.evaristo@tudor.lu
- TRANSQUAL "Réseau transfrontalier de la qualité", yves.collet@tudor.lu

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### "Modelling and simulation" scientific and technological unit

- CASSEM "Composites and Adaptive Structures : Simulation, Experimentation and Modelling", salim.belouettar@tudor.lu
- CONCURRENT MODELLING "Concurrent Modelling Tool Development", serge.gille@tudor.lu
- EMBOUTISSAGE "Emboutissage de pièces de précision en tôlerie fine par simulation numérique", salim.belouettar@tudor.lu
- NANOFEM "Characterisation of Mechanical Properties at Micro- and Nano-Scale Through Combined Use of Nano-Indentation and Finite Element Modelling", gaston.rauchs@tudor.lu

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### "Mechatronics" scientific and technological unit

See "Renewable energies" innovation platform on page 46

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### "Materials" scientific and technological unit

- TRASU "Development of Innovative Surfaces by Means of Optimized Plasma Techniques and Technological Transfer to Industries", julien.bardon@tudor.lu
- ICIMAT "Innovation dans la caractérisation intégrée des matériaux", claude.becker@tudor.lu

- METROLOGIE "Création d'un laboratoire national d'étalonnage accrédité", sylvain.gaillard@tudor.lu
- SYNTHESE "Synthèse de nanocomposites", claude.becker@tudor.lu
- THERA "Création d'un laboratoire de caractérisation thermique et de vieillissement accéléré", claude.becker@tudor.lu

## Centre for IT Innovation (CITI)



### "Quality and certification of IT services" innovation platform

- AIDA "Assessment and Improvement Integrated Approach", andre.rifaut@tudor.lu
- CASSIS\_NET "Mobilisation d'un réseau pour l'innovation par les TIC dans les PME", corinne.loesel@tudor.lu
- EQN "European Innovation and Quality Network", beatrix.barafort@tudor.lu
- GERAMO "Gestion des relations clients/fournisseurs dans les projets TIC", marc.krystkowiak@tudor.lu
- GRIF "Gestion des risques IT dans le secteur financier – nouvelles approches méthodologiques", andre.rifaut@tudor.lu
- NOTITIA "Etude des nouvelles technologies de l'information et de la communication au sein des administrations", corinne.loesel@tudor.lu
- SPICE4A "Supporting the Process Improvement and Capability Determination for Accreditation", dominique.ferrand@tudor.lu
- SPINOV "Software Process Improvement and Innovation", valerie.betry@tudor.lu
- TOOLINNOVE "Systèmes et outils de gestion de projet - méthode QUALINNOVE", laurent.vergnol@tudor.lu



### "Information systems security" innovation platform

- ACCESS-PME "Adoption de compétences interdisciplinaires pour le commerce électronique sécurisé des PME", andre.rifaut@tudor.lu
- LIASIT "Programme de formation/recherche doctorale en technologies de l'information", bruno.cornette@tudor.lu
- R2SIC "Recherche en sécurité des systèmes d'information et de la communication", jean-philippe.humbert@tudor.lu
- SECURE PME "Développement d'un pôle de compétences en sécurité des systèmes d'information dédié aux PME", christophe.feltus@tudor.lu
- SIM "Secure Identity Management", frederic.girard@tudor.lu



### "Interoperability standards and e-business" innovation platform

- AFFLUX "Architecture avancée pour la gestion des flux de dossiers", marc.krystkowiak@tudor.lu
- e-FFICIENT "E-business Framework for an Efficient Capture and Implementation of End-to-end Transactions", michael.schmitt@tudor.lu
- INTEROP "Interoperability Research for Networked Enterprises Application and Software", pierre.brimont@tudor.lu
- LINK ALL "Local-communities Insertion Network", djamel.khadraoui@tudor.lu
- PARRAIN "Parrainage transfrontalier", arnaud.bellaire@tudor.lu



### **"e-learning, knowledge management and networked organisations" innovation platform**

- AVC "Agora virtuelle de la connaissance", brice.bucciarelli@tudor.lu
- CMA-NoE "European Network of Excellence on Complex Metallic Alloys - Volet Knowledge Management", damien.hanser@tudor.lu
- DEMOISEL "Dispositif de e-learning accompagnant une modernisation organisationnelle et informatique au sein de l'Etat luxembourgeois", sandrine.reiter@tudor.lu
- FORM-IT "Conception de filière de formations IT", delphine.giltay@tudor.lu
- Pilot KM "Expérimentation d'un dispositif KM dans le cadre de la conduite de projets d'innovation", brice.bucciarelli@tudor.lu
- PRECODEM "Préparation aux compétences de demain pour les demandeurs d'emploi - ingénieurs et cadres", sandrine.reiter@tudor.lu
- RESINA "Aide à la conception et à l'exploitation de réseaux d'innovation et d'apprentissage", olivier.piot@tudor.lu
- SATnSURF "Développement de services innovants en matière d'exploitation de contenu Internet", thibaud.latour@tudor.lu
- TAO "Testing assisté par ordinateur", thibaud.latour@tudor.lu
- TAO2 "Testing assisté par ordinateur: plate-forme libre de nouvelle génération en environnement ouvert, distribué et multilingue", thibaud.latour@tudor.lu
- TINIS "Technological Innovation Network in the Field of Information Systems", olivier.piot@tudor.lu
- TRANS-e-FORM "Transition vers la e-formation", stephane.jacquemart@tudor.lu
- Web Training Game "Elaboration d'un jeu d'entreprise en ligne pour la téléformation au e-business et au web-marketing", luc.vandenabeele@tudor.lu



### **"Statistical and prospective studies in the knowledge economy" innovation platform**

- ABILITIC "Mise en place d'un dispositif interrégional d'anticipation des compétences liées à l'innovation et les TIC dans les métiers", linda.szelest@tudor.lu
- COMPETIC "Compétitivité et dynamique d'innovation par les TIC", michael.schmitt@tudor.lu
- DOTIC "Mise en place d'une méthodologie opérationnelle de détection précoce des opportunités dans le domaine de l'innovation par les Technologies de l'Information et de la Communication (TIC)", jerry.thesee@tudor.lu
- GEANCOTIC "Gestion anticipative des compétences liées à l'innovation et aux Technologies de l'Information et de la Communication (TIC)", pascale.barbolosi@tudor.lu
- IMSATV "Immersive Satellite Television", olivier.marchand@tudor.lu
- INVESTIC "Innovation et investissement TIC", damien.hanser@tudor.lu
- JULES VERNE "Modélisation appliquée au multimédia", djamel.khadraoui@tudor.lu
- PASSEPARTOUT "Personnalisation de contenus interactifs", yannick.naudet@tudor.lu

## Resource Centre for Environmental Technologies (CRTE)

PFI ▶

### "Cleaner production" innovation platform

- AGID "Analyse et gestion intégrées et durables des flux de matières et d'énergie en entreprise", bianca.schmitt@tudor.lu
- RIFE "Réseau transfrontalier d'information et de formation à la gestion de l'environnement", caroline.fedrigo@tudor.lu
- VALORBOUES "Quelles solutions au devenir des boues d'épuration dans la zone transfrontalière?", caroline.fedrigo@tudor.lu

PFI ▶

### "Sustainable construction" innovation platform

- LEITFADEN "Leitfaden für nachhaltiges Bauen und Renovieren in Luxemburg", bianca.schmitt@tudor.lu

UST ▶

### "Water" scientific and technological unit

- ALZETTE "Flux de matières dans le bassin versant de l'Alzette : impacts de micro/macro-polluants et de nutriments sur la qualité des ressources hydriques", tom.galle@tudor.lu
- CHEMRISK "The Development of a Drinking Water Contamination Risk Assessment and Management Strategy in Luxembourg - An Interdisciplinary Approach", tom.galle@tudor.lu
- CONCEPT "Nouveaux concepts et technologies innovantes pour une gestion durable du cycle de l'eau urbain", torben.lohmann@tudor.lu
- LITFLUID "Application des outils de modélisation/simulation et d'analyse des flux à la technologie des lits fluidisés", mario.plattes@tudor.lu
- OPTISTEP "Optimisation de procédés de traitement des eaux usées par des outils de modélisation/simulation", mario.plattes@tudor.lu
- RESEAU "Modélisation du réseau d'assainissement des localités regroupées autour du lac de la Haute-Sûre", emmanuel.henry@tudor.lu

## Resource Centre for Health Care Technologies

- LUHF "Luxembourg Heart Failure Project", norbert.roesch@tudor.lu
- BIOINFO "Création d'une nouvelle compétence en bio informatique et d'une plate-forme technologique d'analyse génique à grande échelle (puces à DNA), se fondant sur une application en cancérologie", andreas.jahnen@tudor.lu
- CARA "Carnet radiologique électronique", malika.bendaoud@tudor.lu
- e-Care "Towards a Secured, Efficient Platform for the e-Commerce of Personalized Health Products", david.baldacchino@tudor.lu
- EDDRA 6 "Exchange on Drug and Demand Reduction Action", andreas.jahnen@tudor.lu
- HEALTHNET2 "Réseau informatique fermé et sécurisé pour tous les professionnels de la santé", lysiane.cuny@tudor.lu
- MAMMO 4 "Informatisation du programme de dépistage mammographique", malika.bendaoud@tudor.lu
- MENSSANA "Mobile Expert and Networking System for Systematical Analysis of Nutrition-based Allergies", norbert.roesch@tudor.lu
- OPTIMAGE "Quality Control for Optimal Medical Images", andreas.jahnen@tudor.lu
- RIS PACS "Définition de cahiers des charges et de scénarios de travail pour deux hôpitaux luxembourgeois", lysiane.cuny@tudor.lu

## Resource Centre for Information Technologies in Construction

- BUILD-IT "Faire évoluer le secteur de la construction vers les technologies de l'information", fabrice.absil@tudor.lu

## SITec® "Lifelong Learning for Technological Innovation"

- 2ème cycle SSI "Master en Management de la Sécurité des Systèmes d'Information", bernard.lambeaux@tudor.lu
- 3ème cycle II "Diplôme d'Etudes Supérieures Spécialisées Informatique & Innovation", alain.renault@tudor.lu
- ACCESSIT "Accès à la société de l'information et aux technologies", bernard.lambeaux@tudor.lu
- CALIFORM "Intégration de la qualité dans le processus de conception et de production des formations du Centre", sandra.grunewald@tudor.lu
- DULOG "Mise en œuvre d'un Diplôme Universitaire en logistique", lahcene.harbouche@tudor.lu
- FORENCA "Formations, rencontres, catalogues", olivier.decolnet@tudor.lu
- MSTM Session 1 "Réalisation d'un Master in Science and Technical Management", romain.gaasch@tudor.lu

## Technology Watch Centre / Standards Watch Centre (CVT)

- DIPS "Distance Learning Approach applied to Enhance Introduction of Intellectual Property Rights in Management Strategies of Enterprises", cyrille.dubois@tudor.lu
- E-Norm "Mise en place d'une plate-forme Internet dédiée au soutien des entreprises dans l'application des normes", serge.quazzotti@tudor.lu
- HAITI "Etude sur les habitudes en matière d'information technique et de protection des inventions des PME/PMI du Luxembourg", serge.quazzotti@tudor.lu

## Technoport

- NAVOBS "A Support Measure to Boost the Business Project of GMES and Telecom Satellites through Focused and Innovative RTD Work Involving SMEs", diego.debiasio@tudor.lu
- PEATS "Projet d'extension et d'amélioration de l'infrastructure du Technoport", diego.debiasio@tudor.lu

## "Renewable energies" innovation platform

- ANIA "Analyses et gestions des impacts environnementaux et de la consommation énergétique d'installations frigorifiques dans le secteur agro-alimentaire", alexandre.bertrand@tudor.lu
- PV-LAB "PhotoVoltaic Laboratory", oliver.onagy@tudor.lu
- RELIES "Réseau luxembourgeois pour l'information sur l'énergie solaire", daniel.koster@tudor.lu
- RUBIN "Regionale Strategie zur nachhaltigen Umsetzung der Biomasse-Nutzung", bianca.schmitt@tudor.lu

## "Free and Open Source software" innovation platform

- FREEGATE "An Open Source System Integration Solution for Small and Medium Enterprises - Requirement Specification and Marketing Strategy", ortwin.donak@tudor.lu
- ODETTE "Objets distribués, confrontation des facteurs techniques, méthodologiques et organisationnels contribuant à l'industrialisation des composants logiciels métiers", contact: sophie.ramel@tudor.lu

# The 417 project partners of CRP Henri Tudor in 2005

(in alphabetical order)

Acthan (F) | ADELIOR (B) | Administration de la Gestion de l'Eau (AGE) (L) | Administration de l'Emploi (ADEM) (L) | Administration de l'Environnement (L) | Administration des Bâtiments Publics (ABP) (L) | Administration des Ponts et Chaussées (L) | Administration des Services Techniques de l'Agriculture (ASTA) (L) | Agence de l'Energie SA (AEL) (L) | Agence de l'Environnement et de la Maîtrise de l'Energie (ADEME) (F) | AGORIA (B) | AIM (P) | AKER KVAERNER (N) | Alfred Reckinger SA (L) | All About it (L) | Almavis (F) | Alpha Security (L) | Althéys (L) | AMER-SIL (L) | APSEL (L) | Aptosite SARL (L) | ARCELOR (L) | ARCELOR Building and Construction Support (ARCELOR-BCS) (L) | ARCOOP (L) | ARES Rodange (L) | ARES Schifflange (L) | Arpaweb (B) | Arsaudi Bénélux SA (L) | ARTEMIS INT (F) | ASC SA (L) | Association Luxembourgeoise des Ingénieurs Industriels (ALII) (L) | Astron Buildings (L) | Atos Origin Luxembourg SA (L) | Aubay (B) | Audaxis (L) | Avery Denisson (L) | Bâloise Assurances Luxembourg SA (L) | Bitmap (L) | Blue Sky Software (L) | BOC Information Systems GmbH (A) | Bournemouth University (GB) | Bouvy (L) | Broadcasting Center Europe (BCE) (L) | Brüderkrankenhaus Trier (D) | Bureau TMEX (L) | Business Solutions SA (B) | C2A Informatique Luxembourg SARL (L) | Caisse médico-chirurgicale mutualiste (CMCM) (L) | Capgemini Luxembourg SA (L) | Cardinal Information Systems (FIN) | Cargolux SA (L) | Carrelages De Cilia (L) | Cartoon software (NL) | Caves Felix Wolter (L) | CEFORA (L) | Centre de Langues Luxembourg (CLL) (L) | Centre de promotion de la recherche et du développement et de la valorisation des technologies en Hainaut (CERDT) (B) | Centre d'Excellence en Technologies de l'Information et de la Communication (CETIC) (B) | Centre Hospitalier de Luxembourg (CHL) (L) | Centre Hospitalier Emile Mayrisch (CHEM) (L) | Centre Informatique de la Sécurité Sociale (CISS) (L) | Centre Informatique de l'Etat (CIE) (L) | Centre International de l'Eau (NANCIE) (L) | Centre ORL Kordall (L) | Centre Régional d'Innovation et de Transfert de Technologie en Analyses et Surfaces (CRITT Analyses et Surfaces) (F) | Centre Régional d'Innovation et de Transfert de Technologie en Télécommunication et en Technologies de l'Information (CRITT-TTI) (F) | CEQUAL (B) | Ceratizit (L) | Cetrel (L) | Chambre de Commerce de Luxembourg (L) | Chambre de Commerce et d'Industrie de Meurthe et Moselle (F) | Chambre de Commerce et d'Industrie de Moselle (F) | Chambre de Commerce et d'Industrie du Luxembourg Belge (CCILB) (B) | Chambre des Métiers (L) | Chambre Française du Commerce et de l'Industrie (L) | Chambre Régionale de Commerce et d'Industrie de Lorraine (CRCIL) (F) | CIDEM (E) | Cimmedia Limited (GB) | Cimos Association (D) | CIPE (F) | Circuit Foil (L) | Clinique Saint Louis (L) | Clinique Sainte Thérèse (CST) (L) | Club de la Sécurité des Systèmes d'Information (CLUSSIL) (L) | CodaSystem (L) | Codipro (L) | COFACE (B) | Commission de Surveillance du Secteur Financier (CSSF) (L) | Commission Européenne, DG Enterprise, REACH Unit | Commission Européenne, DG Environnement, REACH Unit | Commune de Hesperange (L) | Commune de Mondercange (L) | Commune de Schifflange (L) | Commune de Wiltz (L) | CommunicArt (L) | Computacenter (L) | COMPUTAS AS (N) | Conception Programmation Industrialisation SARL (CPI) (L) | Conostix (L) | Contraste Europe (L) | CRIF-WTCM (B) | Croix-Rouge de Belgique (B) | CRP Gabriel Lippmann (L) | CRP Santé (L) | CTG Luxembourg SA (L) | CTI Systems SA (L) | CTI Telematics Center (GR) | Cybercultus (L) | Danube (A) | DéfinITion SA (B) | DELTA (DK) | Delta Management Luxembourg (L) | Dennemeyer & Associates (L) | Deutsches Institut für Erwachsenenbildung (DIE) (D) | DuPont de Nemours (L) | EASI SA (L) | Ecole Centrale de Lyon – IFOS (F) | Ecole des Hautes Etudes Commerciales de l'Université de Lausanne (HEC Lausanne) (CH) | Ecole des Mines de Nancy - Laboratoire de Science et Génie des Surfaces (LSGS) (F) | Ecole Nationale Supérieure d'Ingénieurs de Limoges (ENSIL) (F) | Ecole Nationale d'Ingénieurs de Metz (ENIM) (F) | Ecole Supérieure de Management de Metz (F) | E-cone (B) | Econocom SA (L) | Egnatia Epirus Foundation (GR) | Eidgenössische Anstalt für Wasserversorgung, Abwasserreinigung und Gewässerschutz (EAWAG) (CH) | Electronics and Telecommunications Research Institute (ETRI) (Corée du Sud) | ELTH SA (L) | Embry-Riddle Aeronautical University (ERAU) (USA) | Umweltberodung Lëtzebuerg ASBL (EBL) (L) | ENSAM Angers – LPMI (F) | Entente des Hôpitaux Luxembourgeois (EHL) (L) | Epuramat (L) | Eurocomposites SA (L) | European Aeronautic Defense and Space – Centre Commun de Recherche (EADS-CCR) (F) | European Monitoring Center for Drug and Drug Addiction (EMCDDA) (P) | European Science Foundation (ESF) (F) | European Space Agency (ESA) | European Spatial Planning Observation Network (ESPON) (L) | Ewald Giebel (L) | e-Xstream (L) | Fachhochschule Krems (FH Krems) (D) | Fachhochschule Trier (D) | Facultés Universitaires Catholiques de Mons (FUCAM) (B) | Facultés Universitaires Notre-Dame de la Paix (FUNDP) (B) | Fédération des Artisans (L) | Fédération des Industriels Luxembourgeois (FEDIL) (L) | Félix Giorgetti SARL (L) | FETA (L) | Finalyse (L) | Finnish Software Measurement Association (FISMA) (FIN) | Flowing Content (L) | Fondation Luxembourgeoise Contre le Cancer (FLCC) (L) | Fonds National de la Recherche (FNR) (L) | FOREM (B) | FORTIS (L) | Forum Network (L) | FSB Systems (L) | Fujitsu Services (L) | Fujitsu Siemens Computers (L) | G4FALCK (L) | Galvalange (L) | Garage Martin Biver (L) | Geolux (L) | Georges Theis (L) | Glaverbel (B) | Global Communication and Services (GCS) (A) | GmbH der Gemeinde Reinsfeld & Ingenieurbüro Spurk (D) | Go4it SPRL (B) | Goodyear (L) | Gottscholl Alcuilux (L) | GRADIANT / IRUTIC (F) | Groupe CACTUS (L) | Groupe Leader Plus (L) | GRUPPO FORMULA SPA (I) | Guardian Automotive Europe (L) | Gummi-Roller (L) | haulogy.net (B) | Haute Ecole "Groupe ICHEC-ISC St Louis" (ISFSC) (B) | Hein SARL (L) | HITEC SA (L) | Hochschule für Technik und Wirtschaft des Saarlandes (HTW) (D) | Holinger (L) | Hôpital du Kirchberg (L) | Hôpital Princesse Marie-Astrid (HPMA) (L) | IALE Tecnología (E) | Iber2Net - Ibermatica (E) | iCube Consulting (L) | IDELUX (L) | IGLux Sàrl (L) | Imprimerie Centrale (L) | Infeurope (L) | INFFOLOR (F) | Infodata (L) | Infopole (B) | Innovation Management Consulting Solutions (IMCS) (F) | InSIC (F) | Instal Fit (L) | Institut de Formation de la Chambre de Commerce (L) | Institut de Formation Sectoriel du Bâtiment SA (IFSB) (L) | Institut für Umweltinformatik (IFU) (D) | Institut für ZukunftsEnergieSysteme (IZES) (D) | Institut National des Sciences Appliquées de Strasbourg (INSA) (F) | Institut National de Recherche en Informatique et en Automatique (INRIA) (F) | Institut National des Administrations Publiques (INAP) (L) | Institut National pour le développement de la Formation Professionnelle Continue (INFPC) (L) | Institut Supérieur de Mécanique de Paris (F) | Institut wallon de Formation en Alternance (IFAPME) (B) | Institution of Electrical Engineers (IEE) (L) | Instituto de Computacion - Facultad de Ingeniera, Universidad de la Republica (Uruguay) | Instituto de Engenharia de Sistemas e Computadores do Porto (P) | Instituto Superior Técnico do Lisboa (P) | Intech (L) | Internaxx (L) | IRACO SA (L) | IRIS Luxembourg (L) | ISCN (A) | ITW Produits Chimiques (F) | Joint Research Centre of the European Commission, Ispra (I) | Jozef Stefan Institute (SLO) | J-Way SA (L) | KBC | Lease (L) | KBL (L) | KIHN (L) | Kitry Consulting SA (L) | Kuhn SA (L) | Laboratoire de Spectrométrie de Masse et de Chimie Laser (LSMCL) (F) | Laboratoire lorrain de Recherche en Informatique et ses Applications (LORIA) (F) | Laboratoire National de l'Eau de l'Environnement (L) | Laboratoire National de Santé (L) |

Laboratorio Energia Ecologia Economia TISO, Canobbio (CH) | Laminoire de Dudelage SA (L) | Lanners (F) | Le Bihan Consulting (F) | Les Carrelages Willy Putz (L) | Les Presses Solar Belfond (F) | Librairie Ernster (L) | Lingua Franca SARL (L) | LOGXPRT EURL (F) | LTM (F) | Luxembourg International Advanced Studies in Information Technologies (LIASIT) (L) | Luxembourg Senior Consultants (LSC) (L) | Luxinnovation (L) | LUXLAIT (L) | LuxScan Technologies (L) | Lyngso Informatique SARL (L) | magic moving pixel (L) | Marbrerie Bertrand (L) | Menuiserie N. Karier (L) | Merks & Clerk (L) | Merloni Electroménager (L) | Ministère de la Culture, de l'Enseignement Supérieur et de la Recherche (L) | Ministère de la Fonction Publique et de la Réforme Administrative (L) | Ministère de la Santé (L) | Ministère de l'Economie et du Commerce extérieur (L) | Ministère de l'Education Nationale et de la Formation Professionnelle (L) | Ministère de l'Egalité des Chances (L) | Ministère de l'Environnement (L) | Ministère des Affaires Etrangères (L) | Ministère des Classes Moyennes, du Tourisme et du Logement (L) | Ministère des Travaux Publics (L) | Mission régionale pour l'emploi en Luxembourg (MIRELUX) (B) | Mixt SA (L) | Mocom (L) | Mondo (L) | Mouvement Luxembourgeois pour la Qualité (MLQ) (L) | MSD Partners (B) | MTA-ITF (H) | Muller et Fils (L) | MUM (L) | Neofacto (L) | Neonline (L) | Neovalens (L) | Noctron (L) | Noemi Concept (L) | Nouvelles Solutions Informatiques (NSI) (B) | Novacel (F) | N-TECH Belgium SA (B) | Observatoire Régional de l'Emploi, de la Formation et des Qualifications (OREFQ) (F) | OekoZenter (L) | Office Européen des Brevets (OEB) | Office Freylinger (L) | Office Luxembourgeois d'Accréditation et de Surveillance (OLAS) (L) | Office Meyers & Van Malderen (L) | One Tree Technologies (L) | Oneweb (L) | Op der Lann (L) | Open Field SA (L) | Optima Consulting (L) | ORBIT Association (D) | Orda-s Succursale de Luxembourg (L) | Ordre des Architectes et des Ingénieurs-conseils (OAI) (L) | Organisation Mondiale de la Propriété Intellectuelle | Ostrava Science & Technology Park (République tchèque) | OtterWasser GmbH (D) | Paul Wurth SA (L) | PCP-Lux (L) | Pechiney CRV (F) | Pechiney Eurofoil (L) | PeerMajor (L) | Peintures Kuttén (L) | Perfgoal sprl (B) | Performance Progrès en Lorraine (PPL) (F) | Philips Digital System Labs (NL) | Philips Semiconductors (NL) | Plovdiv University (BG) | PricewaterhouseCoopers (L) | Proactif (L) | Probelsoft (B) | Professional Computing Solutions SA (B) | ProfilArbed (L) | Promemploi ASBL (B) | PROMOTIC SA (L) | ProSolut SA (L) | Pro-Sud (L) | Qualium (F) | Quint Wellington Redwood Luxembourg SA (L) | Rheinisch-Westfälische Technische Hochschule (RWTH Aachen) (D) | Riga Technical University (LV) | Rotarex (L) | Saint Gobain Abrasives (L) | SAIPEM (F) | Sapiens Tech (L) | Sarca – Linde (L) | Saturne Technologies (L) | Schroeder & Associés (L) | Secalt SA (L) | SecureIT SA (L) | SecureWave SA (L) | Service Central de la Statistique et des Etudes Economiques (STATEC) (L) | Service de Santé au Travail Multisectoriel (STM) (L) | Service e-Luxembourg (L) | Service Météo de l'Administration de l'Aéroport (L) | Service National de la Jeunesse (Centre Hollenfels, SNJ) (L) | Services informatiques de l'administration luxembourgeoise (L) | SES (L) | SGI Ingénierie (L) | Siemens Business Services SA (L) | SLIC Gruchet (F) | SOCOM (L) | SOILCONCEPT (L) | SOLSITEC (F) | Spiece SA (L) | Stiftelsen for Industriell log Teknisk Forskning ved NTH – SINTEF (N) | Stoneroos (NL) | Société du Train Universel de Longwy (STUL) (F) | Sun Microsystems Luxembourg (L) | Syllis France (F) | Syndicat Intercommunal à Vocation Ecologique (SIVÉC) (L) | Syndicat Intercommunal de Dépollution des Eaux résiduaire du Nord (SIDEN) (L) | Syndicat Intercommunal pour l'Assainissement du Bassin de la Chier (SIACH) (L) | Systemat (L) | Tarkett Sommer (L) | Technical Airborne Components (B) | Technical University of Turin (I) | Technifutur (B) | Technische Universität Berlin (D) | Techno.bel (B) | Technofutur TIC (B) | Technological Management Contract Centre BV a company of Technische Universität Eindhoven (NL) | Technology University of Eindhoven (TUE) (NL) | Tec-Minho (Portugal) (P) | Tecnet (IRL) | Telindus (L) | Telvent (E) | Thomson Multimedia (F) | Tilburg University (NL) | Train Laminé Marchand (TLM) (L) | TrefilARBED Bissen (L) | TW1 (Austria) (A) | UNINOVA (P) | Union des Caisses de Maladie (UCM) (L) | Unité de Stratégie Informatique de la Confédération (USIC) (CH) | Universidad de Vigo (E) | Universidad del Cauca (CH) | Universidad Politécnica de Madrid (E) | Universidad Politecnica de Valencia (E) | Universität Duisburg-Essen (D) | Universität Köln (D) | Universitat Politècnica de Catalunya (E) | Université Catholique de Louvain (UCL) (B) | Université d'Aix-Marseille III (F) | Université d'Athènes (GR) | Université de Bordeaux 1 (F) | Université de Katowice (PL) | Université de Liège (B) | Université de Luton (GB) | Université de Marne la Vallée (F) | Université de Metz (F) | Université de Metz - Laboratoire de Spectrométrie de Masse et de Chimie Laser (LSMCL) (F) | Université de Metz - Laboratoire d'Etude des Textures et Applications aux Matériaux (LETAM) (F) | Université de Nancy 1 (F) | Université de Nancy 2 (F) | University of Salzburg (A) | Université de Technologie de Compiègne (F) | University of Trier (D) | Université du Luxembourg (L) | Université du Québec (CA) | Université Libre de Bruxelles (B) | Université Polytechnique de Barcelone (E) | University College London (UCL) (GB) | University of Bergen (N) | University of Geneva (CH) | University of Kent (GB) | University of Lausanne (CH) | University of Oldenburg (D) | Ville de Differdange (L) | Ville de Luxembourg (L) | Ville d'Esch-sur-Alzette (L) | Vlaamse Instelling voor Technologisch Onderzoek (VITO) (NL) | Whatdoweb (L) | Woelfel Beratende Ingenieure (D) |

# Scientific Publications in 2005

## Laboratory for Industrial Technologies and Materials (LTI)

Riche A., Ruch D. : "Correlation between Structural and Mechanical Properties of PbTiO<sub>3</sub> thin Films grown by Pulsed Laser Deposition" in *Applied Surface Science*, in press

Schaeffers J., Colin J., Aggoune R. : "A Performance Measurement System for the Health-care Industry, the Industrial Point of View" in *International Journal of Business Performance Management (IJBPM)*, in press

Belouettar S., Azrar L., Daya E.M., Potier-Ferry M. : "Active Control of Nonlinear Vibration of Sandwich Piezoelectric Beams: A Simplified Approach" in *International Journal of Computers and Structures*, in press

Azrar L., Belouettar S., Wauer J. : "Nonlinear Vibration Analysis of Actively Loaded Sandwich Piezoelectric Beams with Geometric Imperfections" in *International Journal of Computers and Structures*, submitted

Mencik J., Rauchs G., Bardon J., Riche A. : "Determination of Elastic Modulus and Hardness of Viscoelastic-plastic Materials by Instrumented Indentation under Harmonic Load" in *Journal of Materials Research*, Vol. 20, 2005, pp. 2660-2670

Mendibide C., Riche A. : "Correlation between the Viscoplastic Properties of Polymer Coatings Deposited onto PMMA and their Resistance against Fracture and Oligocyclic Fatigue" in *Les Cahiers de l'Innovation "Understanding Ageing for a Better Control of Sustainability"*, in press

Mendibide C., Ruch D. : "Corrosion Inhibition of Hot Dip Metallic Coated Steel by Chromate Conversion Coatings" in *Les Cahiers de l'Innovation "Understanding Ageing for a Better Control of Sustainability"*, in press

Bardon J., Riche A., Mendibide C. : "Evolution of Mechanical Properties of PVC Sheets Submitted to UV Ageing, Determination of Surface Properties Changes and through Thickness Changes by Nanoindentation and Nanoscratch" in *Les Cahiers de l'Innovation "Understanding Ageing for a Better Control of Sustainability"*, in press

Buchheit O., Riche A., Ruch D. : "Wear on PVC Based Floor Coverings: Characterization of Topographical, Mechanical and Analytical Surface Properties" in *Les Cahiers de l'Innovation "Understanding Ageing for a Better Control of Sustainability"*, in press

Hu H., Belouettar S., Daya E.M., Potier-Ferry M. : "Comparaison des divers modèles pour les structures sandwich" in Proceedings du 17ème Congrès Français de Mécanique (CFR2005), Université de Technologie de Troyes, 29th August – 2nd September 2005

Hu H., Belouettar S., Daya E.M., Potier-Ferry M. : "Évaluation des divers modèles analytiques pour les structures sandwich" in Proceedings du 7ème Colloque National en Calcul des Structures, Giens, France, 17th - 20th May 2005

Hu H., Belouettar S., Daya E.M., Potier-Ferry M. : "New Modelling Approach for Damped Multilayered Composites" in Proceedings in Applied Mathematics and Mechanics (PAMM), Wiley-Interscience Online Journal, Volume 5, Issue 1, 2005, pages 413-414

Laptev V., Belouettar S. : "On Averaging of the Non-Periodic Conductivity Coefficient Using Two-Scale Extensions" in Proceedings in Applied Mathematics and Mechanics (PAMM), Wiley-Interscience Online Journal, Volume 5, Issue 1, 2005, pp. 681-682

Hu H., Belouettar S., Daya E.M., Potier-Ferry M. : "Comparison of Classical Models for Viscoelastically Damped Sandwich Beams" in Proceedings of the 7th International Conference on Sandwich Structures, Aalborg, Denmark, 29th - 31st August 2005

Hu H., Belouettar S., Daya E.M. : "Viscoelastically Damped Sandwich Beams" in Proceedings of the Fifth Euromech Non Linear Dynamics Conference, Eindhoven, Netherlands, 7th -12th August 2005

Hu H., Belouettar S., Daya E.M., Potier-Ferry M. : "An Arlequin multiscale FEM for Sandwich Structures" in Proceedings of the International Conference on Mechanical Engineering and Mechanics, Nanjing, China, 26th - 28th October 2005

Laptev V., Belouettar S., Daya E.M., Azrar L. : "An Amplitude Equation for the Non-Linear Vibration of Sandwich Piezoelectric Beams, Active Control" in Proceedings of the Thematic Conference on Smart Structures and Materials II ECCOMAS, Lisbon, Portugal, 18th - 21st July 2005

Bardon J., Ruch D., Riche A., Becker C., Buchheit O. : "Etude du changement de propriétés consécutif au vieillissement par irradiation ultraviolette du polychlorure de vinyle" in *Revue Technique Luxembourgeoise*, 2005-1

Becker C., Ruch D. : "In Situ Laser Remelted Thermal Barrier Coatings: Thermo Physical Properties" in *Surface and Coatings*, in press

Rauchs G. : "Optimization-based Material Parameter Identification in Indentation Testing for Finite Strain Hypo-elastic Plasticity" accepted by *Zeitschrift für Angewandte Mathematik und Mechanik*

Riche A., Bardon J. : "Analysis of the Ductile/Brittle Transition During a Scratch Test Performed into Polymeric Film Deposited on a PMMA Substrate" in *Zeitschrift für Metallkunde*, 11(96)-2006

Bardon J., Riche A. : "Quasi Static and Dynamic Depth Sensing Indentation Measurements to Characterize Wear and Mar Resistance of Coating - Polymer Systems" in *Zeitschrift für Metallkunde*, 11(96)-2006

## Centre for IT Innovation (CITI)

Rousseau A., Grein L. : "Les leçons du CRTI-B. Quels facteurs critiques pour l'innovation en réseau ?" in *Cahier de Recherche "Les réseaux, nouvelles formes de collaboration au service de l'innovation au Luxembourg"*, in press

Rousseau A. : "Les réseaux, nouvelles formes de collaboration au service de l'innovation au Luxembourg" in *Cahier de Recherche "Les réseaux, nouvelles formes de collaboration au service de l'innovation au Luxembourg"*, in press

Hanser D. : "Outillages innovants et réseaux d'innovation - Quel outillage pour l'innovation en réseau ?" in *Cahier de Recherche "Les réseaux, nouvelles formes de collaboration au service de l'innovation au Luxembourg"*, in press

Michel J.-P. : "Potentiel d'innovation TIC à Luxembourg - Apport d'un dispositif national en plates-formes d'innovation" in *Cahier de Recherche "Les réseaux, nouvelles formes de collaboration au service de l'innovation au Luxembourg"*, in press

Pirot O. : "RESINA un projet dédié aux réseaux d'innovation et d'apprentissage" in *Cahier de Recherche "Les réseaux, nouvelles formes de collaboration au service de l'innovation au Luxembourg"*, in press

Durand A. : "Une démarche d'évaluation des stratégies réseau. La méthode MACTOR au service des stratégies du CITI" in *Cahier de Recherche "Les réseaux, nouvelles formes de collaboration au service de l'innovation au Luxembourg"*, in press

Di Maria C.-H., Farcot M. : "Coopération et innovation : facteurs explicatifs" in *Cahiers Economiques n. 97: "L'innovation au Luxembourg"*, édités par le STATEC

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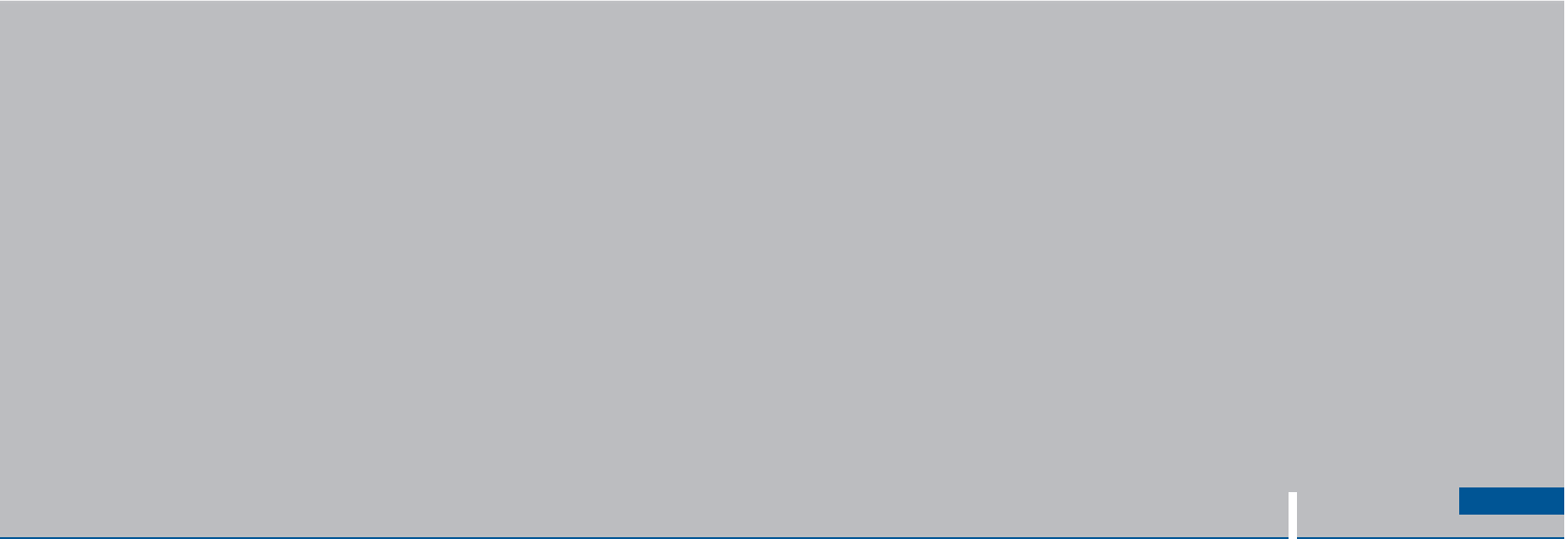
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# Administration & finances



## Board of Directors

Jean de la Hamette, Chairman, engineer

Lucien Schummer, Member of the Executive Committee, Vice-president of Cargolux Airlines International SA

Claude Wehenkel, Member of the Executive Committee, CEO of the CRP Henri Tudor

Georges Bourscheid, Managing Director of GUARDIAN LUXGUARD I SA & GUARDIAN LUXCOATING SA

Pascal Bouvry, Professor at the Faculty of Sciences, Technology and Communication of the University of Luxembourg

Pierre Decker, Commissaire du Gouvernement, Conseiller de Gouvernement 1ère classe, Ministry of Culture, Higher Education and Research

Jean-Marie Haensel, Senior Budget Advisor

Pierre Hirtt, Founding Partner and CTO of HITEC Luxembourg SA

Patrick Nickels, Conseiller de Direction 1ère classe, Ministry of the Economy and Foreign Trade

Jean Tagliaferri, Professeur attaché, Ministry of Culture, Higher Education and Research



After the acceptance of the Fourth Development Plan 2004-2007  
(from right to left) : Pierre Decker, Lucien Schummer, Jean de la Hamette,  
Pierre Hirtt, Claude Wehenkel, Jean-Marie Haensel

## Management Board

Dr Claude Wehenkel, President, Technoport Schlassgoart, incubator, human resources, customer survey

Pr Dr Eric Dubois, Vice-president, Information and Communication Technologies

Etienne D'hoedt, Vice-president, Administration, finances, R&D project monitoring

Jean-Pol Michel, Vice-president, Information and Communication Technologies

Pierre Plumer, Vice-president, Medical and clinical technologies and engineering

Pr Dr Jos Schaeffers, Vice-president, Industrial technologies

Dr André Weidenhaupt (until 1st Sept. 2005, replaced by Joëlle Welfring and Dr Paul Schosseler), Environmental technologies, technology and standard watch

## Scientific Advisor

Dr Serge Allegrezza, Director of STATEC

## Administration

Cécile Cavalade, Customer relations, project evaluation

Etienne D'hoedt, Management audit, finances

Monia Di Pillo, External and internal communication

Hugues Henriot, IT Support

Martin Mus, Co-ordination and management

Robert Schambourg, Technical support, accountancy

Sylvie Weyland, Human resources

## Certifying of accounts

The financial and analytical accountancy has been carried out in the Centre. The accounts have been audited by Mr Marc Müller, auditor, and approved in his Accountant's report of 7<sup>th</sup> March 2006. The Board of Directors has approved the accounts and the balance sheet 2005 on 13<sup>th</sup> March 2006.

## Profit and loss account for the year ended 31<sup>ST</sup> December 2005

(in Euro)

|   | 2005                 | 2004                 |
|---|----------------------|----------------------|
| <b>Costs</b>  |                      |                      |
| Charges on operating costs  | 1 771 391.91         | 2 183 030.08         |
| Other charges   | 2 582 623.19         | 2 527 421.02         |
| Staff expenses  | 13 222 054.46        | 12 621 207.47        |
| Value adjustment on equity tax and in respect of tangible and intangible assets | 669 918.24           | 688 425.44           |
| Value adjustment on current assets  | 443 512.76           | 266 363.57           |
| Other operating costs   | 1 528 052.05         | 926 059.11           |
| Value adjustment on financial fixed and current assets                          | 0.00                 | 6 991.72             |
| Interests payable and similar charges   | 36 561.57            | 62 442.71            |
| Exceptional expenses  | 205 801.69           | 176 803.16           |
| Result of the financial year (income surplus)                                   | 219 286.28           | 55 412.48            |
| <b>Total</b>  | <b>20 679 202.15</b> | <b>19 514 156.76</b> |
| <b>Income</b>   |                      |                      |
| Net turnover  | 9 636 942.94         | 10 779 732.67        |
| Grant for mission of public utility   | 7 264 252.86         | 6 040 399.17         |
| Income on projects and independent structures                                   | 1 111 722.78         | 1 010 004.48         |
| Other income from operations  | 2 294 175.91         | 1 295 198.54         |
| Other interests and similar income  | 6 699.99             | 5 944.34             |
| Exceptional income  | 365 407.67           | 382 877.56           |
| <b>Total</b>  | <b>20 679 202.15</b> | <b>19 514 156.76</b> |

## Balance sheet as at the 31st December 2005

(in Euro)

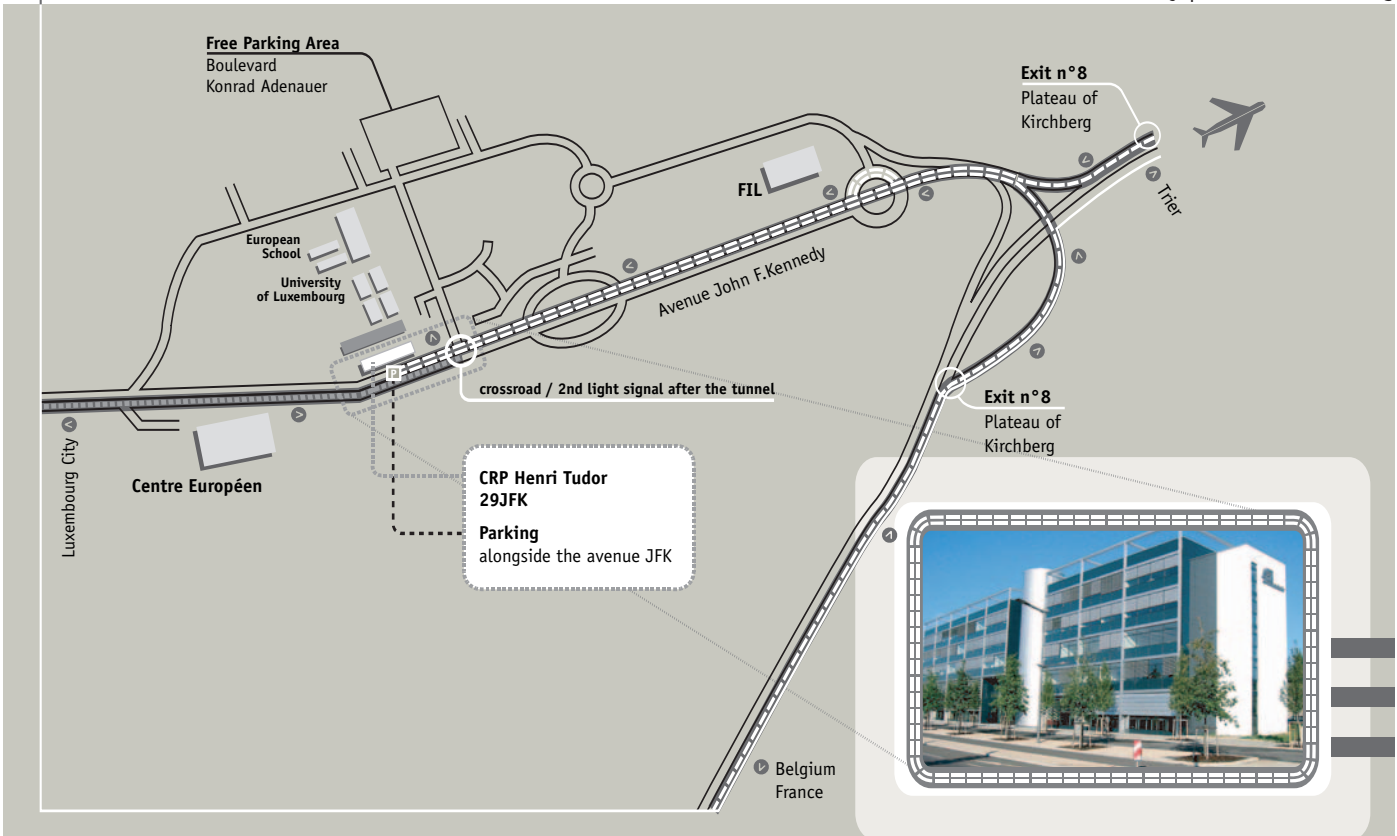
|  | 2005                 | 2004                 |
|--|----------------------|----------------------|
| <b>Assets</b>  |                      |                      |
| <i>Fixed assets</i>                                  |                      |                      |
| Intangible assets                                    | 538 464.63           | 376 113.88           |
| Tangible fixed assets                                |                      |                      |
| Technical equipment and machinery                    | 341 077.07           | 560 161.21           |
| Other equipment and machinery                        | 297 591.27           | 507 837.49           |
| Financial fixed assets                               | 14 873.63            | 5 563.34             |
| <b>Total fixed assets</b>                            | <b>1 192 006.60</b>  | <b>1 449 675.92</b>  |
| <i>Current Assets</i>                                |                      |                      |
| Stocks : raw materials and consumables               | 0.00                 | 0.00                 |
| Accounts receivable                                  |                      |                      |
| Accounts receivable from sales of goods and services | 11 931 663.67        | 11 437 210.24        |
| Other accounts receivable                            | 446 611.27           | 377 376.89           |
| <b>Total accounts receivable</b>                     | <b>12 378 274.94</b> | <b>11 814 587.13</b> |
| Cash in bank and in hand                             | 630 043.52           | 753 740.14           |
| <b>Total current assets</b>                          | <b>13 008 318.46</b> | <b>12 568 327.27</b> |
| Adjusting account                                    | 155 105.68           | 132 234.44           |
| <b>Total assets</b>                                  | <b>14 355 430.74</b> | <b>14 150 237.63</b> |
| <b>Liabilities</b>                                   |                      |                      |
| <i>Equity capital</i>                                |                      |                      |
| Subscribed capital                                   | 247 893.52           | 247 893.52           |
| Non-dedicated reserve                                | 1 823 011.18         | 1 612 654.84         |
| Profit brought forward                               | 55 412.48            | 210 356.34           |
| Income surplus of the financial year                 | 219 286.28           | 55 412.48            |
| <b>Total equity capital</b>                          | <b>2 345 603.46</b>  | <b>2 126 317.18</b>  |
| Provisions   | 965 101.41           | 926 059.11           |
| <i>Accounts payable</i>                              |                      |                      |
| Accounts payable to credit institutions              | 1 053 317.09         | 3 225 690.25         |
| Accounts payable from acquisitions and services      | 817 383.94           | 777 116.65           |
| Tax and social liabilities                           | 367 921.00           | 252 644.27           |
| Other accounts payable                               | 2 085 793.64         | 1 437 678.36         |
| <b>Total accounts payable</b>                        | <b>4 324 415.67</b>  | <b>5 693 129.53</b>  |
| Adjusting account                                    | 6 720 310.20         | 5 404 731.81         |
| <b>Total liabilities</b>                             | <b>14 355 430.74</b> | <b>14 150 237.63</b> |

# Addresses & Access

## ACCESS MAP

LUXEMBOURG-KIRCHBERG

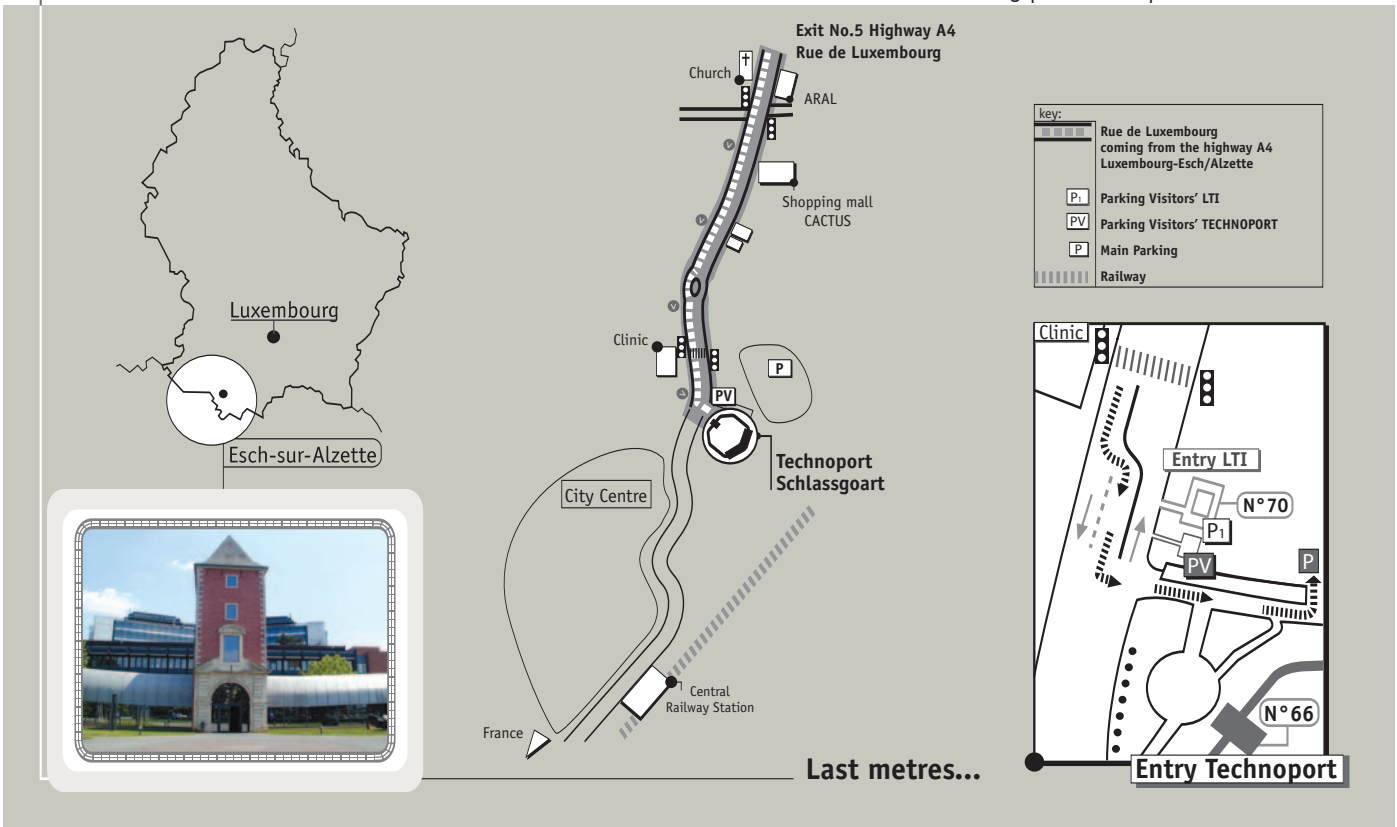
Centre de Recherche Public Henri Tudor  
29, avenue John F. Kennedy | L-1855 Luxembourg



## ACCESS MAP

ESCH-SUR-ALZETTE

Technoport Schlassgoart  
66 & 70, rue de Luxembourg | B.P. : 144 | L-4002 Esch-sur-Alzette



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N°52 | Décembre 2005 - Janvier 2006

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### Highlights

8 février 2006

**Certification ISO 9001 :2000 pour le CRP Henri Tudor**

Le 8 février, le CRP Henri Tudor a reçu des mains de Stefan Zerwes, directeur d'ESCEM (TUV Cert) et en présence du Ministre de la Culture, de l'Enseignement Supérieur et de la Recherche, de développement et d'innovation (RDI). Ce pour la réalisation, la conduite et le pilotage de projets de recherche, de développement et d'innovation (RDI). Ce certificat signifie que des organismes reconnus comme le TÜV Rheinland et l'ESCEM certifient que le CRP Henri Tudor a mis en place un système de qualité (Quality Management System - QMS) conforme à la norme ISO9001: 2000. Le CRP Henri Tudor est ainsi un des premiers centres de recherche publics européens à recevoir ce certificat de qualité pour l'ensemble de ses activités de recherche et d'innovation.



de g. à dr.: François Blitgen, Ministre de la Culture, de l'Enseignement Supérieur et de la Recherche, Claude Wihenkel, Administrateur délégué du CRP Henri Tudor, Jean de la Hamette, Président du Conseil d'Administration du CRP Henri Tudor, Stefan Zerwes, Directeur d'ESCEM et Yves Collet, Responsable qualité du CRP Henri Tudor

1

**Centre de Recherche Public Henri Tudor**

29, avenue John F. Kennedy | L-1855 Luxembourg - Kirchberg

phone: +352 42 59 91 - 1 | fax: +352 42 59 91 - 777

info@tudor.lu | www.tudor.lu

**Technoport Schlassgoart**

66 & 70, rue de Luxembourg | PO. Box: 144 | L-4002 Esch-sur-Alzette

phone: +352 54 55 80 - 1 | fax: +352 54 55 80 - 401

info@technoport.lu | www.technoport.lu