

ANNUAL REPORT

2004



PUBLIC RESEARCH CENTRE  
HENRI TUDOR



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



**1** and **2** > Workshop of the ESA "Digital Divide and Knowledge-based Economy": Romain Bausch, CEO of SES Global, Minister François Biltgen and Catherine Trautman, Member of the European Parliament, former Minister of Culture (F) (13 October 2004 at the 29JFK) | **3** > The visit by Minister François Biltgen and Secretary of State Octavie Modert when it was possible to video-conference with the entrepreneurs of the Technoport in Esch-sur-Alzette (20 October 2004 at the 29JFK) | **4** and **5** > "En route to Lisbon", First Luxembourg Symposium on the Economy of Knowledge from a European Perspective (12 - 13 October at the 29JFK): the Minister of Economy Jeannot Krecké and the organisers (Claude Wehenkel, Georges Schmit, Patrick Cohendet, Serge Allegrezza) | **6** > Presentation of the Technoport to the INNER WHEEL Club Luxembourg-Esch-sur-Alzette | **7** > 5 October 2004, the Centre's Board of Directors approved the Fourth Development Plan 2004 – 2007 | **8** > The 2004 seminar of the Management Board on the subject of the Fourth Development Plan, July 2004 | **9** > On 27 September 2004 the Centre welcomed Richard M. Stallmann for a conference dedicated to the dangers and opportunities of software patents | **10** > Signature of a collaboration agreement between the Ministère de l'Intérieur et de l'Aménagement du Territoire and the Centre de Ressources des Technologies pour l'Environnement | **11** > Steering committee of the ISO certification project for the Centre's project management procedures | **12** > Working group for collaboration between the University of Liège and the CRP Henri Tudor; with the Rector Willy Legros (standing) | **13** > Saint Nicolas at the CRP Henri Tudor (1 December 2004) | **14** > Signature of a collaboration agreement between the CRITT-TTI (F), the Infopôle (B) and the CITI (16 June 2004)

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1 > European recognition of the Technoport with the granting of the "EC-BIC" licence, in the presence of Lydia Mutsch, Mayor of the city of Esch-sur-Alzette (27 April 2004) | 2 > The Technoport and its start-ups present on the stand of the Ministère de l'Economie et du Commerce extérieur at the 2004 CEBIT in Hannover (March 2004) | 3 Opening of the new premises of SecureWave SA, third success story of the Technoport (1 April 2004) | 4 > The conference with Dr Eli Goldratt (left in the photo) "Theory of Constraints: A Viable Vision" was held on 11 June 2004 with more than 120 participants | 5 > Presentation of the Annual Report 2003, in the presence of the Minister of Research Erna Hennicot-Schoepges (14 April 2004) | 6 > On a visit to the CRP Henri Tudor on 17 December 2004, Mars Di Bartolomeo, Minister of Health, tested the Monicard apparatus enabling distance assessment of the state of health of patients suffering from cardiovascular illnesses. The apparatus and method were developed in co-operation between the CHL and the CR SANTEC within the context of a project of the FNR "Luxembourg Heart Failure Project" subject to submission of a European patent | 7 > The conferences SPIRAL 2004 (16 - 17 June 2004) | 8 > Presentation of the 2004 training catalogue of SiTec® "Lifelong Learning for Technological Innovation". The catalogue was realised in collaboration with the University of Luxembourg (11 February 2004) | 9 > Launch meeting of the Diplôme d'Etudes Supérieures d'Université (DESU) in "Management and quality of companies and services, 16 February 2004 | 10 > 31 entrepreneurs participated in the workshops organised by the Technoport in 2004

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## The corporate vision of CRP Henri Tudor is :

- To be at the service of innovation and entrepreneurship to strengthen the economic and social tissue in the sense of sustainable development,
- To answer 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, leader on the national and regional level, deeply involved actor in European and international co-operation,
- To be an autonomous, dynamic and efficient public value company.

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

- To be a “SME of public value”: CRP Henri Tudor is a public institution managed under private law,
- To develop its activities in the “Innovation Chain”: R&D, 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.

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Claude Wehenkel, CEO, Chairman of the Management Board

## “En route to Lisbon”

The year 2004 was marked by a general awareness of the importance of innovation in improving competitiveness, at a national and a European level. Witness of that sudden awareness, the first Luxembourg symposium on the knowledge economy from a European perspective, “En route to Lisbon”, organised in October 2004 jointly by STATEC and the CRP Henri Tudor was a resounding success.

Itself qualifying since its creation in 1987 as a “centre for innovation and technological development”, the CRP Henri Tudor fits perfectly into the Lisbon strategy of innovation.

Deeply immersed in both Luxembourg and European contexts, the Centre participates in a series of activities which have a single objective, improvement of the environment of innovation for companies. These activities cover the incubation of innovative technology companies, applied research, academic research, animation of innovation platforms, technological assistance, awareness and ongoing training at post-graduate level. Any interested reader will find an impressive list of results in this report. The scope and quality of the partnership illustrates the pertinence of the Centre’s transfer and innovation activities.

The mobility of researchers and engineers also contributes to the transfer of skills and the spirit of innovation. In 2004, 19 people found an attractive job, essentially in the private sector, and in all 275 have done so since the creation of the Centre. Moreover, it should be noted that the Centre has generated 250 jobs since its creation, not to mention the jobs created by start-up companies at the Technoport Schlassgoart which also contribute to increasing the potential for innovation. Against that background, the initiative of the SNCI to support the creation of spin-off companies attracted great interest among the Centre’s researchers.

“En route to Lisbon” is also the subtitle we have given to our Fourth Development Plan (DP4) 2004-2007. This pluriannual plan marks an essential milestone for the consolidation of the CRP Henri Tudor and for reflection on its strategy of innovation.

In fact, DP4 serves as the basis for contractual relations with the Research Ministry, guaranteeing perfect transparency and fulfilment of the obligation of accountability on the basis of indicators. These indicators serve both as objective figures and a system of result measurement. In this spirit, in 2004 the CRP Henri Tudor initiated a client satisfaction service also aimed at analysing the results of research projects and facilitating their dissemination.

At a strategic level, the core objective of the CRP Henri Tudor is to be a structural element in the national innovation scheme which should establish a network of all the actors concerned, including the local authorities in industrial areas. DP4 introduces the idea of an innovation platform which generalises that of resource centres, a concept introduced in January 1988 at the CRP Henri Tudor with the creation of the “Computer Integrated Manufacturing Resource Centre”. The twelve innovation platforms and resource centres, and the three service centres, clarify the contribution made by the CRP Henri Tudor to the national innovation scheme. The constitution of committees to support the innovation platforms is intended to enable the Centre’s innovation strategies to be ratified and shared by institutional partners. The priority task for these platforms is to be at the service of companies and groups of companies. The 2004 Annual Report again provides proof of this.

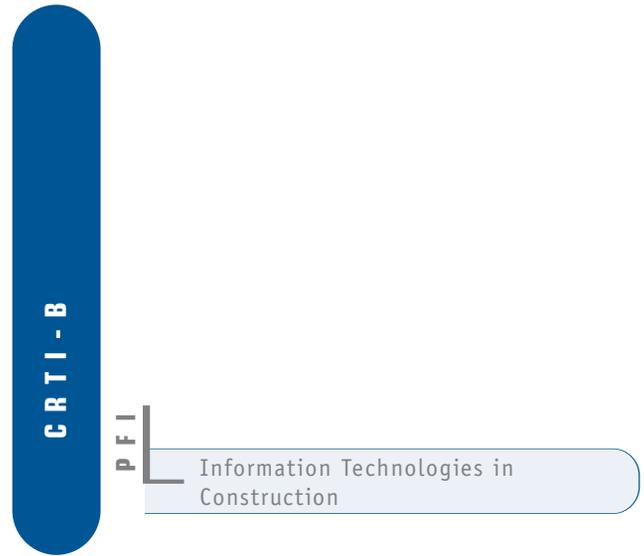
The **Public Research Centre Henri Tudor** is made up of eight departments:

<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)

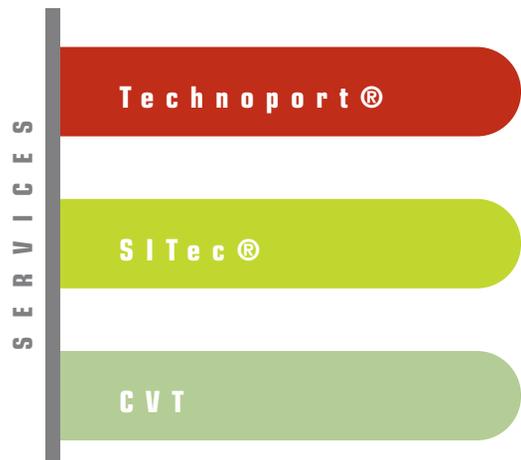
The Centre's departments are made up of:

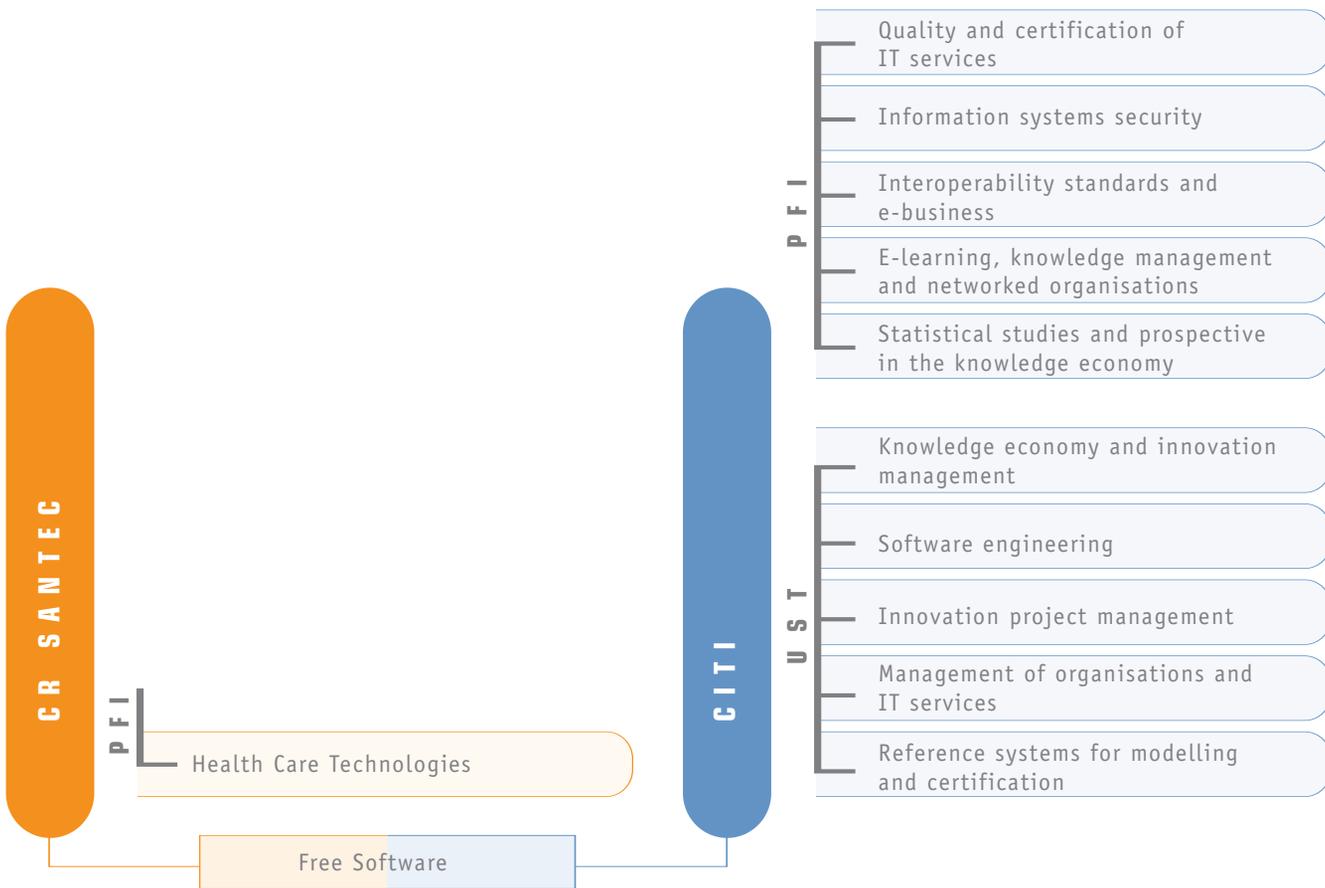
- **Innovation platforms (PFI)**  
who have a common national strategic objective, a large panel of partners and numerous multidisciplinary activities of research and transfer;
- **Scientific and technological units (UST)**  
A pronounced component of specialised research associated with RDI and valorization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

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

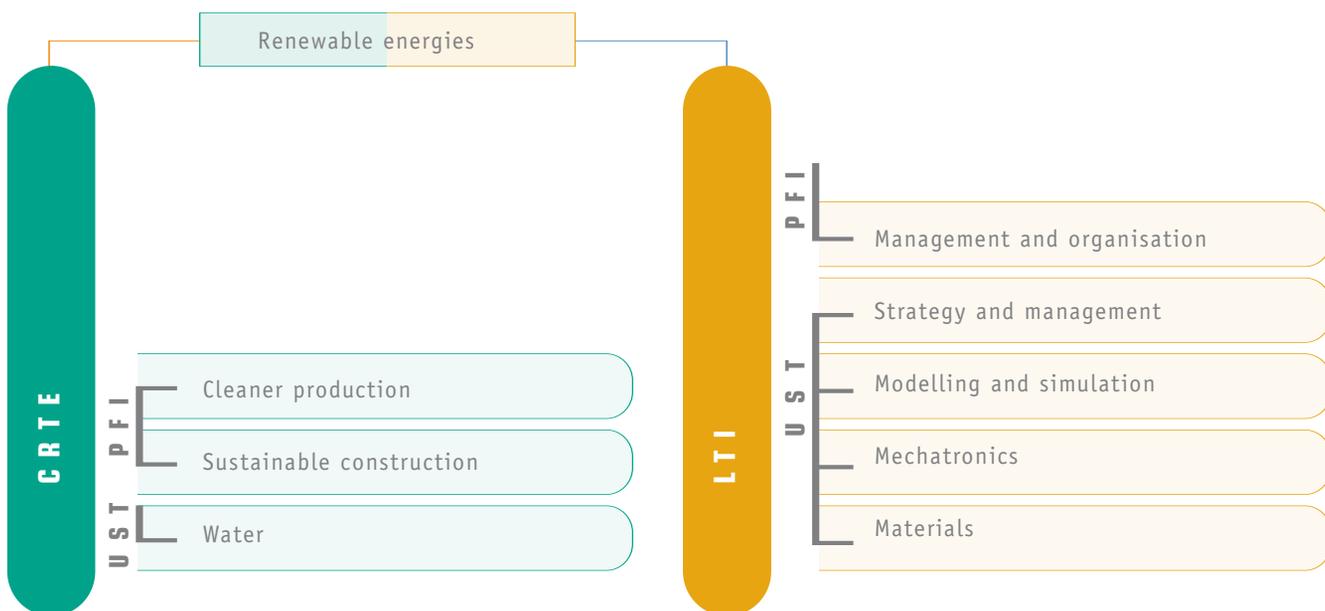


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## RESEARCH CENTRE HENRI TUDOR



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

# Main figures 2004 of the CRP Henri Tudor

	2004	2003
Staff:	252	239
Income (in Euro):	19,514,156.76	17,717,463.96
Self-funding rate:	46.1%	48.2%
Subsidy rate:	27.3%	29.2%
Budget for 2005 (in euros):	21,645,800	

## Projects close both to companies and the scientific world

In 2004, the CRP Henri Tudor participated in 103 projects, among them:

- 36 projects co-financed by the Ministry of Culture, Higher Education and Research (excluding co-financing from European research programmes);
- 8 projects co-financed by other ministries;
- 31 European projects in particular within the context of the FP5, FP6, ESA, LEONARDO, ESF, INTERREG, ERDF Objective 2 and Objective 3 programmes;
- 9 projects financed by the National Research Fund (FNR) within the context of pluriannual research programmes;
- 19 projects financed 100% by the private sector or public departments.

70% of the projects **are implemented in direct partnership with companies** or groups of companies, 34% in partnership with public departments or bodies and 29% in partnership with research centres or universities.<sup>1</sup>

Four actions were launched in 2004 in the 6th European R&D Framework Programme (FP6):

- The Centre co-ordinates a technical group in the network of excellence INTEROP "Interoperability Research for Networked Enterprises Application and Software";
- The Centre is a member of the directorate of the network of excellence CMA "Complex Metallic Alloys";
- The Centre is co-ordinator of the project CASSEM "Composite and Adaptive Structures: Simulation, Experimentation and Modelling" (Specific Targeted Research Project – STREP);
- The Centre participates in the project NAVOBS "A Support Measure to Boost the Business Prospects of GMES and Telecom Satellites through Focused and Innovative RTD Work Involving SMEs" (Specific Support Action) initiated by the European spatial incubators network (ESINet); the Centre is a member of this network created on the initiative of the ESA (European Space Agency) and the EU.

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



## Scientific and academic activities

The engineers of the Centre Henri Tudor wrote **71 scientific articles**, of which 16 were published in scientific journals and 49 in conference proceedings.

In 2004, the Centre trained **16 doctoral students**: 7 in industrial and materials technologies, 6 in information technologies and the economy of knowledge, 1 in health care technologies, 1 in environmental technologies and 1 in technology watch. In 2004, Olivier Buchheit defended its thesis at the Institut National Polytechnique de Lorraine (INPL) in Nancy on the "Study and Characterisation of Wear of PVC-based Floor Coverings: Characterisation of Damage under Real Service Conditions and Laboratory Simulation". It should be stressed that these doctoral works are integrated in the projects of the CRP Henri Tudor.

In 2004, the Centre became a **member of a European doctoral college** in the field of new materials and their characterisation.

**Two international masters** are co-organised with the University of Luxembourg and foreign universities. The fourth promotion of the "Information Technologies and Innovation" closed in September 2004 with nine graduates. The fifteen students in the 2003/2005 promotion are continuing their training and have been joined by twelve new participants for the 2004/2006 promotion. The Diplôme d'Etudes Supérieures d'Université in "Management and quality of companies and services" started its first promotion with eighteen participants over twelve months.

35 researchers at the Centre participated in university training in Europe.

The researchers at the Centre Henri Tudor are recognised for their skills. So they took part in 18 evaluation committees for international scientific conferences, 4 scientific evaluation committees for international research programmes and one normative evaluation committee. Moreover, the Centre was involved in scientific and economic orientation at a national and an international level, participating in 13 national orientation committees and 22 international orientation committees.



## Training and dissemination activities

The Centre's mission of dissemination and transfer were predominant this year with the organisation of numerous qualifying and diploma courses, scientific conferences and professional events.

**148.5 days of ongoing qualifying training** were organised by the Centre, or 93 different courses and cycles of courses involving 932 registered participants. The two ongoing diploma courses represented 79.5 days of courses in 2004.

The Centre organised **six international conferences in 2004**:

- the "Journées du Libre", on 26 March 2004 (66 participants);
- the symposium "Dossier informatisé de la personne soignée", 6 - 7 April 2004 (109 participants)
- "Theory of Constraints: A Viable Vision", with Dr Eli Goldratt, 11 June 2004 (120 participants);
- the SPIRAL/CLUSSIL conferences 2004, 16 - 17 June 2004 (107 participants);
- "En route to Lisbon" 1st Luxembourg symposium on the knowledge economy from a European perspective, organised by STATEC and the CRP Henri Tudor, 12 - 13 October 2004 (383 participants);
- "International Conference on Advances in Intelligent Systems – AISTA 2004", 15 - 19 November 2004 (134 participants).

Two European scientific networks, ERCIM (European Research Consortium on Informatics and Mathematics) and the network of excellence INTEROP organised their annual conference at the CRP Henri Tudor;

- "Workshop of the ERCIM Working Group on the Semantic Web", 27 May 2004 (30 participants);
- "INTEROP General Assembly", 22 - 25 November 2004 (100 participants).

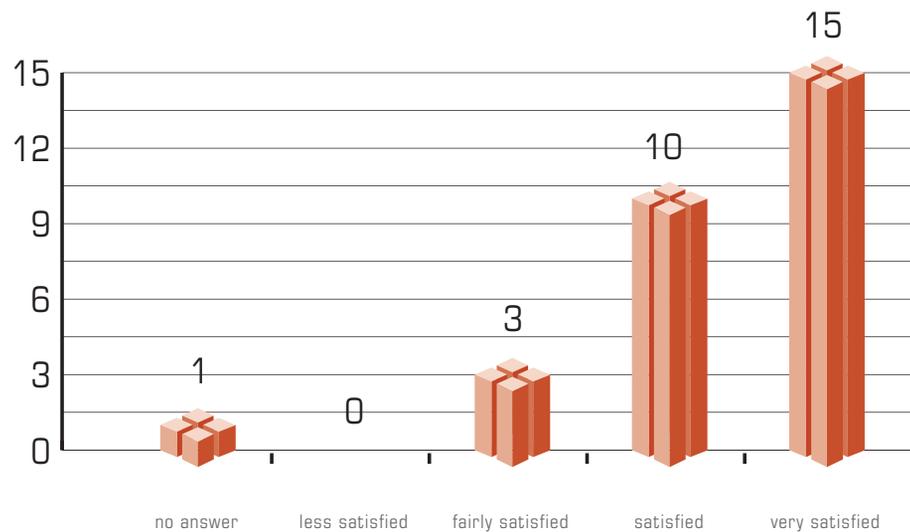
In addition, **79 themed events** were organised, and among them the following can be underlined:

- the "Salon des Bonnes Pratiques" with 200 people spending a day dedicated to quality;
- a professional meeting "Software Patents: Danger or Opportunity?" with 174 participants and another entitled "ERP libres: une alternative crédible au Luxembourg?" with 98 participants;
- the launch of the IT Service Management Forum (ITSMF) Luxembourg within the context of the Quality Week, with 92 people attending.

# Client satisfaction and quality

From 2004, 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

## ■ ■ ■ Satisfaction survey among partners and clients



At the beginning of 2004, a satisfaction survey was carried out among 29 partners in projects ended during the previous year. External consultants conducted interviews so as to ensure the neutrality of results.

The chart above shows the great satisfaction of partners. **100% of partners interrogated are ready to work again with the Centre Henri Tudor.**

The results of the survey highlight **the excellence and added value** provided by the Centre. So, to the open question "Why did you choose Centre Henri Tudor?", 24% of the partners questioned answered spontaneously, to explain their choice by "their skills, their experience and their seriousness".

The survey **identified some proposals for improvement**, in particular in administration and project conclusion, proposals integrated into the ongoing project for ISO certification.

## They give us confidence ...

*"For LuxScan Technologies, the Technoport was and still is a strategic partner in our development. I was impressed by the facility and the flexibility of the start-up offered to us when we started. **The reception we were given enabled us to focus on choices vital to the development of our company**, namely the development of our product and the search for clients."*

*Raphaël Vogrig, CEO LuxScan Technologies*

*"From the start, InTech was positioned on the market for NTIC and innovative projects. It was not therefore by chance that our two companies met and collaborated rapidly and effectively on the subject of e-learning. For InTech, **this collaboration with the CRP Henri Tudor is a bridge between the short term and the long term**, and above all a point of reference giving sustainability to our entrepreneurial action."*

*Roland Weber, Manager InTech SA*

*"I would emphasise the interest of your process\* within the context of our joint consultations with professionals in the financial sector, in relation to the development of our financial market place. Adaptation of the principles of industrial operational management to the finance industry is without doubt a step in the right direction in ensuring that the financial institutions applying them have a sustainable competitive advantage in terms of productivity and the creation of value."*

*Arthur Philippe  
Chairman of the Market Monitoring Committee  
Financial Sector Supervision Commission, Director*

\* "Innovation in Management"



## Quality in 2004: aiming at ISO 9001 certification

2004 was a year of preparatory work for ISO 9001 certification for the project management processes. Exchanges of good practices and the homogenisation of internal training tools enabled all project leaders to perfect their know-how.

The certification process was the occasion for the Centre's Management Board to formalise the lines of its quality policy, namely:

- client and partner satisfaction,
- quality and pertinence of project results,
- development of skills,
- staff mobilisation,
- efficiency of processes and the ongoing improvement of their performance.

This certification process is not the Centre's first, since the Laboratory for Industrial Technologies (LTI) has been ISO/IEC 17025 accredited since 1999.

# Zoom on the departments

A certain number 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).

<b>Staff as at the end of the financial year:</b>	52
<b>Total number of projects in 2004:</b>	21
<b>Projects by source of financing:</b>	National projects principally subsidised by the Ministry of Culture, Higher Education and Research: 9 European projects: 7 Projects financed 100% by the private sector: 5
<b>Publications in 2004:</b>	15
<b>Key competences:</b>	modelling and controlling the Supply Chain, reference frameworks and management of organisations, constraint management, company modelling, new forms of organisations, computational mechanics, data analysis, physical measurement systems, photovoltaics, automation, studies, material trials and characterisation, metrology.
<b>Types of activity:</b>	R&D, doctoral research, expert reports, technological assistance, ongoing post-graduate training, realisation of innovation platforms, specialist services: material trials, metrology and calibration
<b>Units:</b>	- "Management and Organisation" innovation platform - "Strategy and Management" scientific and technology unit - "Modelling and Simulation" scientific and technology unit - "Mechatronics" scientific and technology unit - "Materials" scientific and technology unit  The LTI also participates in the "Renewable Energies" innovation platform launched at the end of 2004 ( <i>see appended list of the projects of this platform</i> ).
<b>Main partners :</b>	Arcelor, Guardian Automotive, Netzsch, Goodyear, Ceratizit, Service de l'Energie de l'Etat (SEE – standards committees), Office Luxembourgeois d'Accréditation et de Surveillance (OLAS), Proactif, Feta, Luxtp, Reckinger, Agence de l'Energie SA (AEL), Centre Hospitalier Emile Mayrisch (CHEM), Wickeltechnik (D), Mouvement Luxembourgeois pour la Qualité (MLQ) (see detailed list of LTI project partners appended).
<b>Contact :</b>	Jos Schaefers, Director, phone: +352 54 55 80 – 1, jos.schaefers@tudor.lu, www.lti.lu





## Key facts 2004 for the department

- launch of a project for the 6th European R&D Framework Programme, the CASSEM project “Composite and Adaptive Structures: Simulation, Experimentation and Modelling” for which the LTI provides co-ordination;
- strengthening of the collaboration with the CRP Gabriel Lippmann in the field of materials through the definition of a joint project in the TRASU programme of the National Research Fund (FNR);
- the materials unit was asked to develop and ensure the conformity of different components of the AIRBUS 380;
- emphasis placed in 2004 on the competitiveness of companies and the organisation of a series of seminars and workshops on competitiveness;
- conference day for world experts in the field of constraint theory, with Dr Eli Goldratt. More than one hundred company executives took part in this conference.



## Key facts 2004 for each unit



### “Management and Organisation” innovation platform

*The innovation platform aims at aiding companies to become competitive on a sustainable basis through the application of innovative methods and organisation such as the system of measurement and decision, the productive supply chain and the change management.*

#### Key facts 2004:

The year 2004 was the year of a series of events, working groups and training courses:

- The conference “Theory of Constraints: A Viable Vision” with Dr. Eli Goldratt took place on 11 June and was attended by the management of thirty-five companies to discuss the theory of constraints (120 participants).
- The Construction day dedicated to “the preparation of work on-site: a challenge to security and the exploitation of skills” was held on 7 December 2004 with twenty professionals.
- 30 professionals attended the conference “Customer Relationship Management” which was held in June 2004.
- The “Salon des Bonnes Pratiques” organised on 9 November 2004 in the premises of the CRP Henri Tudor was a great success welcoming more than two hundred visitors during a marathon day.
- Eleven consultants had the opportunity in 2004 to exchange views within the context of the TRANSQUAL “Cross-Border Quality Network” initiative on the relationship between consultants and clients.
- Within the context of the TRANSQUAL initiative, six participants laid the first stone for reflections into the adaptation of best management practices to the building sector.
- The QUALITY PASS “Passport for the sustainability of small companies” project was presented to small companies in three communes: Wiltz, Differdange and Schiffflange.
- Six training courses were held on subjects 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



Salon des Bonnes Pratiques (9 November 2004)

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 2004:

2004 has seen important steps

- design and validation within the context of the EXIND project “Pilotage et conception de formations en stratégie de gestion industrielle et d’organisation” of new training courses in statistical process control, in AMDEC product and in functional analysis. This was made possible thanks to a strong collaboration with Ceratizit and Goodyear;
- success of the first cluster on the implementation of ISO quality management system and dedicated to small companies of the construction sector. Two companies of the cluster have been certified ISO 9001. Strengthened by this remarkable success, the cluster has been duplicated.
- finalizing of the referential of the Prix Luxembourgeois pour la Qualité and transfer to the Mouvement Luxembourgeois pour la Qualité (MLQ);
- design of the first flow/activities selection basis of a integrated management software for material and immaterial supply chains;
- design of an diagnostic tool for small trade companies;
- design within the framework of the TRANSQUAL project of a diagnostic measuring the maturity of a company in relation with the implementation of a quality management system. The diagnostic tool will be accessible in 2005 through TRANSQUAL web site;
- supervision of two thesis.

#### Contact:

Magalie Briquet, Unit Manager, [magalie.briquet@tudor.lu](mailto:magalie.briquet@tudor.lu)

**“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 2004:**

The year 2004 was marked by the launch of the CASSEM project “Composite and Adaptive Structures: Simulation, Experimentation and Modelling”. The project is among 62 projects (out of 493 projects submitted) retained by the European Commission in the 6th framework programme. This project, with a total budget of 1.44 million euros, aims at developing technologies for the control of vibrations which will permit an improvement of the performances of lightweight structures. The project will define the best techniques for modelling, simulating and validating new concepts for the active and passive control of composite structures. The unit is to co-ordinate the project over a period of three years. The project partners are the Institut Supérieur de Mécanique in Paris (Mechanical Systems and Materials Engineering Laboratory), the Politecnico di Torino (Department of Aeronautics and Aerospace Engineering), the University of Metz (materials Physics and Mechanics Laboratory), EADS (Corporate Research Centre Airbus), Riga Technical University (Institute of Materials and Structures), Woelfel Beratende Ingenieure (D), Instituto Superior Técnico Lisbon, the Université Libre de Bruxelles (Faculty of Applied Science).

Two other projects are also under way. The NanoFEM “Characterisation of Mechanical Properties at Micro- and Nano-Scale Through Combined Use of Nano-Indentation and Finite Element Modelling” project has the aim of increasing the opportunities for characterisation of materials with the nanoindenter. The CONCURRENT MODELLING “Concurrent Modelling Tool Development” aims at developing a modelling methodology which uses various methods and tools such as statistical models, fuzzy logic and neural networks, in a simultaneous and integrated manner.

Furthermore, with the financial support of the National Research Fund (FNR), the unit welcomed two foreign researchers: Pr Jaroslav Mencik of the University of Pardubice (Czech Republic) and Pr Nicolae Constantin of the University of Bucharest. These scientific visits enabled the unit to start collaborations with these two universities.

Finally, since 2004 the unit has supervised two new theses, one in collaboration with the University of Metz “Adaptive Structure: Simulation and Modelling” by Hakim Boudaoud, and the other with the Institut National Polytechnique de Lorraine (Nancy): “Computational High Precision Sheet Metal Forming” by Mohamed Azouzi.

**Contact :**

Serge Gillé, Unit Manager, 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 2004:**

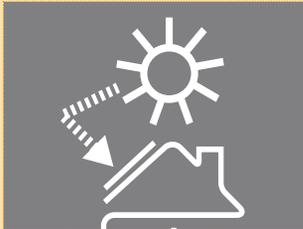
The year 2004 was marked for the unit by the implementation of an innovation platform shared with the CRTE in the field of renewable energies and the launch within that context of two projects: the projects PV-LAB “PhotoVoltaic Laboratory” and RELIES “Réseau Luxembourgeois pour l'Information sur l'Energie Solaire” (Luxembourg Network for Information on Solar Energy).

The year was also marked by the company consulting mission in particular with the realisation of a feasibility study for the design of a control system for letter sorting.

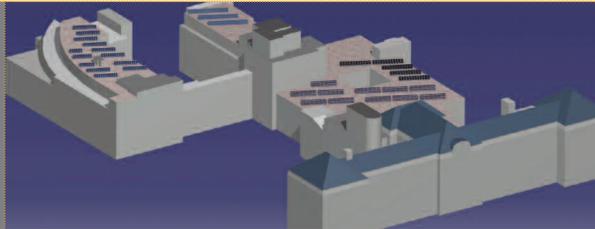
Finally, the unit presented its activities in the field of photovoltaics at the OEKOFoire 2004, held on 17 - 19 September at LUXEXPO in Luxembourg-Kirchberg.

**Contact :**

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



Photovoltaic installation on the roof of the Centre Hospitalier Emile Mayrisch (CHEM), Esch-sur-Alzette



Prototype of the photovoltaic installation presented at the Oekofoire 2004

UST ▶

### **“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.*

#### Faits marquants 2004 :

Particular attention was paid in 2004 to the development of skills and activities in the field of materials tests, as well as the strengthening of the laboratory quality system. The nanoindentation test was thus integrated into the quality system accredited ISO/CEI 17025.

Within the context of the SURFACES project, new methods of analysis in the mechanical and topographical characterisation of surfaces were developed in particular with the establishment of a model for the calculation of a viscoplasticity index by nanoindentation.

In the THERA “Creation of a laboratory for thermic characterisation and accelerated aging” project, the initial results have been obtained on the complete thermo-physical characterisation of materials. The instruments acquired during 2004, the DSC (Differential Scanning Calorimetry), the LFA (Laser Flash Apparatus), the Dilatometer, the STA (Simultaneous Thermal Analysis), coupled with an infra-red FTIR (Fourier Transform Infra Red) spectrometer, and an MS - Mass Spectrometry - spectrometer, contributed to these initial results. Furthermore, new combined test procedures were elaborated through the development of the accelerated aging and corrosion activity.

Efforts to put in place the most complete metrological function possible in particular with the re-definition of the dimensional activity of the laboratory and the implementation of calibrating climatic chambers were continued in 2004 within the context of the METROLOGY “Creation of a national accredited calibration laboratory” project.

The TRASU “Treatment of Surfaces” project under the National Research Fund (FNR), defined in collaboration with the CRP Gabriel Lippmann, has been accepted.

The unit accompanied a thesis on the study and characterisation of the wear and tear of PVC-based soil coverings, a thesis successfully presented by Olivier Buchheit. The thesis work was carried out in collaboration with the industrial group Tarkett Sommer and the Laboratoire de Sciences et Génie des Surfaces (LSGS) in Nancy.

The unit took part in the editing of a dozen scientific publications.

#### Contact :

David Ruch, Research engineer, david.ruch@tudor.lu

STA (Simultaneous Thermal Analysis), coupled with an infra-red FTIR (Fourier Transform Infra Red) spectrometer



Dilatometer



<b>Staff as at the end of the financial year:</b>	90
<b>Total number of projects in 2004:</b>	32
<b>Projects by financing source:</b>	<p>National projects principally subsidised by the Ministry of Culture, Higher Education and Research: 17</p> <p>National projects principally subsidised by other ministries: 1</p> <p>Projects in FNR research programmes: 2</p> <p>European projects: 9</p> <p>Projects financed 100% by the private sector: 3</p>
<b>Publications in 2004:</b>	40
<b>Key competences:</b>	<p>strategic piloting of innovation by Information and Communications Technologies (ICT) and ICT modelling of companies, anticipations and measurements of the impact of innovation through ICT, organisation and change management: structure and dynamism of innovation, value and organisation of knowledge, IT/trade alignment, assessment and improvement of software processes, new forms of IT organisation, management service, operational risk management, conceptual modelling, IT certification, quality referentials, security referentials and management, requirements engineering and package selection, business technology consultancy, management of innovation projects, workflow systems, interoperability of information systems</p>
<b>Types of activity:</b>	<p>doctoral research, collective R&amp;D, bilateral R&amp;D, assessment and diagnostics, preliminary studies and pre-projects, technological and methodological assistance, innovation projects, ongoing training and specialist advice, post-graduate diploma training, realisation of innovation platforms, meetings, conferences, professional and scientific publications, realisation of innovation networks, working groups, spin-off projects.</p>
<b>Units:</b>	<p><u>Innovation platforms :</u></p> <ul style="list-style-type: none"> <li>- "Quality and certification of IT services"</li> <li>- "Information systems security"</li> <li>- "Interoperability standards and e-business"</li> <li>- "E-learning, knowledge management and networked organisations"</li> <li>- "Statistical and prospective studies in the knowledge economy"</li> </ul> <p><u>Scientific and technology units :</u></p> <ul style="list-style-type: none"> <li>- "Knowledge economy and innovation management"</li> <li>- "Software engineering"</li> <li>- "Innovation project management"</li> <li>- "Management of organisations and IT services"</li> <li>- "Reference systems for modelling and certification"</li> </ul>

CITI also participates in the shared innovation platform "Free and open source software" launched at the end of 2004 (*see appended list of projects for this platform*).

**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, Association des Professionnels de la Société de l'Information (APSI), Service E-Luxembourg (SEL), Fédération des Industriels Luxembourgeois (FEDIL), the three faculties of the University of Luxembourg, Ministry of the Economy, Institut National d'Administration Public (INAP), Club de la Sécurité des Systèmes d'Information au Luxembourg (CLUSSIL) (see detailed list of project partners appended).

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## Key facts 2004 for the department

2004 is the year which enabled the CITI to benefit fully from its reorganisation, on the one hand by innovation platforms oriented to applied research and technology transfer and on the other hand by scientific and technology units oriented to scientific work and the development of competences mobilised in innovation platforms. The new organisation is reflected by the emergence of strategic partnerships in national ICT innovation platforms and the deployment of major ICT sector projects. The year 2004 also presented a significant increase of activity of a national and professional orientation (SPIRAL network) and also a solid foundation in European R&D programmes and an increased visibility in international scientific activities.

### Creation of national ICT innovation platforms

Within the context of the definition of the Fourth Development Plan 2004-2007, six strategic innovation objectives were identified in ICT matters for Luxembourg. These innovation objectives are tackled by a broad strategic partnership (clients, suppliers, regulators, research actors) called upon to orient, amplify and assess public investments granted through national innovation platforms. The first results of this national synergy are given in the report from the innovation platforms of the CITI.

### Deployment of major ICT sector projects

- SME sector: security of ICT systems for SMEs, in co-operation with the Ministry of the Economy;
- financial sector: management of operational risks, in co-operation with the Commission de Surveillance du Secteur Financier (CSSF);
- public sector: quality of IT projects, in co-operation with the Service e-Luxembourg;
- construction sector: e-business and impact of IT, in co-operation with the CRTI-B.

### Animation of the community of Luxembourg ICT professionals

In 2004, SPIRAL and its associated networks CLUSSIL and ITSMF (IT Service Management Forum) mobilised more than one thousand professionals through working groups, meetings and national conferences. For 2004, note will be taken more specifically that the SPIRAL/CLUSSIL conferences which launched the idea of a Master of post-graduate training in "Management of information systems security", as well as the project for creation of the Luxembourg Chapter of the IT Service Management Forum. Another defining moment was the conference "En route to Lisbon" (12 - 13 October 2004) which enabled decision makers to assess the Luxembourg situation within the context of fixed European objectives.

### International co-operation in innovation and R&D programmes

Beyond the continuation of cross-border co-operations (INTERREG programme), the CITI anchored its participation in European programmes such as LEONARDO, FP6 and Eureka/ITEA. At an international level, partnerships with South America and Vietnam were developed through co-operation programmes. Finally, with the SES, the CITI is participating in one of the first projects of the ESA (European Space Agency) programme since Luxembourg joined the space agency.

### National and international scientific co-operation

At a national level, the partnership with the University of Luxembourg permitted finalisation of the research project on "computer-assisted testing" with the Faculty of Language and Literature, Humanities, Arts and Education and by co-ordination with two other faculties, realising the launch in 2005 of a Master of post-graduate training in "Management of Information Systems Security". At Greater Region level, the CITI extended its partnership through new collaborations with the following innovation centres: Fraunhofer Institute for Experimental Software Engineering (IESE), Laboratoire lorrain de Recherche en Informatique et ses Applications (LORIA) / Institut National de Recherche en Informatique et en Automation (INRIA), Centre d'Excellence en Technologies de l'Information et de la Communication (CETIC) and with the universities of Nancy, Metz and Namur.

At an international level, 2004 saw a considerable increase in the presence of CITI researchers in scientific conferences with forty scientific publications.



## Key facts 2004 for each unit

The CITI is organised in five scientific and technological units, with the principal task of contributing to innovation platforms. As a 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 are documented which are associated with their task of ensuring 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 innovation on ICT, strategic control of innovation by ICT and company modelling, organisation and change management, structure and dynamics of innovation, value and organisation of knowledge.*

#### Key facts 2004:

- concept and application of methods of anticipation, strategic definition and change management in the platforms of the CITI and the CRTI-B;
- several workshops and meetings with academic partners: Centre Lillois d'Analyse et de Recherche sur l'Evolution des Entreprises (CLAREE – University of Lille), Hautes Etudes Commerciales (HEC – University of Liège), University of Troyes;
- two theses initiated on the appropriation of ICT and knowledge management;
- participation in training courses at the Université Catholique de Louvain;
- participation in twenty three scientific publications and six reports;
- national representation in the permanent working group "eSkills in Europe" of DG Companies.

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### **"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 use of components, systems of co-operation and collaboration (workflow and groupware), software technologies oriented to multi-agents and mobile*

#### Key facts 2004:

- realisation of software prototypes for the different platforms of the CITI;
- participation in sixteen scientific publications;
- a thesis in progress in the field of multi-agent systems;
- development of skills in the field of interactive television;
- participation in training courses at the Universities of Metz, Nancy and Luxembourg;
- scientific co-ordination of several professional meetings such as: "E-learning platforms", "Company architecture, modelling and perspectives", "Free software, also a business matter";
- organisation of the International Conference on Advances in Intelligent Systems AISTA'04 on 15 - 18 November 2004 (134 participants).

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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: quality referentials, conceptual modelling, IT certification, referentials in security management, requirements engineering.*

**Key facts 2004:**

- development of skills associated with the semantic web with several international publications and the constitution of a dedicated working group within the ERCIM (European Research Consortium on Informatics and Mathematics);
- development of the field of interactive and dynamic multimedia objects: participation in normalisation activities associated with that field through sub-committee 29 of the ISO;
- creation of a Luxembourg normalisation committee on the security of information systems (sub-committee 27 of the ISO) and participation in associated expert groups;
- participation in training courses at the universities of Metz and Namur;
- animation of a working group “Requirement and specification engineering”.

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**Project results**

The Semantic Web at the service of shared collective knowledge

Today, the Web is recognised as an extremely useful instrument of management of reservoirs of knowledge bases. However the Web user is also aware of the difficulties in finding pertinent information required in specific research. In its regard, so-called “Semantic Web” technologies are aimed at enhancing the possibilities of research and the manipulation of information by its users. These technologies in fact allow greater association of (“semantic”) meaning to the information available on the Web.

The application of semantic web techniques also enables transformation of a vast and non-structured act of information into a structured and sharable base of knowledge. This possibility of sharing favours the emergence and development of communities of practices and clusters, the final objective of the SEMANTIC R&D project realised in 2004 by the CITI in partnership with Luxinnovation and the CRP Gabriel Lippmann within the context of the innovative actions of the FEDER. In order to do this, the work of the project related to four aspects:

- the collective structuring of knowledge within a community;
- the techniques of modelling, representation of knowledge and the construction of ontologies in the field of innovation networks and collective watch systems;
- the definition of a research and innovation thesaurus (“ontology”) in order to allow the syndication, exploitation and interrogation of national R&D data;
- the development of tools for the creation and exploitation of collective knowledge.

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**“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.*

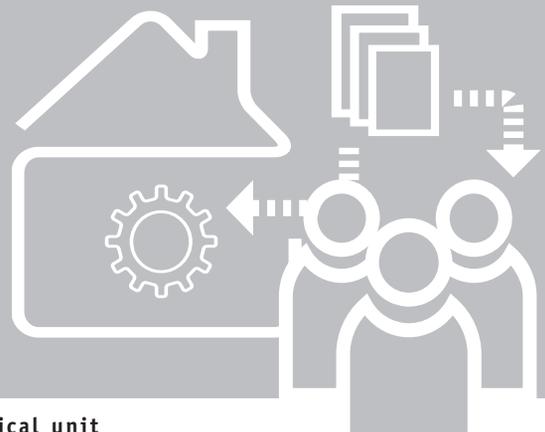
**Key facts 2004:**

As regards the assessment of processes, the unit rose to international recognition with the positioning of the CRP Henri Tudor by the “Convener” of ISO 15504 as leader of the initiative for assessment of ITIL (Information Technology Infrastructure Library) processes, thus opening up possibilities of preferred partnerships within the international community in relation to the assessment of processes as well as opportunities for initiatives at ISO level. Consequently, the CRP Henri Tudor was asked to host the international conference SPICE in 2006.

The skills developed by the unit and combined with a knowledge of the specific features of SMEs enabled the establishment of an original model for sharing IT resources (including an assessment of maturity), inspired by the ITIL and ISO 15504. This development was received favourably by the international community through the presentation of three publications centred on the contextualisation of referentials for SMEs.

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

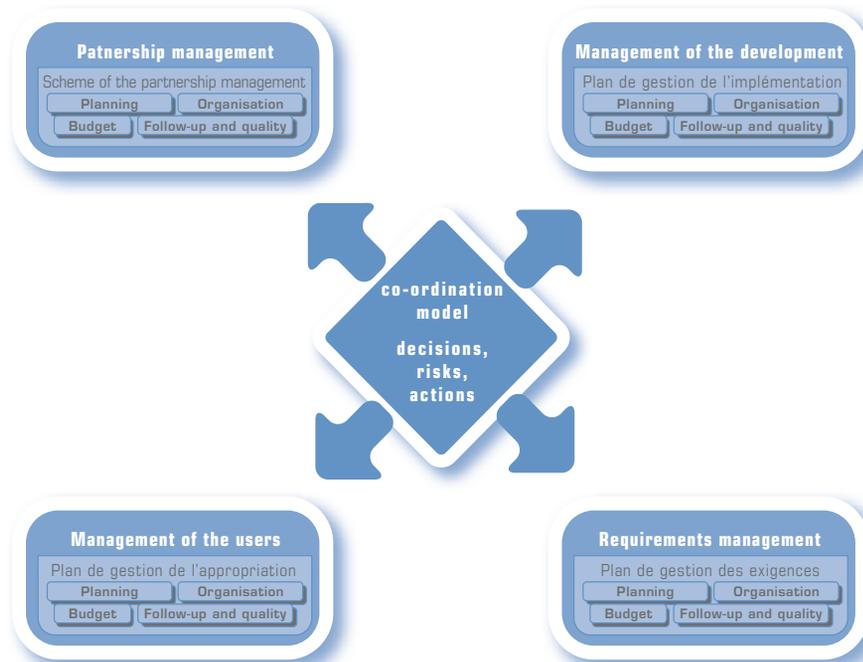
*The unit is aimed at providing the appropriate skills for innovation platforms and developing new skills in the following subjects: management of innovation projects, expertise in business technology consultancy, risk management, assessment and improvement of processes associated with project management.*

**Key facts 2004:**

- realisation of an exhaustive survey of project referentials in order to position the unit’s own methodological productions;
- validation by international publications of its original methodological productions in matters of the management of innovation projects and assistance in work mastery in the selection of IT packages. These results were subject to major dialogue with professionals in Luxembourg;
- in 2004, the work of the unit was identified as the basis for deployment of a project quality policy in the Luxembourg public sector;
- contribution to improvement of the conduct of the project at the CRP Henri Tudor within the context of the Centre’s ISO 9001 project.

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The management model for the QUALINNOVE project



## Project results

QUALINNOVE, towards a new dynamic of project management

The majority of IT projects are innovation projects, characterised by instabilities which render all planning complex: new strategy to be implemented, new development technology, new application to be used, new partner to get to know, etc.

The CITI therefore spent two years on the QUALINNOVE research project which proposes a management methodology adapted to innovation projects. The principal result is a project management referential structured in four processes: management of the partnership, management of requirements, management of users and management of development. For each it details the aim, the actors, the inputs, outputs and activity. This is not sufficient however. It is vital to take account of the impacts and interactions between the four processes identified. This systemic approach finds its expression in the form of a fifth process: the process of coordination, which identifies and manages the impacts of decisions taken in each process.

In order to manage the evolution of the project, QUALINNOVE proposes key indicators so as to be able to react in each of the areas of instability of the project: technical competence of the project team, coherence of strategic objectives, maturity of elicitation of needs, measurement of the level of use of the application.

The referential was elaborated and validated by working groups and in meetings which were attended over two years by more than 150 professionals from twenty five companies. Methodological experiments, numerous training sessions and project management audits were also carried out within the context of the project.

The result of the QUALINNOVE project is the establishment of the referential in order to allow large-scale transfer. Already the Luxembourg government has selected the CITI to deploy its ICT project management quality system on the basis of the QUALINNOVE methodology.

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“Quality and certification of IT services” innovation platform

*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 2004:

The year 2004 saw the implementation of the strategy centred around the ITIL (IT Infrastructure Library) with the involvement of a significant majority of banks and other large companies in the market on the subject, with an accumulated total of more than 170 people trained, the mobilisation of central actors and the creation of the Luxembourg chapter of the IT Service Management Forum (ITSMF).

A method of software selection, developed and validated experimentally by the Centre, mobilised twenty seven companies and nine consultants in a working group which met five times.

A group of six SMEs experimented on and validated the model for IT co-sourcing developed by the Centre (see the presentation of the results of the NOEMI project). Success was such that the six SMEs decided to appropriate the model at the end of the project and issued a call for tenders which brought responses from five service companies. In its wake the spin-off creation project came about.

The CASSIS network, providing quality advice on innovation strategy, has six new members, bringing the total number of approved consultants to thirteen.

In order to respond better to market requirements in matters of e-commerce, two new certificates were created on top of “Luxembourg e-commerce certified”: “Luxembourg e-privacy certified” and “Partner Luxembourg e-commerce certified”.

Through the e-Luxembourg QUAPITAL project “Implementation of a quality system and management of the IT projects of public departments” the public department mobilised the platform in order to deploy its quality system for management of the ICT project. At the same time, the CITI decided to invest in establishing the most favourable elements for its research into the management of innovation projects.

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**Project results**

## NOEMI, an innovative IT service for SMEs

The NOEMI project proposes to share IT resources with SMEs which do not have the critical mass to hire IT staff dedicated to the maintenance and exploitation of their IT systems. The final objective of the project is to improve the quality and stability of IT service while limiting costs.

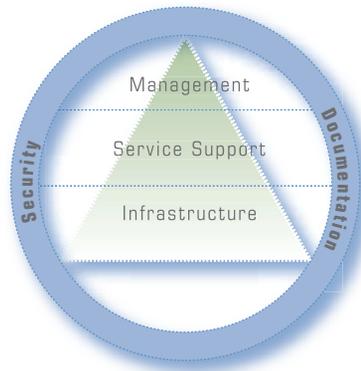
The project successfully experimented with the sharing of IT staff for a cluster of seven Luxembourg companies. The CITI recruited the IT staff in order to make them available to the cluster, thus assuming the risk of testing the new service, a risk which the companies involved did not wish to take. At the end of the project, six of the seven companies wanted to continue the sharing and, with the help of the CITI, together launched a call for tenders so as to decide on a IT service supplier which could take over the project. The testing was convincing “proof of concept” on the consultant market since sixteen companies asked to be consulted and six responded to the call for tenders. In addition to the SSI chosen by the group, two other companies are interested in this type of service to SMEs. Among them a spin-off from the CITI project team.

Beyond the model for collaborative management of IT resources, the project also developed an assessment of the maturity of IT services. This assessment, tested with fourteen SMEs, enables them to gain rapid awareness of their situation regarding management of security, documentation, management, support and infrastructure. Based on the ISO 15504 standard and the ITIL (Information Technology Infrastructure Library) referential, the assessment enable the emergence of a certain number of

improvements classified in relation to the urgency and importance of implementation of these recommendations.

Two NOEMI labels are in the course of definition, one for IT service suppliers on collaborative management and the other intended for consultants, on the assessment of maturity.

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The five fields of activity of NOEMI

PFI ▶

### “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 service market able to respond.*

#### Key facts 2004:

2004 saw the formation of a national strategic partnership around the subject of “Security” with the firm involvement of the Commission de Surveillance du Secteur Financier, the Ministry of the Economy and the University of Luxembourg (partnership through the Luxembourg International Advanced Studies in Information Technologies - LIASIT).

So the innovation platform launched a new R&D project (Research into the security of information and communication systems) in partnership with the Ministry of the Economy aimed at analysing the behaviour, vulnerabilities and threats of IT piracy within SMEs. Through a complementary project (SECURE PME “Development of a pole of competences in the security of information systems dedicated to SMEs”), the innovation platform invests on a sustainable basis in providing awareness and support to SMEs.

At the last call of the SE-COM programme, the FNR selected the SIM “Secure Identity Management” project in matters of management of rights of access to IT resources in a distributed and mobile IT environment.

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**“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 2004:**

- first version of the workshop on modelling and validation of electronic transactions emerging from the project FNR EFFICIENT “E-Business Framework for an Efficient Capture and Implementation of End-to-End Transactions”. Utilisation of the workshop for putting in place a demonstrator of e-business transactions in Vietnam in order to facilitate the appropriation of new exchange standards for electronic business in Asia;
- organisation and hosting of the general meeting of the European network of excellence FP6 INTEROP (100 researchers);
- specification of a secure collaboration platform to aid the development and the promotion of activities in the communities of Latin America, in the craft industry, ecological and agricultural tourism and culture;
- organisation of an inter-regional conference on identification by radio frequency (RFID) which was attended by more than one hundred heads of companies from three countries; publication of a white paper on RFID technology; specification of a demonstrator of RFID technology responding to the needs of target companies in the Greater Region (RFID group of fifteen companies) which will be resulting in a shared investment in 2005;
- launch of a study aimed at proposing solutions to organisational and technological obstacles associated with the dematerialisation of flows of data in departments.

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**Project results**

A prototype simulator of electronic transactions for e-business in Asia

In 2001, within the context of its first SE-COM programme, the National Research Fund retained the EFFICIENT project put forward by the CITI in partnership with the University of Luxembourg and the CRP Gabriel Lippmann. The project deals with toolkits for designing and deployment of B2B electronic transactions between (public and private) partners wishing to dematerialise the exchanges of paper documents in their commercial relations.

The toolkit proposed by EFFICIENT meets all the criteria of new forms of electronic exchange recommended at an international level for EDI (Electronic Data Interchange). Furthermore, it proposes an innovative methodology in the concept of such exchanges. These qualities led EDI France (the French association for the promotion of new EDI practices) to the CITI, two years ago, to participate in the European EA2 (EURO ASIAN EDI ADAPTATION) project. The purpose of this project is to facilitate the appropriation of e-commerce and e-administration techniques by Vietnamese economic operators, enabling the advent of a business environment and the development of efficient public institutions as well as stimulating the growth of commercial exchanges among companies and their economic partners between Vietnam and Europe.

Within the context of this project, the EFFICIENT device was used to develop a demonstrator of the dematerialisation of documents exchanges in a commercial and administrative import/export procedure. This project closed at the end of 2004 and the results of the work will be presented at a plenary conference to be held in Hanoi at the beginning of 2005. They should augur well for future CITI projects within the context of the implementation of more global electronic exchanges projects between Europe and Asia.

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**“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 2004:**

- implementation of a method for the anticipation and self-assessment of ICT competences including the identification of ICT competences for forty trades ([www.innosertion.lu](http://www.innosertion.lu));
- proposal for the process of anticipation of ICT competences per trade. This process was tested by Luxembourg professionals in the sectors of building and accountancy;
- organisation with STATEC of the international scientific conference “En route to Lisbon”, first Luxembourg symposium on the economy of knowledge from a European point of view, 12 - 13 October 2004 in Luxembourg (383 participants);
- two studies carried out jointly with STATEC: “From information and communication technologies to electronic business, the case of Luxembourg companies, annual report 2004”; “Utilisation and users of the Internet: A research of determining factors, annual report 2004”;
- by virtue of the European ITEA/EUREKA programme, the platform undertook to accompany innovative Luxembourg companies in the exploration of new technological opportunities associated with interactive television and interactive multimedia objects: deployment of tests for interactive television and prototyping of the RAMO (Reactive and Adaptive Multimedia Objects) model.

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**“E-learning, knowledge management and networked organisations” innovation platform**

*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 2004:**

- launch of an ESA (European Space Agency) project in partnership with SES and LORIA for the development of innovative services regarding the exploitation of Internet content;
- 2004 survey of 179 companies on the situation regarding e-learning in Luxembourg in partnership with “Studies and Training”;
- elaboration and experimentation of a diagnostic of opportunity and feasibility of putting e-learning devices in place, in collaboration with a group of Luxembourg companies;
- elaboration of a diagnostic of opportunity in knowledge management;
- joint development with the company INTECH of versions 1.0 and 2.0 of ANAXAGORA, an open-source platform for the management of change integrating e-learning with the management of knowledge and skills;
- first prototype of the computer-aided assessment system (TAO) in partnership with the University of Luxembourg;
- organisation of meetings of some thirty external people each time on e-learning platforms, the rapid conception of e-learning content, e-learning and language learning and the computer-assisted testing of new prospects for the assessment of skills;
- Within the context of the FEDER programme of innovative actions, the CITI proposed the introduction of the technologies of the Semantic Web in order to improve semantic navigation in portals. Demonstrators were proposed for the portal of the CRTI-B as well as for the innovation Portal (Luxinnovation), associated with the proposal of a standard nomenclature (RIO – Research and Innovation Ontology).

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## Project results

An advanced distance training tool for project management

ITEMA is a European project (LEONARDO programme, in partnership with French, Belgian and Spanish universities and a Greek organisation). The goal of the project is the creation of an e-learning course on management of IT project. Project management here is understood as a multi-disciplinary, covering methods of IT engineering as well as quality assurance, planning and the risk management or the change management.

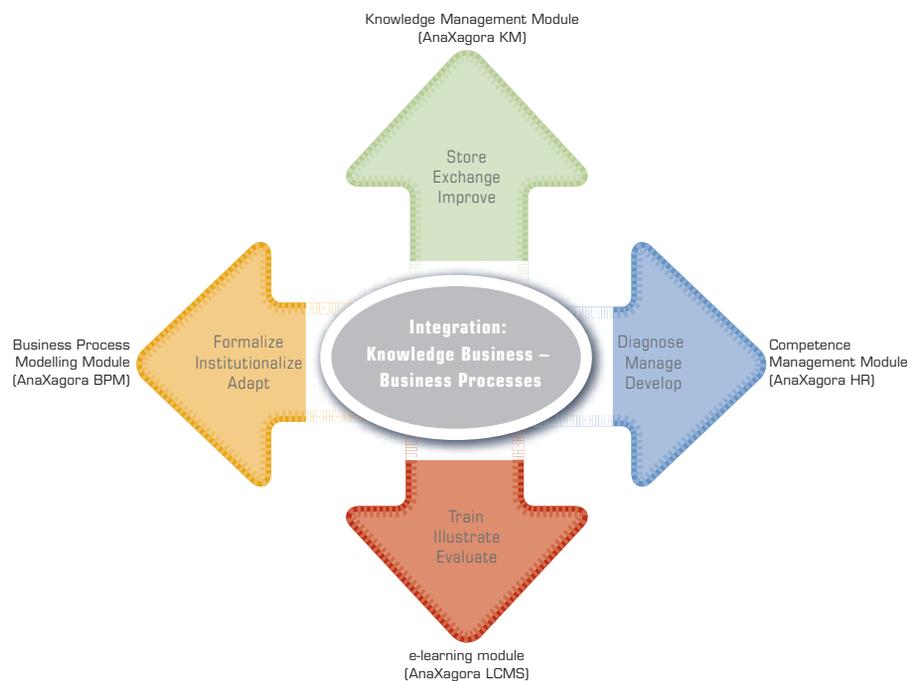
Analysis of existing courses and the need expressed by a panel of one hundred people led to a course being built of twelve modules. It combines two hundred web pages with descriptions, interactive exercises, illustrations and assessment questionnaires, and it is available in French, English and Greek. The authors, experts in each field, have applied and implemented educational methods specific to e-learning, interactive and multimedia enabling the Centre Henri Tudor to offer training of “blended learning”, mixing distance learning and attended sessions.

The project team chose an open-source e-learning platform, “Ganesha”, and added new functions to respond to the needs expressed, in particular:

- the possibility of a student defining its own course tailor-made on the basis of a questionnaire identifying its needs and knowledge;
- a type of exercise based on exchange between the student and the tutor;
- the possibility of a course author himself changing pages in the pre-defined arborescence of contents.

A hundred participants from different countries tested and assessed the course within lifelong learning or initial training programmes. A follow-up of the project, in partnership with the companies InTECH and P&T will allow the provision to all of a unique “Anaxagora” platform, an open-source distance training reference tool.

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The open source platform AnaXagora

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

<b>Staff as at the end of the financial year:</b>	13
<b>Total number of projects in 2004:</b>	11
<b>Projects by source of financing:</b>	<p>National projects principally subsidised by the Ministry of Culture, Higher Education and Research: 1</p> <p>National projects principally subsidised by other ministries: 2</p> <p>Projects of the FNR research programmes: 4</p> <p>European projects: 3</p> <p>Projects financed 100% by the private sector: 1</p>
<b>Publications in 2004:</b>	8
<b>Key competences:</b>	environmental sciences and techniques, best available techniques, referentials for environmental certification, process engineering, environmental process modelling, sustainable management of material flows, environmental risk assessment, energy technologies
<b>Activities:</b>	R&D, expert reports, advice on environmental strategy, technological assistance, ongoing post-graduate training, realisation of innovation platforms, advice on environmental technologies, eco-balance, 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 Laboratory for Industrial Technologies and Materials in the "Renewable energies" innovation platform launched at the end of 2004 (<i>see appended list of this platform's projects</i>).</p>
<b>Strategic partners:</b>	Ministère de l'Environnement, Ministère de l'Intérieur et de l'Aménagement du Territoire, Administration de l'Environnement, Administration de la Gestion de l'Eau, Chambre des Métiers, Chambre de Commerce du Luxembourg ( <i>see detailed list of project partners appended</i> ).
<b>Contact :</b>	<p>André Weidenhaupt, Director, <a href="mailto:andre.weidenhaupt@tudor.lu">andre.weidenhaupt@tudor.lu</a></p> <p>phone: +352 54 55 80 – 600</p> <p><a href="http://www.crte.lu">www.crte.lu</a></p>



## Key facts 2004 for the department

2004 was marked by the signature of a collaboration agreement with the Ministère de l'Intérieur et de l'Aménagement du Territoire, strengthening the partnership between the CRTE and the Direction de la Gestion de l'Eau. The research work and strategic advice provided in the agreement is aimed at contributing to the implementation of the water framework directive. The agreement also provides for scientific assistance in the planning of wastewater treatment infrastructures in Luxembourg and in particular advice on the best available techniques. Finally, the CRTE may be asked about chemical products, as illustrated by the analysis in 2004 of the toxic nature of effluents from chemical toilets and the assessment of their impact on wastewater treatment plants.

2004 also saw collaboration between the CRTE and the mecatronics team of the Laboratoire de Technologies Industrielles in the field of renewable energies formalised with the establishment of a joint innovation platform on the subject. Three projects were thus defined and/or launched in this platform in 2004: ANIA "Analysis and management of the environmental impacts and the energy consumption of cooling systems in the food sector", PV-LAB "PhotoVoltaic Laboratory" the first installations of which were installed on the roof of the Centre Hospitalier Emile Mayrisch in Esch-sur-Alzette, RELIES "Luxembourg solar energy network". A first version of the Internet site of this network is being put in place with the aim of disseminating the results of projects in this field.

Another significant feature during the past year was the establishment of an innovation platform on sustainable construction and the multiplication of activities in this field, in partnership with the Ordre des Architectes et Ingénieurs-conseils. The CRTE stand at the Oekofoire 2004 (17 - 19 September 2004) was principally dedicated to different activities in the field of sustainable construction. Different aspects of the life cycle of a building – from construction through use to demolition – were dealt with from the point of view of environmental impact. We note that on this occasion the new Internet pages of the CRTE have been presented ([www.crte.lu](http://www.crte.lu)). The content has been reworked, considerably fleshed out and structured in the logic of the Centre's Fourth Development Plan.



Signature of a collaboration agreement between the Ministère de l'Intérieur et de l'Aménagement du Territoire and the CRTE

**“Cleaner production” innovation platform**

*The platform aims at reducing the environmental impact of industrial, craft or local authority installations through a proactive and integrated approach to the 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).*

**Key facts 2004:**

- the fourth Cleaner Production Guideline (“Cahier de la Production Propre”) “Production of cold in the industrial, tertiary and food sector – environmental impacts and technical applications” which was presented on 1<sup>st</sup> December to the Chambre de Commerce du Luxembourg in the presence of the relevant public departments, cooling experts and industrialists. This fourth “Cahier de la Production Propre”, intended for operators of refrigeration systems, analyses the principal environmental impacts of installations for the production of cold in Luxembourg (destruction of the ozone layer, greenhouse effect, acidification, photosmog) in order to determine the primary sources of pollution, as well as the techniques enabling their impacts to be reduced.
- the realisation of an assessment of the impact on Luxembourg companies and, in particular, downstream users, of the proposal of REACH rules on the registration, evaluation and authorisation of chemical substances. This study ordered by the Fédération des Industriels Luxembourgeois (FEDIL) allows an assessment of the administrative and technical efforts to be made by a company in order to conform to the new European legislation on chemical products.

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**“Sustainable construction” innovation platform**

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

**Key facts 2004:**

During 2004, the “Sustainable construction” innovation platform participated for the second time in the organisation and the courses in the training cycle “Building and Energy” on the rational use of energy in the construction sector. The training cycle “Building and Energy” is run in collaboration with SITec®, the Ordre des Architectes et Ingénieurs-conseils (OAI), the University of Luxembourg, the Agence de l’Energie SA and the Fondation Oekofonds.

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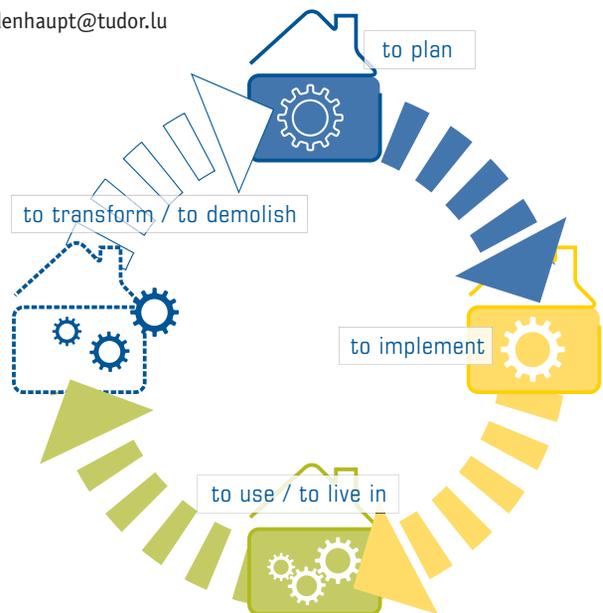


Diagram: life cycle of a building; minimising the impact of each phase of the life of the building and revaluing resources

**“Water” scientific and technological unit**

*The scientific and technological unit aims at better management and understanding of water treatment processes and concepts, as well as the knowledge and management of flows of pollutants and the risks associated with different chemical substances in the water cycle.*

**Key facts 2004:**

2004 saw progress in the research projects financed by the “Sustainable management of water resources” programme of the National Research Fund (FNR):

- ALZETTE “Material Flows in the Catchment Area of the River Alzette: Impacts of Micro/Macropollutants and Nutrients on the Water Resources”;
- CONCEPT “New concepts and innovative technologies for the sustainable management of the urban water cycle”;
- LITFLUID “Application of modelling/simulation tools and substance flow analysis to the moving bed biofilm technology”. Within the context of this project, in June 2004 a research prototype was inaugurated at the purification plant in Hesperange, an event which had considerable impact among professionals in the Luxembourg water sector. The prototype allows analysis and comparison of innovative biological processes for the treatment of used water, in particular fluidized bed biofilm processes;
- RESEAU “Modelling of the sewage network around the Upper Sûre Lake”.

Two new members of staff joined the teams working on the unit’s FNR projects.



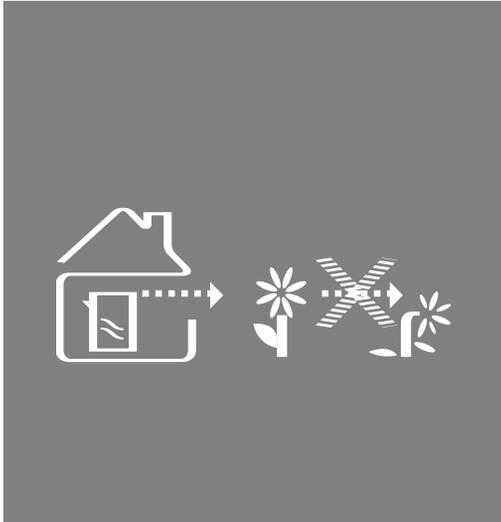
Research prototype alongside the aeration basin at the purification plant in Hesperange

A research project on the optimisation of wastewater treatment processes, the OPTISTEP project, was launched in 2004, in collaboration with three intercommunal syndicates and with European co-financing (FEDER programme). The project implements modern process modelling/simulation tools so as to achieve appropriate management and control strategies.

The unit’s activities will be extended to the drinking water sector with the acceptance for financing in 2004 of a research project in the “Food safety (SECAL)” programme of the FNR. The CHEMRISK “The Development of Drinking Water Contamination Risk Assessment and Management Strategy for Luxembourg – An Interdisciplinary Approach” project is aimed at analysing and managing the risks associated with chemical pollution in sources of drinking water in the Grand Duchy of Luxembourg and will be realised in partnership with the University of Luxembourg, the Administration de la Gestion de l’Eau and the Laboratoire National de la Santé.

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Stand of the CRP Henri Tudor at the Oekofoire 2004



Combustion chamber for wood chips (source: Administration des Eaux et Forêts)



Production of wood chips in the forest (source: Administration des Eaux et Forêts)



### Project results

National study into the energy potential of wood as a renewable energy

The Ministère de l'Environnement asked the CRTE to carry out a study into the energy potential of wood as a renewable energy at national level.

The initial study consisted of determining the energy potential in Luxembourg: calculation of the energy potential available in the form of wood and wood waste, on the basis of information provided by the Administration de l'Environnement, the Administration des Eaux et Forêts and additional scientific data.

The channels for valorisation of the energy potential were then identified and studied. The analysis of the Luxembourg situation resulted in a proposal of six different technologies for the exploitation of wood. Two are dedicated to heating and four are mixed, producing heat and electricity.

The technology costs for these principal channels for valorisation were determined and compared with those of technologies based on the use of fossil energies. The existing subsidies for the production of renewable energy were identified.

An environmental impact study was also carried out for these technologies by a simplified LCA, "Life Cycle Assessment", defined by the standard ISO 14040 (life cycle assessment to compare emissions and environmental impacts). This environmental study allows a comparison to be made, on the one hand, of the recommended technologies and, on the other hand, of the impacts arising from the utilisation of different fuels (forest wood, wood waste; treated wood waste).

An action plan offers recommendations aimed at the sustainable utilisation of wood energy in Luxembourg. The study and the action plan were presented to the Ministère de l'Environnement.

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<b>Staff as at the end of the financial year:</b>	20,5
<b>Total number of projects in 2004:</b>	11
<b>Projects by source of financing:</b>	<p>National projects principally subsidised by the Ministry of Culture, Higher Education and Research: 1</p> <p>National projects principally subsidised by other ministries: 1</p> <p>Projects of the FNR research programmes: 3</p> <p>Projects financed 100% by the private sector: 6</p>
<b>Publications in 2004:</b>	3
<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 (administrative, medical and care sections), clinical expert and decision-support systems, data security security of systems and of data, medical databases);</li> <li>- communication (networks, Intranet, Extranet, telemedicine and home care, mobile and wireless computing, interfacing and communicating 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 technologies" innovation platform.</p> <p>The CR SANTEC also participates with the CITI in the "Free software" innovation platform launched at the end of 2004 (<i>see appended list of platform projects</i>).</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 appended</i> ).
<b>Contact :</b>	Pierre Plumer, Director, phone: +352 42 59 91 – 250, pierre.plumer@tudor.lu, www.santec.lu

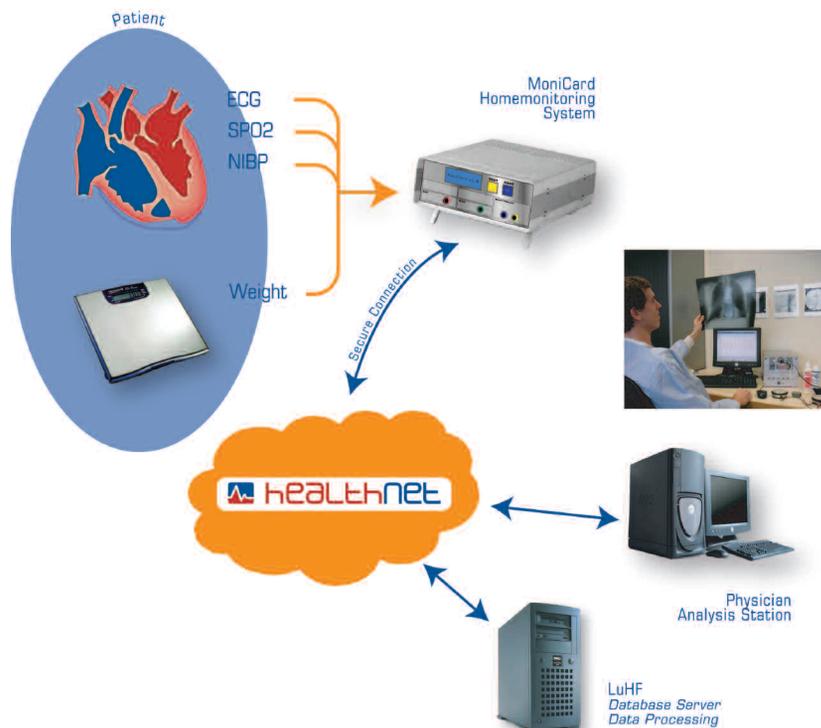


**Key facts 2004:**

The year 2004 was marked by the launch of a research project financed by the National Research Fund (FNR) in the field of nutrition-based allergies. The MENSSANA “Mobile Expert & Networking System for the Systematical Analysis of Nutrition-based Allergies” project aims at the development of a knowledge base for research in the field of food allergies, the creation of a multi-disciplinary working group on “Information technologies and Allergies” and the carrying out of a controlled clinical study to assess efficiency and socio-economic impacts.

Another significant feature was the lodging in August 2004 of a European patent relating to a method and an apparatus enabling assessment in a “non-invasive” and remote manner of the state of health of patients suffering from chronic heart failure (see diagram below). This patent is one of the results of the LuHF (Luxembourg Heart Failure) project realised in the BIOSAN programme of the FNR. At present, a spin-off project is being defined in collaboration with the CRP Henri Tudor and with the financial support of the Société Nationale de Crédit et d’Investissement (SNCI). The spin-off will have the object of development and marketing of the LuHF method and apparatus.

Diagram: Monicard enables the distance monitoring of patients suffering from cardiac deficiency



In 2004, the CR SANTEC also invested in two new fields of intervention: bioinformatics and public health. In years to come, activities in these two fields will be reinforced.

Finally, particular attention was paid in 2004 to strengthening international collaborations. Collaborations were agreed with various universities, institutions, research associations, and hospitals in Paris, Lyon, Lausanne, Trier, Bielefeld, Karlsruhe and Köln. These synergies will be consolidated in years to come, in particular by the definition and realisation of joint research projects.



The symposium "Dossier informatisé de la personne soignée" had one hundred participants (6 - 7 April 2004)



### **Project results**

#### Accompanying the implementation of RIS-PACS systems

The CR SANTEC assisted two Luxembourg hospitals in the implementation of a RIS-PACS system, a complete computerized management system for radiology services. The RIS (Radiology Information System) part enables administrative information to be managed (patient data, appointments, rooms, etc.) and the PACS (Picture Archiving and Communication System) part deals with the management of digital images.

The Hôpital Princesse Marie-Astrid (HPMA) currently has a system for archiving digital radiological images put in place in the Nineties, a system which the hospital intends to replace with a RIS-PACS. The CR SANTEC gave the HMPA methodological assistance for:

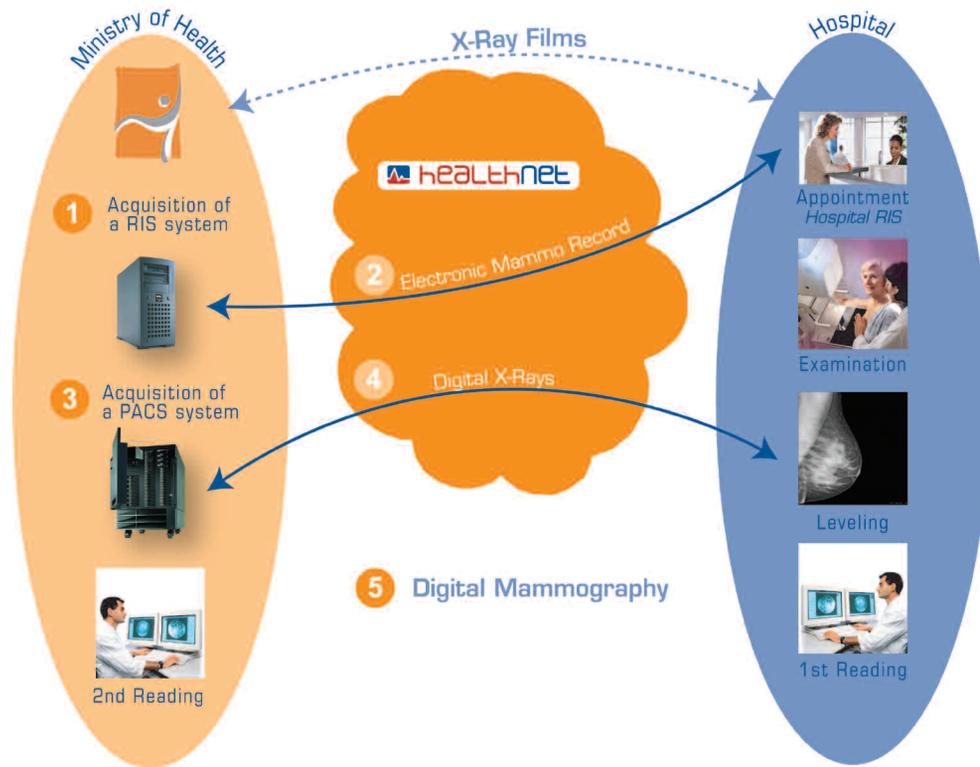
- establishing specifications for the future RIS-PACS system;
- analysing the opportunity for utilisation of a communication server at the HPMA;
- analysing the updating of the IT network due to the implementation of the new radiology system and the coming refurbishing of the hospital.

Moreover, the Clinique Ste Thérèse also drew up specifications for the acquisition and installation of a RIS-PACS system. The CR SANTEC assisted the clinic in the finalisation of its specifications, in the analysis of the RIS-PACS systems available on the market (operational and technical specifications of solutions) as well as in the studying of the integration of existing modes of medical imagery and IT systems with the future RIS-PACS system.

The Centre Henri Tudor enabled the two hospitals to make precise definitions of their specifications at both an operational and a technical level, while taking account of existing IT systems and radiological equipment.

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Diagram: System for electronic exchange of information put in place for the Mammography Programme



### Project results

Supporting the exchange of electronic information for the Mammography Programme

Within the Mammography Screening Programme, the Ministère de la Santé installed an RIS (Radiology Information System) to manage the information from the national Mammography Screening Programme. Secondly, it wanted to implement electronic communication of information relating to the Mammography Programme between hospitals and the Ministère de la Santé. That electronic communication may be realised either via client terminals linked to the RIS of the Ministère de la Santé or by interfacing the RIS of hospitals with such a system, through an e\*Gate communication server.

The CR SANTEC gave methodological support to hospitals and the Ministère de la Santé in the implementation of the communication system. It also aided the development of interfaces between the different systems.

With this involvement, two hospitals equipped with an RIS system of the same type as that of the Ministère de la Santé can benefit from the interfaces developed within the context of this project. The Centre Hospitalier Emile Mayrisch now sends information relating to the Mammography Project in electronic form to the Ministère de la Santé. Tests will commence at the beginning of 2005 at the Kirchberg Hospital.

Other hospitals have the necessary information to enable them to connect to the Ministère de la Santé. The CR SANTEC will continue to assist them as the implementation progresses. Finally the project will see the installation of digital mammography which will also allow the transmission of digital mammography images between hospitals and the Ministère de la Santé.

The project can be realised thanks to the HealthNet network which the CR SANTEC developed on request of the Ministère de la Santé.

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<b>Staff as at the end of the financial year:</b>	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.
<b>Total number of projects in 2004:</b>	1 (national project principally financed by the Ministry of Culture, Higher Education and Research)
<b>Publications in 2004:</b>	3
<b>Key competences:</b>	<ul style="list-style-type: none"> <li>- strategic direction of innovation by Information and Communication Technologies (ICT) in the construction sector;</li> <li>- anticipation of the impact of ICT on the construction trades;</li> <li>- new modes of coordination and collaboration in the construction sector;</li> <li>- standards of electronic exchanges in the construction sector;</li> <li>- interoperability of information systems;</li> <li>- assistance in the implementation and management of the innovation project in the construction sector;</li> <li>- standardisation of contractual and technical clauses.</li> </ul>
<b>Unit:</b>	The CRTI-B is the "Information Technologies for Construction" innovation platform
<b>Strategic partners:</b>	Ministère des Travaux publics (MTP), Administration de 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 ( <i>detailed list of all partners at <a href="http://www.crtib.lu">www.crtib.lu</a></i> ).
<b>Contact :</b>	<p>Michel Brachmond, Deputy Director of the Chambre des Métiers, Secretary General of the CRTI-B, <a href="mailto:michel.brachmond@cdm.lu">michel.brachmond@cdm.lu</a> (photo)</p> <p>Laurent Grein, Vice-Chairman of the CRTI-B, phone: +352 42 59 91 – 333, <a href="mailto:laurent.grein@tudor.lu">laurent.grein@tudor.lu</a>, <a href="http://www.crtib.lu">www.crtib.lu</a></p>

## Key facts 2004

- conception, development and implementation of the Portail Luxembourgeois de la Construction ([www.crtib.lu](http://www.crtib.lu));
- elaboration and dissemination of "Construction tomorrow: electronic cooperation in the Luxembourg construction sector on a horizon to 2010" on the basis of technological monitoring of practices in electronic co-operation and international pilot experiences;
- standardisation of exchange files (XML) for electronic exchange of submission documents;
- establishment of a national working group on "Electronic co-operation in the construction sector" and participative elaboration of the 2005/2006 action plan;
- review of certain clauses with a view to their adaptation to technological evolution.



<b>Staff as at the end of the financial year:</b>	17
<b>Total number of projects in 2004:</b>	17
<b>Projects by source of financing:</b>	<p>National projects principally subsidised by the Ministry of Culture, Higher Education and Research: 6</p> <p>National projects principally subsidised by other ministries: 2</p> <p>European projects: 7</p> <p>Projects financed 100% by the private sector: 2</p>
<b>Activities:</b>	<ul style="list-style-type: none"> <li>- setting up and organisation of continuous vocational training (diploma or qualifying) and dissemination activities (conferences, workshops, working groups);</li> <li>- setting up, test and implementation of new services dedicated to innovation in continuous training;</li> <li>- management of innovation projects in continuous training;</li> <li>- training of trainers and e-learning consulting.</li> </ul>
<b>Strategic partners:</b>	University of Luxembourg, Ordre des Architectes et Ingénieurs-conseils (OAI), Institut National d'Administration Publique (INAP), professional chambers, Institut National pour le développement de la Formation Professionnelle continue (INFPC) ( <i>see detailed list of project partners appended</i> ).
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## Key facts 2004

### Organisation of seven national and international conferences:

- "Les Journées du Libre", 26 March 2004 (66 participants);
- Symposium "Dossier informatisé de la personne soignée", 6 - 7 April 2004 (109 participants);
- "Theory of Constraints: A Viable Vision" conference, 11 June 2004 (120 participants);
- SPIRAL 2004: the annual rendez-vous of IT professionals, 16 - 17 June 2004 (107 participants);
- The first Luxembourg symposium on the economy of knowledge from a European perspective "En route vers Lisbonne", 12 - 13 October 2004 (383 participants);
- "International Conference on Advances in Intelligent Systems - AISTA 2004", 15 - 19 November 2004 (134 participants);
- "INTEROP General Assembly", 22 - 25 November 2004 (100 participants);

### Development of continuous diploma training products

- launch in February 2004 of the first class of the Diplôme d'Etudes Supérieures (DESU) in "Management and quality of companies and services" with sixteen participants, the fruit of a co-operation between the Ecole Supérieure de Management in Metz (ESM), the Ecole Nationale d'Ingénieurs in Metz (ENIM), the Facultés Universitaires Catholiques in Mons (FUCaM), the University of Quebec at Trois-Rivières (UQTR) and the CRP Henri Tudor (see appended comments);
- launch of the sixth class of the Master of "IT and Innovation" co-organised since 1999 by the Facultés Notre-Dame de la Paix in Namur, the University of Nancy 2, the University of Luxembourg and the CRP Henri Tudor;
- setting up of a Master's degree in "Management of information systems security" in partnership with the University of Luxembourg and the CLUSSIL. The launch is planned for the second half of 2005;
- support of the Embry-Riddle Aeronautical University (ERAU), a private American university, world leader in the field of aeronautics and aerospace, in the creation of a site for its "Extended Campus" at the Technoport Schlassgoart in Esch-sur-Alzette. The training activities of the ERAU in Esch-sur-Alzette started in January 2005 with the first session of the "Master of Science in Technical Management". Lines for RDI projects in partnership with the ERAU have also been identified and should be realised in 2005.

### Strengthening the training catalogue partnership

In 2004, the SITec® training catalogue partnership was also strengthened. The catalogue brings together all the intensive and specialisation training courses representative of the profession of engineer and the principal fields of competence of the CRP Henri Tudor, i.e. almost 125 innovative training courses. The range of training courses in 2005 integrates an extremely active partnership in the concept, validation and animation of training. In addition to the universities of Luxembourg, Nancy, Metz, Namur, Mons and Quebec, different professional and representative organisations such as the Ordre des Architectes et Ingénieurs-conseils (OAI), the Association Luxembourgeoise des Ingénieurs Industriels (ALII) and the Club de la Sécurité des Systèmes d'Information à Luxembourg (CLUSSIL) contribute to the richness of the catalogue.

### Six new projects and two projects closed

As a complement to its qualifying and diploma training activities, in partnership with various research units of the Henri Tudor Centre, in 2004 SITec® successfully submitted six projects to the European Social Fund (ESF). These projects cover three principal subjects:

- e-learning and the improvement of training's pedagogical quality ;
- management and anticipation of competences;
- innovation in training and the fight against unemployment through new instruments and new methods developed with the Administration de l'Emploi (ADEM).

du capital compétences” and INNOSERTION “Plate-forme de gestion anticipative des competences liées à l’innovation technologique” closed in 2004, which enabled SITec®, as well as the CITI, to acquire recognised expertise in the assessment and anticipation of skills. The two projects also gave rise to a strong partnership forged with the Chambre de Commerce du Luxembourg, the Chambre des Métiers, the Chambre des Employés Privés, the Chambre du Travail, the Association des Professionnels des Systèmes d’Information (APSI) and the Administration de l’Emploi (ADEM) (see insert).

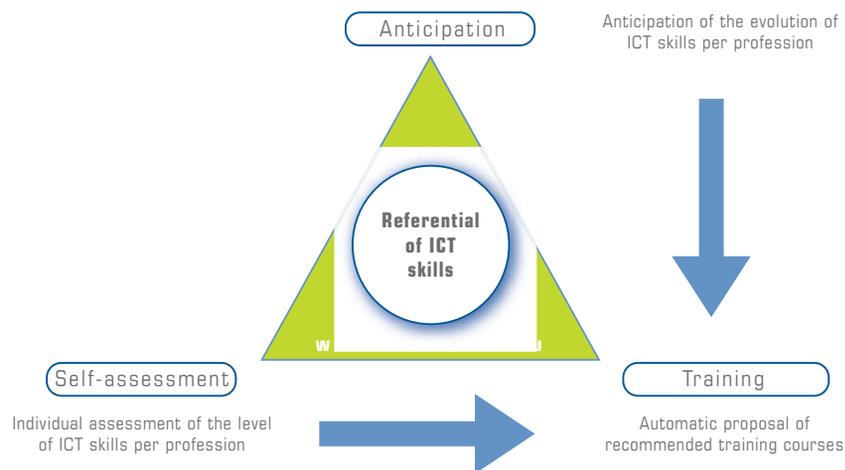


Diagram: Innosertion enables the identification of the skills of the future and assessing those of today in order to adapt training requirements.



### Project results

**INNOSERTION: Anticipating and assessing skills associated with technological innovation in each of our professions**

In the economy of knowledge, innovation and new technologies are major factors employment evolution, bringing about risks of exclusion. Within this context, the main objective of the INNOSERTION project was to highlight per job the ICT skills that will be needed tomorrow.

So, a methodology enabling anticipation of ICT skills has been developed and tested. This methodology aims to update the referentials of trade skills and **to highlight the ICT skills for which there is still no training**. Recommendations are formulated and submitted to training providers so that they can adapt their training curriculum to future needs with a view to guaranteeing the maintenance of a good level of skills within the company and to enhance the employability of staff and job applicants.

An Internet platform, [www.innosertion.lu](http://www.innosertion.lu) has been developed, on which it is possible to consult **referentials for ICT skills of about forty different professions**, as well anticipation studies for three of them (trainers, accountants and builders). In addition, each person, whether citizen, student, employee or job applicant, has the possibility to **assess online its level of ICT skills** via a self-assessment form.

The final goal is therefore to build a permanent link between the needs of companies and the orientations of the education system, whilst enabling individuals to update their level of ICT skills in relation with the evolution of the profession, so as to avoid exclusion.

This project has been accompanied and supported by a group of partners who participated very actively in the permanent orientation of the project: the ADEM, the Association des Professionnels des Systèmes d’Information (APSI), the Chambre de Commerce du Luxembourg, the Chambre des Employés Privés, the Chambre des Métiers and the Chambre du Travail.

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Launched at the beginning of 2004, the INNOQUALIF programme enabled fifteen engineers and executives to follow an eight-week training programme, as well as a company placing, so as to become project leaders in an ICT environment. Supported by the Luxembourg government and the ADEM, this programme responded to a new factor on the Luxembourg labour market: the development of unemployment in IT trades. One month from completion of the project, the balance was more than positive: nine trainees were hired, one created his own company and two had their placing extended for six months (see appended comments).



### Testimony

#### INNOQUALIF: an effective antidote to unemployment

Launched at the beginning of 2004, the INNOQUALIF programme enabled some fifteen unemployed people to follow a training programme to become project leaders in an ICT environment.

The eight-week **course** was followed by a **company placement**. A formula enabling the trainee to relate learned theory to the real needs of companies. These latter still had to play their role. This was indeed the case, and some even extended the placement with a contract of employment, others directly suggested a contract of employment to candidate trainees. SecureIT took this option and hired two people in July 2004.

#### **SecureIT hired two trainees and is prepared to repeat the experience.**

SecureIT is a company specialising in the provision of secure IT centres. For Gary Kneip, its Managing Director, the INNOQUALIF experience was extremely positive, for several reasons. *"When we were informed of the existence of the INNOQUALIF programme, we thought we should take part. We made an active promotion of it,"* he states. *"For us, the major advantage of INNOQUALIF rests in the preselection and accompaniment of candidates. The CVs we received were very good and I can say that without the INNOQUALIF programme we would not have been able to hire such skilled people so rapidly,"* Gary Kneip explains.

But as regards skills, was the contribution made by INNOQUALIF decisive? Have the candidates who were hired shown themselves to be more innovative than others?

*"It is difficult to assess the contribution made by INNOQUALIF in relation purely to skills, since we did not know the people prior to this. Having said that, we observed that the people recruited proved to have great motivation, flexibility and openness to change,"* Gary Kneip confides.

*"Knowledge and attitude are also skills,"* Serge Meurice, Quality Manager of SecureIT emphasises. And the various INNOQUALIF people did not forget to sprinkle the subjects taught with these vital elements. *"In a young company like ours, things evolve very quickly, and we need flexibility,"* adds Michael Maus, Operations Manager of SecureIT.

Would there be any cloud on this horizon? SecureIT managers regretted a certain indecision on the part of several trainees whom they offered jobs. *"Taking the decision to join one employer or another often took too long,"* they rue. This is doubtless a message to be given to candidates next time. Although we realise the choice of a future employer is not to be made in an instant.

If it were repeated? *"Yes, 100%,"* answers Gary Kneip without hesitation. *"We very much appreciated the attentive follow-up provided by SITec®,"* he added. The SITec® quality label is not therefore usurped.

## Trainings and events organised by SITec® in 2004

Activity	Number of organised activities	Cumulated hourly volume	Cumulated number of participants
Conferences	7	136 hours	996
Professional meetings and working groups	14	45 hours	149
Inter-company trainings	51	431 hours	643
E-learning trainings	1	36 hours	10
Tailor-made trainings	13	90 hours	124
Qualifying training courses	2	392 hours	29
Diploma courses/Masters	2	637 hours	60
All activities 2004	NA	1.768 hours	2.011



### Testimony

Fourth diploma promotion of the DESS "IT and Innovation"

Muriel G. is head of IT in a company in the Luxembourg financial sector. For two years she followed the courses of the Master "IT and Innovation", gaining her diploma in 2004. Her account underlines the added value provided by this training for her daily work and for the company.

*"I chose to take this training course because my profession had evolved so much that it hardly matched the basic training I had received.*

*The Master is a complete training course. As the course and work progressed, I rediscovered many aspects of my daily work. In each of the fields, we studied how to innovate and the best practices directly applicable to the every day. Work like many major time consumers often find its inspiration in the real needs of the company. I was able for instance to use what I learned on the "law and IT" course in managing contracts and subcontractors.*

*The training gave me a clearer view of the decisions to be taken every day in the interests of the company. It gave me technological and methodological knowledge as well as the necessary assurance to make investment choices, to follow technological evolution, renewal of material and so on.*

*The ambiance of the group, the many exchanges, and the group work were all extremely worthwhile since everyone had a different background and could share their experience with the others.*

*As for the placing, this enabled me to put into practice all I had learned in training. The Master and the placing are drivers for the implantation of innovation projects in companies and particularly for SMEs which sometimes tend to give less consideration to it. My placing related to the implementation of a security policy. Although IT security is very much a matter of now, without the impuls given by the placing, I do not think a security policy would have been put in place in my company for several years.*

*I do not know exactly if it is due to the work done for the Master or the enthusiasm of being a promoter of innovation, but gradually I was noticed positively in my company and in my group. That is extremely beneficial and motivating."*

Contact Master "IT and Innovation": [chrystel.petiteville@tudor.lu](mailto:chrystel.petiteville@tudor.lu)

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

<b>Staff as at the end of the financial year:</b>	10
<b>Total number of projects in 2004:</b>	8
<b>Projects by source of financing:</b>	National projects principally subsidised by the Ministry of Culture, Higher Education and Research: 2 European projects: 4 Projects financed 100% by the private sector: 2
<b>Publications in 2004:</b>	6
<b>Key competences:</b>	scientific and technology watch, competitive intelligence, scientific and technical documentation, information research, information analysis (bibliometrics, text-mining), dissemination of information, standardisation, standard and regulation watch, intellectual property
<b>Activities:</b>	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
<b>Strategic partners:</b>	Ministry of the Economy – Intellectual Property Department, Office Luxembourgeois d'Accréditation et de Surveillance (OLAS), European Patent Office (EPO), World Intellectual Property Organisation (WIPO) ( <i>see detailed list of project partners appended</i> ).
<b>Contact:</b>	Serge Quazzotti, Manager, phone: +352 54 55 80 – 600, serge.quazzotti@tudor.lu, www.veille.lu, www.brevet.lu, www.vnorm.lu

### CVT's service activities in 2004

Watch services offered by CVT	Number of requests satisfied
Technology and Competitive Watch services	85
Standards and Regulations Watch services	45
Other services	15



## Key facts 2004

2004 has been marked by a complete re-definition of the product catalogue of the CVT. CVT offers now twenty-two competitive intelligence and technology watch services. New regulation watch services have been launched in the domains of environment (in co-operation with the Centre de Ressources des Technologies pour l'Environnement – CRTE), security and health on the workplace. These new services have been well appreciated. Testimony of this is the multiplication by 6.4 of the turnover of the standard and regulation watch products.

Moreover, within the framework of the FNR project “Nouveaux concepts et technologies innovantes pour une gestion durable du cycle de l'eau urbain” of the CRTE and thanks to a strong collaboration between experts and technology watch experts, CVT developed a new method in scientific and technology watch specifically aimed at research centres. This new method called “modular watch” presents numerous advantages notably in terms of possibility to implement a watch system progressively according to the needs, of easy implementation of each modul and of adaptability to different themes and problems. The new method has been the subject of a communication during the VSST'04 congress (Veille Stratégique Scientifique et Technologique) held in October 2004 in Toulouse.

The European project LIIP “Linking Innovation and Intellectual Property”, co-ordinated by the CVT, ended in December 2004. A multi-media tool “IP-toolbox” has been implemented, as well as a best practices guide on intellectual property. A cross-border network of exchange of competences and intellectual property services has also been launched within this same project: [nap.liip.org](http://nap.liip.org) (see insert below).

Finally, CVT presented its projects and its awareness activities on intellectual property destined for SMEs during the PATLIB 2004 congress organised in Vilamoura (Portugal) from 18 to 21 May 2004.



### Project results

Creation of a European network for the exchange of services and information on intellectual property

LIIP “Linking Innovation and Industrial Property” is a European project (fifth framework programme) initiated and co-ordinated by the CVT with the objective of contributing to better integration of intellectual property in innovation projects as well as in the strategies adopted by actors in innovation (companies and research centres). The project created and disseminated tools intended on the one hand for companies (a guide to good practices and an interactive CD-ROM) and on the other hand to national bodies involved in intellectual property (in order to improve the range of services to companies). A trans-national network for the exchange of skills, services and practices, [nap.liip.org](http://nap.liip.org), today associates four European countries with the participation of national patent offices.

The guide was produced in five languages in a paper and an electronic version. The CD-ROM is multilingual and in addition to the recommendations contained in the paper guide, it offers information on specific national features and a module for self-assessment of the intellectual property practices for the company.

Contact: [xavier.delecroix@tudor.lu](mailto:xavier.delecroix@tudor.lu)

European network or the sharing of practices and services for patent offices and national actors in matters of intellectual property

**Staff as at the end of the financial year:** 3.75

**Total number of projects in 2004:** 2 European projects

**Activities:**

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

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

Public and institutional partners: Syndicat des communes régional pour la promotion et le développement de la région Sud- PRO-SUD, Innovating Regions Network (IRE), Business and Innovation Centre Kaiserslautern, Promotech Nancy, TechnologieZentrum Ludwigshafen / BIC Rhein-Neckar-Dreieck, La Maison de l'Entreprise, Technopole de l'Aisne;

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)*).

**Contact :** Diego De Biasio, chargé de mission, [diego.debiasio@tudor.lu](mailto:diego.debiasio@tudor.lu)

phone: +352 54 55 80 – 1

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





## Key facts 2004

2004 saw the development of several new services targeting future entrepreneurs and companies members of the “Technoport Innovation Network”. A complete range of workshops has been developed and implemented throughout the year. These workshops are the result of a close collaboration with the entrepreneurs and allowed the implementation of a regular and personalised coaching structure through the definition of three specific programmes corresponding to the pre-commercial, start-up and high-growth phases (for further details see [www.technoport.lu](http://www.technoport.lu)). Other services have been developed in close collaboration with other departments of the Centre. A quarterly patent-watch newsletter, tested by the Centre de Veille Technologique within their European LIIP “Linking Innovation and Industrial Property” project, was validated by a sample of entrepreneurs from the Technoport. This newsletter will be included from January 2005 in the standard range of services offered by the incubator. Entrepreneurs have also been offered access to the services of the new documentation centre at the CRP Henri Tudor. As regards infrastructure, the year 2004 was marked by the first investments to improve the Internet network connections of the building. These infrastructural improvements are co-financed by the European Commission through a FEDER – Objective 2 project. Finally, we can also mention that the service giving access to the secure server room for companies was included in the monthly service package offered to the companies.

In 2004 the Technoport also accepted four new companies within the incubator and two under external coaching. These companies are following ones:

On site:

- NeoValens: an independent provider of innovative software solutions, specializing in kernel-level security for Windows platforms;
- OneTree Technologies: company developing tools and services for the flexible integration of information in the company;
- PeerMajor: company promoting artistic creations via its portal [www.jamendo.com](http://www.jamendo.com) using the principle of “creative commons” licences;
- FSB Systems: company offering hardware and software solutions in the field of open-source software - spin-out from the European FEDER Objective 2 AIDILL project managed by the Centre d’Innovation par les Technologies de l’Information (CITI);

External:

- All About IT: Consultancy and software development company that developed Spamkiss“, an innovative product to reduce spam and make e-mail exchanges safe;
- e-Xstream engineering: high-tech company focused on software and consulting services in advanced micromechanical modelling of composite materials and structures.

The European commission quality licence “EC-BIC” award marked also the year 2004. This award supports and validates the operational management and the strategy developed by the Technoport. As regard partnerships and collaborations, the senior partnership agreement with Broadcasting Centre Europe was renewed in May 2004 until 2007. Technoport became also, through the collaboration with PRO-SUD, the official representative of the South region of Luxembourg within the “Innovating Regions” (IRE) network, which currently encompasses two hundred regions in twenty-seven European countries. This network is the joint platform for collaboration and exchange of experience for regions that are developing or implementing regional innovation strategies and schemes.

Photo left: Official opening of the new premises of SecureWave SA, success story of the Technoport (1 April 2004)



## Figures of Technoport as at 31st December 2004

Available office space	<b>1.600 m<sup>2</sup></b>
Occupation rate	<b>64%</b>
Planned exists in 2005	<b>3</b>
Average tenancy period	<b>3,3 ans</b>
Number of companies within the technoport Innovation Network	<b>26</b> <i>hosted companies</i> <b>17</b> <i>Success stories</i> <b>5</b> <i>external companies</i> <b>4</b>
Cumulated turnover <i>data for 20 among them 14 hosted companies</i>	<b>14,5 M euros</b>
Total positions within the companies	<b>168</b>
Positions created in 2004	<b>52</b>
Intership positions in 2004	<b>23</b>
?theses in 2004	<b>4</b>
Company subsidiaries outside Luxembourg	<b>10</b>
Inter-company synergies	<b>11</b>
Co-operation with CRP Henri Tudor	<b>14</b>
Clusters	Cluster in <b>free and open software</b> in co-operation with the « Free software » of CRP Henri Tudor. Cluster in <b>IT security</b> in co-operation with the « Information systems security » innovation platform of CITI.
participation in trade foirs	<b>CeBit 2004</b> in march 2004 (stand of the Ministry of the Economy) <b>Software and IT Solutions EXPO 04</b> (stand of 120 m <sup>2</sup> with 11 companies represented)
Number of companies accepted by the board of directors since June 1998	<b>32</b>
Success rate <u>before</u> exit of the incubator	<b>60 %</b>
Success rate <u>after</u> exit of the incubator	<b>100%</b>

## Workshops 2004

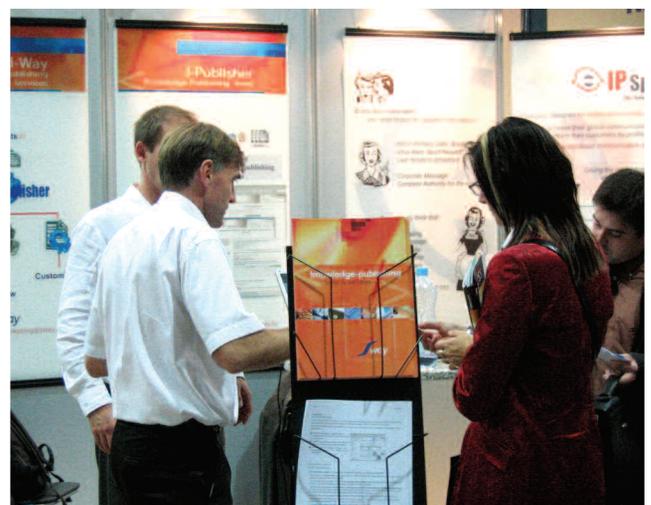
Themes	Business Development Idea Development (module within the context of the INNOQUALIF programme) Marketing Communications Branding
Number of participants	31 entrepreneurs of 19 companies 14 external participants externes (participants INNOQUALIF)
Cumulated hourly volume of the workshops 2004	98 hours

# Technoport's companies

1998	1999	2000	2001	2002	2003	2004
 magic moving pixel Internet Business Solutions	 SecureWave	 COMPOSYS	 NEOFACTO	 TechAdvantage Enterprise Network Technologies	 Lux-IT	 NeoValens
↳ exit in 2004	↳ exit in 2004					
 bluesky software	 sway	 FORUM NETWORK S.A.	 CONOSTIX	 cybercultus	 Spiece S.A.	 FSB Solutions
↳ exit in 2000					↳ exit in 2003	
 LuxScan Technologies			 Double A Technologies Group	 SAPIENS TECH	 Qoalux	 jamendo open your ears
↳ exit in 2002						
					 NEONLINE	 onetree TECHNOLOGIES
					 oneweb <a href="http://www.ipspot.com">http://www.ipspot.com</a>	

This table considers only companies active at the 31<sup>st</sup>.12.2004

The Technoport and its start-ups present on the stand at the Software & IT-Expo, October 2004





## **J-Way SA**

« 2004 - the year of the commercial break-through »

**Date of entry to the Technoport:** November 1999

**Date of departure from the Technoport:** 1st half-year 2005

**Number of employees:** 4

**Field of activity:** Knowledge-Publishing and e-government

**Product:** J-Publisher

**Geographic coverage:** Luxembourg, France, Belgium, Switzerland, European institutions

**Reference clients:** Government of Wallonia (B), Agence wallonne des Télécommunications (B), Ministère de la Fonction publique et de la Réforme administrative, Ministère des Affaires étrangères et de l'Immigration, Astron Building Systems, Union des Caisses Nationales de Sécurité Sociale (F), Waterair (F)

**Growth-rate of turnover in 2004:** 30%

Five years after having joined the Technoport, the company J-Way saw a consistent increase of its activity in 2004. J-Way was able to position itself as a credible competitor to publication solutions offered by world leaders in multimedia publication and e-government.

J-Publisher, the company's leading product, is a unique and efficient solution simplifying the online process of intelligent, interactive and didactic forms. J-Publisher allows realising, without programming, applications able of delivering added-value services to the end user. J-Publisher generates a service independent of any specific environment and freely implemented on a Web server, on a client desktop or even on a CD-Rom.

Recent positive developments led the company to sign different partnership contracts, for example with a subsidiary of the "Caisse des Dépôts et Consignation" in France, and to participate within a first European project. In 2005, J-Way aims at becoming the sixth success story since the creation of the Technoport in 1998, by moving to its own premises in order to continue its business development.

Contact: J-Way SA, 66, rue de Luxembourg, L-4221 Esch-sur-Alzette  
phone: +352 54 22 23, fax: +352 26 53 16 17, [www.jway.lu](http://www.jway.lu), [jmb@jway.lu](mailto:jmb@jway.lu)



## **magic moving pixel SA**

« A company forges ahead »

**Date of entry to the Technoport:** June 1998

**Date of departure from the Technoport:** October 2004

**Staff:** 5

**Field of activity:** Internet Business Solutions

**Products:** mmpContent : mmpGroup,

**Geographic coverage:** Luxembourg, Germany

**Reference customer:** Confédération Européenne du Volley-Ball, .DOK., Fonds d'Urbanisation et d'Aménagement du Plateau de Kirchberg, Kaempff-Kohler, Landesbank Rheinland-Pfalz International, Panelux/Fischer, Soteg.

**Turnover 2004:** +/- 300.000 euros (estimation on 31.12.2004)

magic moving pixel was the first company to join the Technoport in 1998. magic moving pixel has been supporting its customers since its foundation with high-quality solutions to establish and optimize their e-business strategy. The company attaches importance to free its customers from anything that could constrain their strategy's deployment. Motivated by this mission magic moving pixel has developed a range of ready-to-use solutions, including the Web content management system mmpContent.

mmpContent has developed to the company's most successful online business solution. It reflects experiences from the past years in managing online content in various business environments. This product is accompanied by a set of other productivity solutions, such as the groupware solution mmpGroup, allowing users to coordinate their work activities over the Internet. All these solutions are operated and maintained on the company's own application service platform.

The company's development has led to the decision to leave the Technoport at the end of 2004, and to move to premises in Niederanven. Yet, magic moving pixel will keep up a close contact with the Technoport via the "Technoport Innovation Network".

Contact: magic moving pixel SA, 141, route de Luxembourg, L-6940 Niederanven  
phone: +352 54 75 75 - 1, fax: +352 54 75 75 - 54, [www.mmp.lu](http://www.mmp.lu), [info@mmp.lu](mailto:info@mmp.lu)



## NEOFACTO SARL

« Strong expertise and a constant innovation spirit »

**Founders :** Pierre Gérard, Laurent Kratz

**Date of entry to the Technoport :** February 2001

**Number of employees :** 13

**Field of activity :** free software services

**Geographic coverage :** Grand Duchy of Luxembourg, France, Belgium

**Partnerships :** certified retailer RedHat, partner Novell SuSe

**Reference clients :** Le Foyer, ARCELOR, Dupont de Nemours, RTL, European Investment Bank, Fideuram Bank, Crédit Agricole Indosuez, European parliament in Luxembourg, Winterthur, Lombard Assurances, Clement (F), Clinique des Vallées (F)

**Turnover 2004 :** 770,000 euros (estimation on 31.12.2004)

NEOFACTO, a consultancy company, has sound expertise in the development, installation and integration of open source solutions. The strategy adopted by NEOFACTO is to rely on that internal expertise to develop its activities with major Luxembourg and French accounts with the aim make them benefiting from the numerous advantages offered by these alternative solutions. The company saw its workforce increase to thirteen people as at the end of 2004.

The two founders of NEOFACTO continue to innovate however in terms of commercial diversification. It is according to this principle that a first subsidiary was created in 2002 with NEONLINE, for which NEOFACTO has developed, houses and edits the two community portals [www.diegrenzgaenger.lu](http://www.diegrenzgaenger.lu) and [www.lesfrontaliers.lu](http://www.lesfrontaliers.lu), the latter having become the second most visited web site in Luxembourg.

Finally, in November 2004, the founders of NEOFACTO created a new company called PeerMajor. This company manages the portal [www.jamendo.com](http://www.jamendo.com), a platform facilitating the promotion, association and collection of funds for artists using licences based on the innovative concept of "creative commons". This platform, relying on the latest technological advances, consequently provides a legal content in the main "Peer to Peer" networks. NEONLINE and PEERMAJOR have also been an integral part of the Technoport since their creation.

Contact: NEOFACTO SARL, 66, rue de Luxembourg, L-4221 Esch-sur-Alzette  
phone: +352 26 53 10 08, fax: +352 26 53 10 09, [www.neofacto.com](http://www.neofacto.com), [contact@neofacto.com](mailto:contact@neofacto.com)



Official opening of the new premises of magic moving pixel in Niederanven

# RDI projects of the CRP Henri Tudor in 2004

The majority of the Centre's projects are research, development and innovation (RDI) projects realised in partnership with companies or groups of companies (70% of projects) and/or with public organisations (34% of projects) and/or with research centres and universities (29% of projects). The above list contains the principal RDI projects active in 2004 within the context of the agreement specific to each project or overall collaboration agreement in a particular field.

## Laboratory for Industrial Technologies (LTI)

PFI ▶

### "Management and organisation" innovation platform

- COFAQ « Conception d'un service de formation et d'accompagnement pour l'amélioration de la qualité », contact : laurent.bravetti@tudor.lu
- EXIND2 « Pilotage et conception de formations en stratégie de gestion industrielle et d'organisation », contact : laurent.bravetti@tudor.lu

**Partners :** Ceratizit, Geolux, Goodyear, Menuiserie N. Karier, ARCOOP, Marbrerie Bertrand, Carrelages De Cilia, Peintures Kuttén, Muller et Fils, Instal Fit, Bouvy, Putz Willy Service, Bureau TMEX, MIXT SA

UST ▶

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

- CELLULE MODELISATION « Création d'une cellule experte en modélisation / simulation / diagnostic des entreprises et stimulation de démarche qualité totale au Luxembourg », contact : david.evaristo@tudor.lu
- INNOMA « Innovative Management », contact : jos.schaefers@tudor.lu
- QUALITY PASS « Passeport pour la qualité pour les très petites et petites entreprises », contact : remi.fabbri@tudor.lu
- TRANSQUAL « Réseau transfrontalier de la qualité », contact : frederic.lepit@tudor.lu

**Partners :** Mouvement Luxembourgeois pour la Qualité (MLQ), Chambre de Commerce du Luxembourg, Chambre de Commerce et d'Industrie de Meurthe et Moselle, Performance Progrès en Lorraine (PPL), Chambre de Commerce et d'Industrie du Luxembourg Belge (CCILB), CEQUAL, Galvalange, FETA, ProActif, Glaverbel, Goodyear

UST ▶

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

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

**Partners :** Gottscholl Alcuilux, InSIC

UST ▶

### "Mechatronics" scientific and technological unit

- Waben « Analyse et optimisation des processus de fabrication des nids d'abeille », contact : frank.minette@tudor.lu

**Partners :** Wabentechnik

Other projects of the unit : see "Renewable Energies" innovation platform.

**“Materials” scientific and technological unit**

- METROLOGIE « Création d'un laboratoire accrédité d'étalonnage au service des industriels dans différents domaines : thermique, dimensionnel, électrique », contact : sylvain.gaillard@tudor.lu
- SURFACES « Développement des activités de caractérisation topographique et mécanique des surfaces », contact : julien.bardon@tudor.lu
- THERA « Création d'un laboratoire de caractérisation thermique et de vieillissement accéléré », contact : claude.becker@tudor.lu

**Partners :** Ecole des Mines de Nancy (Laboratoire de Sciences et Génie des Surfaces - LSGS), LETAM (Université de Metz), LSMCL (Université de Metz), LISS (INSA Strasbourg), LPMI (ENSAM Angers), IFOS (Ecole centrale de Lyon)

**Centre for IT Innovation (CITI)****“Quality and certification of IT services” innovation platform**

- AIDA « Assessment and Improvement Integrated Approach », contact : sylvie.prime@tudor.lu
- QUAPITAL « Mise en place du système qualité et de gestion des projets informatiques des administrations publiques » ; contact : pascal.lhoas@tudor.lu
- CI-BIZ « Développer, certifier et outiller le conseil stratégique en e-business pour les PME », contact : jean-charles.bernacconi@tudor.lu
- GERAMO « Gestion des relations clients/fournisseurs dans les projets TIC », contact : marc.krystkowiak@tudor.lu
- NOEMI « Nouvelle organisation de l'exploitation et de la maintenance informatiques », contact : sylvie.prime@tudor.lu
- NOTITIA « Etude des nouvelles technologies de l'information et de la communication au sein des administrations », contact : corinne.loesel@tudor.lu
- QPI « Qualité pour l'innovation », contact : laurent.vergnol@tudor.lu
- SPINOV « Software Process Improvement and Innovation », contact : valerie.betry@tudor.lu
- TOOLINNOVE « Systèmes et outils de gestion de projet - méthode QUALINNOVE », contact : laurent.vergnol@tudor.lu

**Partners :** Facultés Universitaires Notre Dame de la Paix de Namur, Université Polytechnique de Barcelone (GESSI), Qualium, Fonds National de la Recherche (FNR), SGI Ingénierie, Ministère des Affaires Etrangères, Service e-Luxembourg, Ministère de la Fonction Publique et de la Réforme administrative, Centre Informatique de l'Etat (CIE), Unité de stratégie informatique de la Confédération (USIC), Swiss Federal Strategy Unit for Information Technology (FSUIT), Group 4 Falk, Chambre des Métiers, Administration des Bâtiments Publics, Centre Régional d'Innovation et de Transfert de Technologie en Télécommunication et en Technologies de l'Information (CRITT TTI), Bureau économique de la province de Namur, Office Freylinger, Soteg, E-H Consult, LuxCEC, Perry Weber, Commissariat aux Affaires Maritimes, Toiture Moderne, Compagnie de Construction, Poudrerie de Luxembourg, Mediation, Zeyen et Baumann, Ministère de l'Environnement, Caisse médico-chirurgicale mutualiste (CMCM), La Bâloise, P.C. Solution

**“Information systems security” innovation platform**

- ACCESS-PME « Adoption de compétences interdisciplinaires pour le commerce électronique sécurisé des PME », contact : andre.rifaut@tudor.lu
- GRIF « Gestion des risques IT dans les secteur financier – nouvelles approches méthodologique », contact : andre.rifaut@tudor.lu

- R2SIC « Recherche en sécurité des systèmes d'information et de la communication », contact : christophe.feltus@tudor.lu
- SECURE PME « Développement d'un pôle de compétences en sécurité des systèmes d'information, dédié aux PME », contact : christophe.feltus@tudor.lu

**Partners :** Ministère de l'Economie et du Commerce Extérieur, Club de la Sécurité des Systèmes d'Information à Luxembourg (CLUSIL), Gummi-Roller, Université du Luxembourg, Aubay, Commission de Surveillance du Secteur Financier (CSSF), Luxembourg International Advanced Studies in Information Technologies (LIASIT)



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

- AFFLUX « Architecture avancée pour la gestion des flux de dossiers » ; contact : marc.krystkowiak@tudor.lu
- EA2 « Faciliter l'appropriation des techniques du e-commerce et du e-administration par les acteurs économiques vietnamiens », contact : michael.schmitt@tudor.lu;
- EFFICIENT « E-business Framework for an Efficient Capture and Implementation of End-to-end Transactions », contact : michael.schmitt@tudor.lu
- INTEROP « Interoperability Research for Networked Enterprises Application and Software », contact : eric.dubois@tudor.lu
- LINK ALL « Local-Communities Insertion Network », contact : djamel.khadraoui@tudor.lu
- PARRAIN « Parrainage transfrontalier », contact : christophe.feltus@tudor.lu
- Portail\_INFPC « Elaboration et mise en œuvre du volet « Offre de formation des organismes de formation » du portail national de la formation continue luxembourgeoise », contact : sophie.ramel@tudor.lu

**Partners :** NSI Nouvelles Solutions Informatiques (B), University College London (London), Institut National pour le développement de la Formation Professionnelle Continue (INFPC), Université du Luxembourg, Ecole des Hautes Etudes Commerciales (HEC) de Lausanne, Université de Namur, Chambre de Commerce et d'Industrie de Meurthe et Moselle, Chambre de Commerce et d'Industrie du Luxembourg Belge, Centre Régional d'Innovation et de Transfert de Technologie en Télécommunication et en Technologies de l'Information (CRITT TTI), Ministère de l'Environnement, EDIFRANCE, EDIVietnam, Ministry of Science and Technology - Government Agency (Vietnam), Egnatia Epirus Foundation (GR), European Centre for Eco Agro Tourism (NL), Cybercultus, Manos del Uruguay (Uruguay), Gestion y rollo (Chili), Federation Industries of Santa Catarina (Brésil), Cooperativa Nacional de Ahorro y Credito (Uruguay), Star One (Brésil), Iber2Net, Ibermatica (E), Instituto de Engenharia de Sistemas e Computadores do Porto (Portugal), Beratungsstelle für Formgebung (D), Universidad del Cauca (Colombia), Centro Latinoamericano de Economía Humana (Uruguay), Instituto Latinoamericano de Museos (Costa Rica), Instituto Coordinador de Estudios y Promoción Humana (Argentine), Fundo Brasileiro Para a Biodiversidade (Brésil), Instituto de Computación – Facultad de Ingeniería, Universidad de la República (Uruguay), 51 universités, centres de recherche ou entreprises des quinze pays partenaires du Network of Excellence INTEROP



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

- DEMOISEL « Dispositif d'e-learning accompagnant une modernisation organisationnelle et informatique au sein de l'Etat luxembourgeois », contact : sandrine.reiter@tudor.lu
- FORM-IT « Conception de filières de formations IT », contact : delphine.giltay@tudor.lu
- ITEMA « Application intelligente de téléformation en management de projet », contact : brice.bucciarelli@tudor.lu
- IT CLUSTERS « Qualité des prestations informatiques et promotion de l'informatique libre », contact : christophe.feltus@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
- PILOTE KM « Expérimentation d'un dispositif de KM par le CRP dans le cadre de la conduite de projets d'innovation », contact : brice.bucciarelli@tudor.lu

- RESINA « Aide à la conception et à l'exploitation de réseaux d'innovation et d'apprentissage », contact: olivier.piro@tudor.lu
- SATnSURF « Développement de services innovants en matière d'exploitation de contenu Internet », contact : jean-sebastien.brunner@tudor.lu
- SEMANTIC R&D « Mise en place et outillage d'un réseau R&D au Luxembourg (expérimentation des technologies du Web Sémantique) », contact : thibaud.latour@tudor.lu
- TAO « Testing assisté par ordinateur », contact : thibaud.latour@tudor.lu

**Partners :** Université du Luxembourg, CRP Gabriel Lippmann, ZEUS Consulting (GR), Facultés Universitaires Notre Dame de la Paix de Namur, Institut Supérieur de Commerce St Louis (B), Fundacion Universidad Empr. Region de Murcia (E), Université de Nancy II - ICN, AGORIA, Université de Metz, Laboratoire lorrain de Recherche en Informatique et ses Applications (LORIA)- Institut National de Recherche en Informatique et en Automatique (INRIA), e-glutek, Darckedge, Luxinnovation, Bouygues, European Space Agency, SES, Ministère des Affaires Etrangères et de l'Immigration, Ministère de la Fonction Publique et de la Réforme Administrative, Institut National des Administrations Publiques (INAP), Technofutur 3 (B), Technifutur (B)



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

- INVESTIC « Innovation et investissement TIC », contact : jean-charles.bernacconi@tudor.lu
- JULES VERNE « Modélisation appliquée au multimédia interactif », contact : djamel.khadraoui@tudor.lu

**Partners :** Ministère de l'Economie et du Commerce extérieur, Service Central de la Statistique et des Etudes Economiques (STATEC), Philips Digital System Labs (NL), Philips Semiconductors (NL), Thomson Multimedia (F), Telvent (E), Cardinal (FI), Institut National de Recherche en Informatique et en Automatique (INRIA) Laboratoire lorrain de Recherche en Informatique et ses Applications (LORIA), ARTEMIS INT (F)

## **Resource Centre for Environmental Technologies (CRTE)**



### **"Cleaner production" innovation platform**

- AGID « Analyse et gestion intégrées et durables des flux de matières et d'énergie en entreprise », contact : joelle.welfring@tudor.lu, bianca.schmitt@tudor.lu
- RIFE « Réseau transfrontalier d'information et de formation à la gestion de l'environnement », contact : caroline.fedrigo@tudor.lu

**Partners :** Chambre de Commerce du Luxembourg, Agence de l'Environnement et de la Maîtrise de l'Energie (ADEME), Chambre Régionale de Commerce et d'Industrie de Lorraine (CRCIL), Chambre de Commerce et d'Industrie de Meurthe et Moselle, Chambre de Commerce et d'Industrie de la Meuse, Chambre de Commerce et d'Industrie de Moselle, Université de Liège, Chambre de Commerce et d'Industrie du Luxembourg Belge (CCILB)



### **"Sustainable construction" innovation platform**

- LEITFADEN « Leitfaden für nachhaltiges Bauen und Renovieren », contact : bianca.schmitt@tudor.lu

**Partners :** Groupement des fabricants des matériaux de construction, CRTI-B, Ministère de l'Environnement



### **"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 », contact : joelle.welfring@tudor.lu
- CONCEPT « Nouveaux concepts et technologies innovantes pour une gestion durable du cycle de l'eau urbain », contact : paul.schosseler@tudor.lu

- LITFLUID « Application des outils de modélisation/simulation et d'analyse des flux à la technologie des lits fluidisés », contact : mario.plattes@tudor.lu
- OPTISTEP « Optimisation de procédés de traitement des eaux usées par des outils de modélisation/simulation », contact : mario.plattes@tudor.lu
- RESEAU « Modélisation du réseau d'assainissement des localités regroupées autour du lac de la Haute-Sûre », contact : emmanuel.henry@tudor.lu

**Partners :** Université de Trèves Département d'hydrologie, Eidgenössische Anstalt für Wasserversorgung, Abwasserreinigung und Gewässerschutz (EAWAG), Institut TAURUS, CRP Gabriel Lippmann, Syndicat Intercommunal de Dépollution des Eaux résiduaires du Nord (SIDEN), Syndicat Intercommunal pour l'Assainissement du Bassin de la Chier (SIACH), Syndicat Intercommunal à Vocation Ecologique (SIVEC)

## Resource Centre for Health Care Technologies

- 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 », contact : andreas.jahnen@tudor.lu
- EDDRA5 « Exchange on Drug and Demand Reduction Action », contact : patrick.harpes@tudor.lu
- HEALTHNET2 « Réseau informatique fermé et sécurisé pour tous les professionnels de la santé », contact : lysiane.cuny@tudor.lu
- LUHF « Luxembourg Heart Failure Project », contact : norbert.roesch@tudor.lu
- MAMOGRAPHIE « Informatisation du programme de dépistage mammographique », contact : malika.bendaoud@tudor.lu
- MENSSANA « Mobile Expert and Networking System for Systematical Analysis of Nutrition-based Allergies », contact : norbert.roesch@tudor.lu
- OPMAS « Centre de cancérologie virtuel », contact : andreas.jahnen@tudor.lu
- OPTIMAGE « Quality Control for Optimal Medical Images », contact : andreas.jahnen@tudor.lu
- RIS PACS « Elaboration de cahiers de charges pour l'informatisation d'un service de radiologie », contact : frederic.zucconi@tudor.lu

**Partners :** Ministère de la Santé, Direction de la Santé, Service de Santé au Travail Multisectoriel, Fondation Luxembourgeoise contre le Cancer, Centre Hospitalier de Luxembourg, CRP Santé, EC, Clinique Sainte Thérèse, Centre Hospitalier Emile Mayerisch (CHEM)

## Resource Centre for Information Technologies in Construction

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

**Partners :** Ministère des Travaux Publics, Chambre des Métiers, Ordre des Architectes et Ingénieurs-conseils (OAI), Fédération des Artisans, Fédération des Industriels Luxembourgeois (FEDIL)

## SITec® “Lifelong Learning for Technological Innovation”

- 2e cycle SSSI « Master en management de la sécurité des systèmes d'information », contact : carole.corydon@tudor.lu
- 3e cycle II « Diplôme d'Etudes Supérieures Spécialisées "Informatique & Innovation" », contact : carole.corydon@tudor.lu
- ACCESSIT « Accès à la société de l'information et aux technologies », contact : bernard.lambeaux@tudor.lu
- CHECK-UP « Valorisation et développement du capital de compétences », contact : olivier.decolnet@tudor.lu
- CONFERENCES « Programme pluriannuel de conférences scientifiques et professionnelles du CPR Henri Tudor », contact : ana.teixeira@tudor.lu
- DULOG « Mise en œuvre d'un diplôme universitaire en logistique », contact : sandra.conradt@tudor.lu
- FORENCA « Formations, rencontres, catalogues », contact : olivier.decolnet@tudor.lu
- INNOQUALIF « Programme d'évaluation et de développement de compétences TIC « additionnelles » de la société de l'information pour demandeurs d'emploi », contact : sandra.conradt@tudor.lu
- INNOSESSION « Plate-forme de gestion anticipative des compétences liées à l'innovation technologique », contact : bernard.lambeaux@tudor.lu
- MSTM 1ère session « Accompagnement à la mise en place d'un Master in Science and Technical Management », contact : romain.gaasch@tudor.lu
- PARENT « Améliorer le retour en entreprises par les nouvelles technologies », contact : olivier.decolnet@tudor.lu
- RENFORT « Renforcer la formation par les technologies », contact : olivier.decolnet@tudor.lu
- TETRAFORM « Télétravail dans le domaine de la formation », contact : severine.mignon@tudor.lu

### Partners :

Université du Luxembourg, Université de Nancy II, Facultés Universitaires Notre Dame de la Paix de Namur, Embry-Riddle Aeronautical University (ERAU), Université de Trois-Rivières du Québec, Ecole Nationale d'Ingénieurs de Metz, Ecole Supérieure de Management de Metz, Facultés Universitaires Catholiques de Mons (FUCaM), Administration de l'Emploi (ADEM), Chambre du Travail, Chambre de Commerce du Luxembourg, Chambre des Métiers, Chambre des Employés Privés, Association des Professionnels de la Société de l'Information (APSI), Club de la Sécurité des Systèmes d'Information à Luxembourg (CLUSSIL), Hôpital Princesse Marie-Astrid, Inlingua, Audaxis, Gax, Telindus, Secure IT

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

- DIPS « Distance Learning Approach Applied to Enhance Introduction of Intellectual Property Rights in Management Strategies of Enterprises », contact : cyrille.dubois@tudor.lu
- E-NORM « Mise en place d'une plate-forme Internet dédiée au soutien des entreprises dans l'application des normes », contact : xavier.delecroix@tudor.lu
- HAITI « Etude sur les habitudes en matière d'information technique et de protection des inventions des PME/PMI du Luxembourg », contact : xavier.delecroix@tudor.lu
- IELux « IE Luxembourg : Mise en place d'un système intégré d'intelligence économique pour la communauté R&D au Luxembourg », contact : xavier.delecroix@tudor.lu
- LIIP « Linking Innovation and Industrial Property », contact : xavier.delecroix@tudor.lu

- TARKETT « Mise en place d'activités de veille scientifiques et technologique », contact : cyrille.dubois@tudor.lu

**Partners :** Ministère de l'Economie et du Commerce Extérieur (Direction de la Propriété Intellectuelle), Service Central de la Statistique et des Etudes Economiques (STATEC), Office Européen des Brevets, Luxinnovation, Officina Espanola de Patentas y Marcas (OEPM), Observatorio de Prospectiva Tecnologica Industrial (OPTI), Office des Brevets de Grèce (OBI), Management Company of the Science and Technology Park of Crete (EDAP), Thessaloniki Technology Park / Management and Development Company SA (TTP/MDC), Irish Patent Office (IPO), Enterprise Ireland, Windmill Lane Ltd, Ufficio Italiano dei Brevetti e Marchi (UIBM), ABCnet, Innovation Management Consulting Solutions (IMCS), Universitat Politecnica de Catalunya, IALE Tecnologia SA, Tec Minho, Office Freylinger, Associacao de Inovacao do Minho (AIM), CIDEM, Université Aix Marseille III, Bournemouth University, Université du Luxembourg, Mondo, Qoalux, Cybercultus, Feidert, J-Way, Pechiney Eurofoil, Tarkett Sommer.

## Technoport

- NAVOBS « A Support Measure to Boost the Business Prospects of GMES and Telecom Satellites through Focused and Innovative RTD Work Involving SMEs », contact : diego.debiasio@tudor.lu

- PEATS « Projet d'extension et d'amélioration de l'infrastructure et des équipements du Technoport Schlassgoart », contact : diego.debiasio@tudor.lu

**Partners :** European BIC Network, Wallonia Space Logistics, European Space Agency

## Shared innovation platforms



### “Renewable energies” innovation platform

- ANIA « Analyses et gestions des impacts environnementaux et de la consommation énergétique d'installations frigorifiques dans le secteur agro-alimentaire », contact : alexandre.bertrand@tudor.lu

- PV-LAB « PhotoVoltaic Laboratory », contact : frank.minette@tudor.lu

- RELIES « Réseau luxembourgeois pour l'information sur l'énergie solaire », contact : frank.minette@tudor.lu

**Partners :** Centre Hospitalier Emile Mayrisch (CHEM), Joint Research Centre of the European Commission Ispra (I), Laboratorio Energia Ecologia Economia TISO (CH), Agence de l'Energie (AEL), Service météorologique de l'Administration de l'Aéroport de Luxembourg, Administration des Services Techniques de l'Agriculture (ASTA), Administration de l'Environnement, Groupe Cactus



### “Free and Open Source software” innovation platform

- IT CLUSTERS « Qualité des prestations informatiques et promotion de l'informatique libre », contact : christophe.feltus@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

**Partners :** Conostix, INTECH, Université du Luxembourg, Facultés Universitaires Notre Dame de la Paix de Namur

# Scientific publications 2004

## Laboratory for Industrial Technologies (LTI)

« Etude et caractérisation de l'usure de revêtements de sol à base PVC : Caractérisation des défauts consécutifs aux conditions réelles d'utilisation et aux simulations en laboratoire » thèse soumise à l'École des Mines de Nancy en octobre 2004, olivier.buchheit@tudor.lu

« Viscoplastic Properties of Coating-polymer Systems. Comparison between Quasi-static and Dynamic Depth Sensing Indentation Measurements to Characterize Wear and Mar Resistance », in *5th European Symposium on nanomechanical testing*, in press in *Zeitschrift für Metallkunde*, antoine.riche@tudor.lu, julien.bardon@tudor.lu, Hervé Pelletier (collaboration avec INSA de Strasbourg), Florent Bernardo

« Modeling of Response of Viscoelastic Materials to Harmonic Loading », in *Engineering Mechanics*, edited by I. Zolotarev and A. Pozivilova, Svratka, 10 - 13 mai 2004, IT ASCR, Prague, ISBN 80-85918-88-9, jaroslav.mencik@upce.cz, gaston.rauchs@tudor.lu, salim.belouettar@tudor.lu, julien.bardon@tudor.lu, antoine.riche@tudor.lu

« Analysis of the Ductile/Brittle Transition during a Scratch Test performed into Polymeric Film deposited on PMMA Substrate » in *5th European Symposium on Nanomechanical Testing*, in *Zeitschrift für Metallkunde*, antoine.riche@tudor.lu, julien.bardon@tudor.lu, Hervé Pelletier, G. Heck (INSA de Strasbourg)

« Quantification de l'endommagement/usure de revêtements de sol polymères durant le test Lisson par une approche topographique », in *Les progrès en tribologie par l'ingénierie des matériaux et des surfaces*, Presses Polytechniques Universitaires de Lausanne, ISBN: 2-88074-608-6, olivier.buchheit@tudor.lu, nathalie.bonnel@tudor.lu, Jurgen von Stebuth (Ecole des Mines de Nancy)

« Modélisation numérique des structures sandwichs viscoélastiques » in *Revue Technique Luxembourgeoise*, n° 04/2004, salim.belouettar@tudor.lu

« Identification of Elasto-Plastic Material Parameters from Indentation Testing using Numerical Optimization and Finite Element Modelling » in *International Conference on Advances in Intelligent Systems - Theory and Applications (AISTA 2004)*, Luxembourg, 15 -18 novembre 2004, ISBN 2-9599776-8-8, gaston.rauchs@tudor.lu

« Une procédure par séparation et évaluation pour l'ordonnancement du job shop sous contraintes de Dis » in *Actes de la conférence MOSIM 04*, Nantes, 1-3 septembre 2004, ISBN 2-7430-0731-1, riad.aggoune@tudor.lu

« A Re-engineering Project Based on the TOC Fundamental Measurements » in *ISS'04 International Scheduling Symposium*, édité par Hiroshi Kise, *Japan Society of Mechanical Engineers*, Awaji, Hyogo, Japon, jos.schaefers@tudor.lu, riad.aggoune@tudor.lu, remi.fabbri@tudor.lu

« A Branch and Bound Algorithm for the Job Shop Scheduling Problem under Availability Constraints » in *Special Issue of European Journal of Operational Research : Operations Research Methods for IT-Based Management*, édition spéciale du *Journal of Global Optimization: "Modeling, Computation and Optimization in Systems Engineering"*, ed. Hermes, riad.aggoune@tudor.lu

« Two-Job Shop Scheduling Problems with Availability Constraints » in *Proceedings of the Fourteenth International Conference on Automated Planning and Scheduling (ICAPS 2004)*, Whistler, Canada, 3 - 7 juin 2004, ISBN 1-57735-200-9, riad.aggoune@tudor.lu

« A Measurement System for the Health Care Industry, the Industrial Point of View » in *International Workshop on Performance and Risk Measurement : Operations, Logistics and Supply Chains*, Università de Bocconi, Milan, 8 - 10 décembre 2004, jos.schaefers@tudor.lu, jerome.colin@tudor.lu, myriam.kucina@tudor.lu

« Ordonnancement et optimisation de l'activité de maintenance dans les ateliers de production » in *FRANCORO IV, Journées Francophones de Recherche Opérationnelle*, Fribourg, Suisse, 8 - 10 décembre 2004, riad.aggoune@tudor.lu

« Modélisation d'établissement de santé » in *Proceedings of the International Conference GISEH'04*, Mons, septembre 2004, A. Artiba (Centre de Recherche en Gestion Industrielle (CREGI) - Facultés Universitaires Catholiques de Mons (FUCaM)), magalie.briquet@tudor.lu., jerome.colin@tudor.lu., A. Dontaine (CREGI - FUCAM), D. Gourc (Centre de Génie Industriel de l'École des Mines d'Albi), C. Pourcel (Laboratoire Génie Industriel et de Production Mécanique (LGIPM) - Ecole Nationale d'Ingénieurs de Metz (ENIM)), R. Stock (LGIPM - ENIM)

« Réflexions sur le déploiement de la stratégie des établissements de santé » in *Proceedings of the International Conference GISEH'04*, Mons, septembre 2004, A. Artiba (CREGI – FUCAM), magalie.briquet@tudor.lu., jerome.colin@tudor.lu, A. Dontaine (CREGI – FUCAM), D. Gourc (CGI – EMAC), G. Pemptroad (BOC), C. Pourcel (LGIPM – ENIM), R. Stock (LGIPM – ENIM)

## Centre for IT Innovation (CITI)

« Coopération et innovation: Facteurs explicatifs », à paraître dans *Cahiers R&D STATEC*, charles-henri.dimaria@tudor.lu, mathieu.farcot@tudor.lu

« Les déterminants du dépôt de marques: une étude économétrique pour le BENELUX », à paraître dans *Cahiers R&D STATEC*, charles-henri.dimaria@tudor.lu

« Devenir internaute: Les facteurs décisionnels, plaidoyer pour une démarche pluridisciplinaire », in *Economie et Statistique du STATEC*, n°1/2004, charles-henri.dimaria@tudor.lu, christelle.mallet@tudor.lu

« NOEMI, a Collaborative Management for ICT Process Improvement in SME: Experience Report », in *Norwegian University of Science and Technology (NTNU)*, ISSN: 1503-416X, bernard.direnzo@tudor.lu, christophe.feltus@tudor.lu, sylvie.prime@tudor.lu

« Méthode d'évaluation NOEMI », in *Ingénierie des Systèmes d'Information*, Ed. Hermès, bernard.direnzo@tudor.lu, matthieu.farcot@tudor.lu, christophe.feltus@tudor.lu

« Reactive and Adaptive Multimedia Objects Approach for Immersive and Interactive Applications », in *Proceedings of the 1<sup>st</sup> international conference ICTTA'04*, Damas, 9-23 avril 2004, simon.renault@tudor.lu, farid.meinkoehn@tudor.lu, djamel.khadraoui@tudor.lu, patrick.blandin@tudor.lu

« A Model-based Ontology of the Software Interoperability Problem: Preliminary Results », in *Proceedings of the Workshop On Enterprise Modelling and Ontologies for Interoperability EMOI-INTEROP2004* (organisé dans le cadre de CaiSE'04 Conference), Riga, 7-8 juin 2004, vincent.rosener@tudor.lu, thibaud.latour@tudor.lu, eric.dubois@tudor.lu

« Ontologies in the CRP Henri Tudor Projects », poster présenté dans le cadre du *Workshop On Enterprise Modelling and Ontologies for Interoperability EMOI-INTEROP2004* (organisé dans le cadre de CAiSE'04 Conference), Riga, 7-8 juin 2004, jean-sebastien.brunner@tudor.lu, thibaud.latour@tudor.lu

« Intuitive Annotation of Documents in an n-Dimensional Thematic Space for Scientific and Technological Watch », in *Putting the Sparkle in the Knowledge Society, Proceedings of the 7th International Conference on Current Research Information Systems CRIS2004*, Anvers, 13-15 mai 2004, Annemarie Nase, Geert Van Grootel (Eds.), Leuven University Press (2004) 187-188, jean-sebastien.brunner@tudor.lu, thibaud.latour@tudor.lu

« Towards a Generic Semantic Web Processor » in *Inaugural Workshop of the ERCIM Working Group on Semantic Web*, Hersonissos, 27 mai 2004, thibaud.latour@tudor.lu, yannick.naudet@tudor.lu, patrick.plichart@tudor.lu, simon.renault@tudor.lu

« Referencing Text Documents in Multidimensional Concept Spaces for Technological and Scientific Watch. A Conceptual Overview of Text Models in the Context of a Collaborative Scientific Watch System » in *Proceedings of the Workshop on Terminology, Ontology and Knowledge Representation*, Lyon, 22-23 janvier 2004, jean-sebastien.brunner@tudor.lu, thibaud.latour@tudor.lu

« A Distributed Architecture for Internet-Based Computer-Assisted Testing » in *Proceedings of the World Conference on Educational Multimedia, Hypermedia & Telecommunications – ED-MEDIA 2004*, Lugano, 21-26 juin 2004, pages 114-116, Romain Martin (Université du Luxembourg), Gilbert-Busanat (Université du Luxembourg), thibaud.latour@tudor.lu, luc.vandenabeele@tudor.lu

« EFFICIENT: atelier de prototypage de transactions d'e-commerce » in *Workshop ECI 2004*, Institut National des Sciences Appliquées de Lyon (INSA), 15 – 16 janvier 2004, bertrand.gregoire@tudor.lu, sophie.ramel@tudor.lu, michael.schmitt@tudor.lu, pierre.brimont@tudor.lu, eric.dubois@tudor.lu

« EFFICIENT: A Framework for Animating and Validating e-Business Transactions » in *ERCIM News*, n° 57, avril 2004, bertrand.gregoire@tudor.lu, christophe.incoul@tudor.lu, sophie.ramel@tudor.lu, michael.schmitt@tudor.lu, laurent.gautheron@tudor.lu, pierre.brimont@tudor.lu, eric.dubois@tudor.lu

« If Business Models could speak! EFFICIENT: a Framework for Appraisal, Design and Simulation of Electronic Business Transactions » in

*International Conference on Enterprise Integration and Modelling Technology*, Toronto, octobre 2004, michael.schmitt@tudor.lu, bertrand.gregoire@tudor.lu, christophe.incou@tudor.lu, sophie.ramel@tudor.lu, pierre.brimont@tudor.lu, eric.dubois@tudor.lu

« Efficient COTS Selection with OPAL Tool » in *Proceedings of International Workshop on Models and Processes for the Evaluation of COTS Components - MPEC'04*, Edinbourg, 25 mai 2004, (organisé dans le cadre de ICSE International Conference on software engineering), marc.krystkowiak@tudor.lu, valerie.betry@tudor.lu, eric.dubois@tudor.lu

« Multi-Agent Organisational Model for E-Contracting » in *Proceedings of the 6th International Conference on Enterprise Information Systems ICEIS*, Porto, 14-17 avril 2004, pages 489-492, benjamin.gateau@tudor.lu, djamel.khadraoui@tudor.lu, eric.dubois@tudor.lu, boissier@emse.fr

Proceedings "International Workshop on Models and Processes for the Evaluation of COTS Components (MPEC'04)" in *IEE Press (2004)*, ISBN 0-86341-422-2, eric.dubois@tudor.lu, franch@lsi.upc.es

« Models and Processes for the Evaluation of COTS Components » in *Proceedings of the 26th International Conference on Software Engineering (ICSE)*, Edinbourg, 23-28 mai 2004, IEEE Society Press (2004) 759-760, eric.dubois@tudor.lu, franch@lsi.upc.es

« Ten Years of RESQ : Outcomes and Outlooks » in *Proceedings of the International Workshop on Requirements Engineering: Foundation of Software Quality (REFSQ '04)*, Riga, 7-8 juin 2004, à paraître dans *Lecture Notes on Computer Science (LNCS)*, ISBN 3-922602-91-6, andreas.opdahl@uib.no, eric.dubois@tudor.lu, pohl@sse.uni-essen.de

« An Abstract Intelligent Machine for the Semantic Web » in *Proceedings of the International Conference on Advances in Intelligent Systems - Theory and Applications in cooperation with IEEE Computer Society (AISTA 2004)*, Luxembourg, 15-18 novembre 2004, IEEE On-line Digital Library, yannick.naudet@tudor.lu, patrick.plichart@tudor.lu, simon.renault@tudor.lu, thibaud.latour@tudor.lu

« A Simple and Intuitive Method for Cooperative Ontology Construction Based on a P2P Network of Personal Desktop Management Tools » in *Proceedings of the International Conference on Advances in Intelligent Systems - Theory and Applications in cooperation with IEEE Computer Society (AISTA 2004)*, Luxembourg, 15-18 novembre 2004, IEEE On-line Digital Library, jean-sebastien.brunner@tudor.lu, alain.vagner@tudor.lu, thibaud.latour@tudor.lu

« TAO, a Collaborative Distributed Computer-based Assessment Framework built on Semantic Web Standards » in *Proceedings of the International Conference on Advances in Intelligent Systems - Theory and Applications in cooperation with IEEE Computer Society (AISTA 2004)*, Luxembourg, 15-18 novembre 2004, IEEE On-line Digital Library, patrick.plichart@tudor.lu, raynald.jadoul@tudor.lu, luc.vandenabeele@tudor.lu, thibaud.latour@tudor.lu

« Empirical Study on Knowledge Based Systems » in *Electronic Journal of Information Systems Evaluation (EJISE)*, 2005, ISSN 1566-6379, gabriela.avram@tudor.lu

« Using Weblogs for Knowledge Sharing and Learning in Information Spaces » in *Journal of Universal Computer Science*, mars 2005, ISSN 0948-6968, gabriela.avram@tudor.lu, eric.ras@iese.fraunhofer.de, patrick.watson@iese.fraunhofer.de, sweibelzahl@ncirl.ie

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« Using Semantic Graphs in Clustering Process : Enhance Information Level » in *2004 IEEE/WIC/ACM International Conference on Web Intelligence (WI 2004)*, Pékin, 20-24 septembre 2004, ISBN: 0-7695-2100-2, jean-sebastien.brunner@tudor.lu, iberrien@bouygues.com

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« Image Quality in MRI » document réalisé dans le cadre du Master of Science de l'Open University, septembre 2004, andreas.jahnen@tudor.lu

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## Resource Centre for Information Technologies in Construction (CRTI-B)

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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 S.A.

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

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



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

## Management Board

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

Dr Eric Dubois  
Information and Communication Technologies

Etienne D'hoedt  
Administration, finances, R&D project monitoring

Jean-Pol Michel  
Information and Communication Technologies

Pierre Plumer  
Medical and clinical technologies and engineering

Dr Jos Schaeffers  
Industrial technologies

Dr André Weidenhaupt  
Environmental technologies, technology and standard watch

## 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 1<sup>st</sup> March 2005. The Board of Directors has fixed and approved the accounts and the balance sheet 2004 on 14<sup>th</sup> March 2005.

## Profit and loss account for the year ended 31<sup>st</sup> December 2004

(in Euro)

	2004	2003
<b>Costs</b>		
Operating costs	2 183 030.08	2 784 180.64
Staff expenses	12 621 207.47	10 603 923.97
Value adjustment in respect of tangible and intangible fixed assets	688 425.44	701 646.26
Charges to provisions	1 199 414.40	1 258 446.28
Other operating costs	2 527 421.02	2 003 263.42
Interest payable and similar charges	62 442.71	30 834.97
Extraordinary expenses	176 803.16	124 812.08
Result of the financial year (income surplus)	55 412.48	210 356.34
<b>Total</b>	<b>19 514 156.76</b>	<b>17 717 463.96</b>
<b>Income</b>		
Net turnover	10 978 305.08	8 539 634.81
Grant for mission of public utility	6 118 502.79	6 989 261.36
Income on projects and independent structures	710 390.62	775 085.06
Provision adjustment	916 753.60	722 915.33
Other income from operations	378 444.94	440 363.67
Other interests and similar income	5 944.34	7 178.48
Exceptional income	405 815.39	243 025.25
<b>Total</b>	<b>19 514 156.76</b>	<b>17 717 463.96</b>

# Balance Sheet as at 31<sup>ST</sup> December 2004

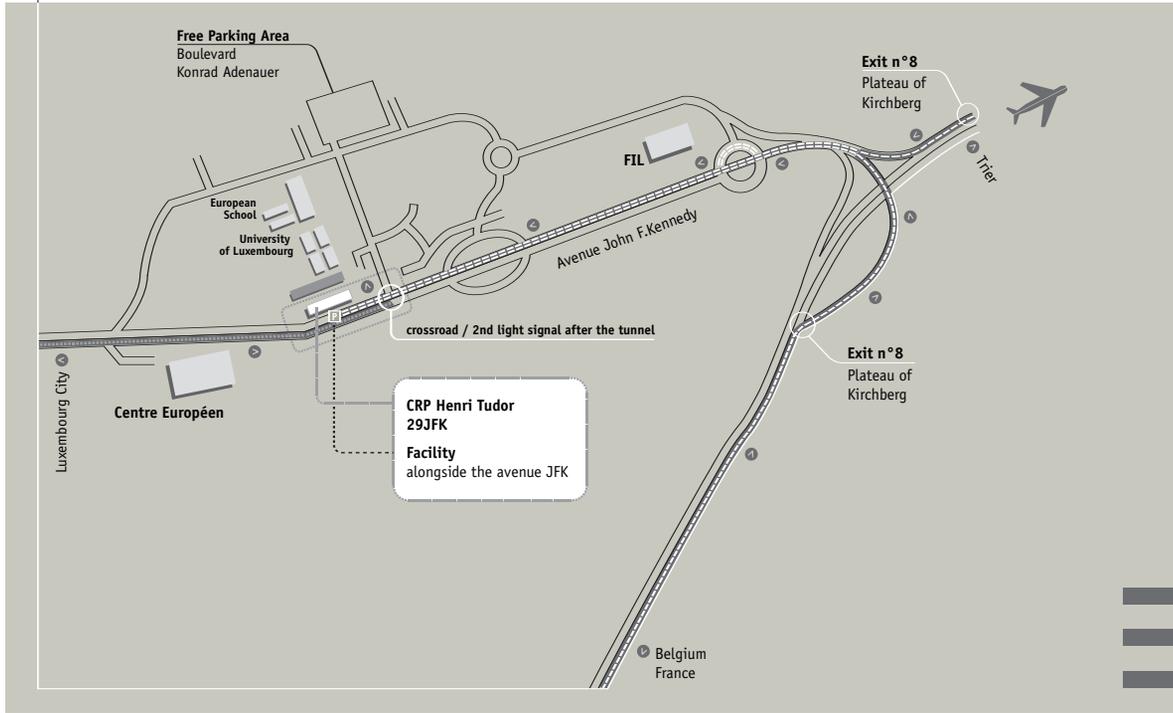
(in Euro)

	2004	2003
<b>Assets</b>		
Fixed assets		
Intangible assets	376 113.88	195 432.44
Tangible fixed assets		
Technical equipment and machinery	560 161.21	704 907.14
Other equipment, industrial material and furniture	507 837.49	548 470.99
Financial fixed assets	5 563.34	12 555.06
Total fixed assets	1 449 675.92	1 461 365.63
Current Assets		
Stocks: raw materials and consumables	p.m.	p.m.
Accounts receivable		
Accounts receivable from sales of goods and services	11 437 210.24	10 205 463.83
Other accounts receivable	377 376.89	1 869 870.58
Total accounts receivable	11 814 587.13	12 075 334.41
Cash in bank and in hand	753 740.14	518 852.99
Total current assets	12 568 327.27	12 594 187.40
Adjusting account	132 234.44	111 179.81
Cost surplus of the financial year	0.00	0.00
<b>Total assets</b>	<b>14 150 237.63</b>	<b>14 166 732.84</b>
<b>Liabilities</b>		
Equity capital		
Start-up contribution / Equity grant	247 893.52	247 893.52
Non-dedicated reserve	1 612 654.84	1 250 724.70
Profit brought forward	210 356.34	361 930.14
Total equity capital	2 070 904.70	1 860 548.36
Provisions	926 059.11	796 288.87
Accounts payable		
Accounts payable to credit institutions	3 225 690.25	3 196 366.06
Accounts payable from acquisitions and services	777 116.65	840 042.23
Tax and social liabilities	265 954.73	360 084.90
Other accounts payable	1 424 367.90	2 115 707.03
Total accounts payable	5 693 129.53	6 512 200.22
Adjusting account	5 404 731.81	4 787 339.05
income surplus of the financial year	55 412.48	210 356.34
<b>Total liabilities</b>	<b>14 150 237.63</b>	<b>14 166 732.84</b>

# Adresses & Access

## ACCESS MAP

LUXEMBOURG-KIRCHBERG



## Centre de Recherche Public Henri Tudor

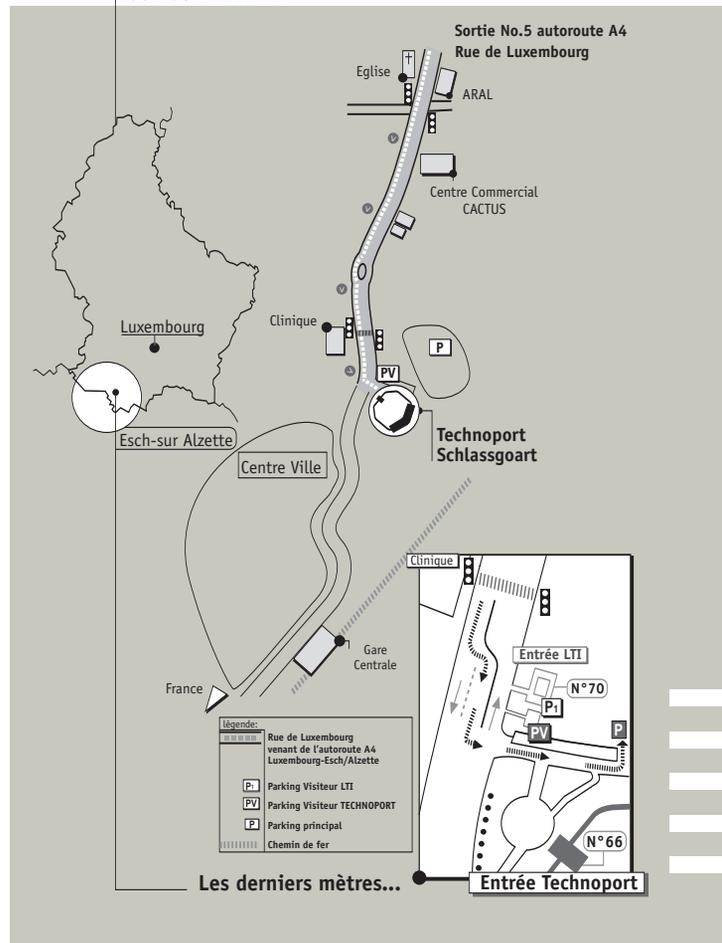
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## Technoport Schlassgoart

66 & 70 rue de Luxembourg | B.P. : 144 | L-4002 Esch-sur-Alzette  
 Phone: +352 54 55 80 - 1 | Fax: +352 54 55 80 - 401

## PLAN D'ACCES

ESCH-SUR-ALZETTE

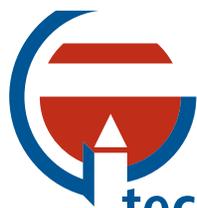
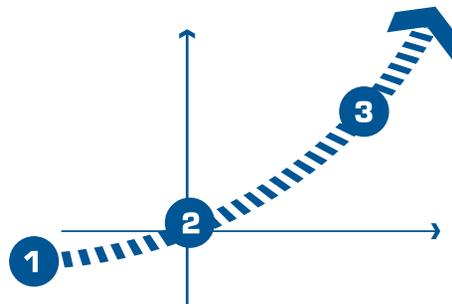


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