

ANNUAL REPORT 2016

LUXEMBOURG
INSTITUTE OF SCIENCE
AND TECHNOLOGY

LIST







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FOREWORD FROM THE CHAIRMAN OF THE BOARD OF DIRECTORS

LIST's mission, you will recall, is to accelerate innovation transfer to public and private stakeholders through high-quality research, thereby contributing to economic diversification and competitiveness and helping to build the Luxembourg of tomorrow. Our work must have a public purpose, as demonstrated by its economic and societal impact.

In this respect, 2016 was an noteworthy year for LIST.

It saw the departure of Gabriel Crean, LIST's first CEO, appointed the previous year. Fernand Reinig was named CEO ad interim as a means to steady and bolster the institute, whose employees had to face a large number of changes in a very short time. All credit is due to him for the Collective Labour Agreement signed with the trade unions, which was welcomed by our staff, and the launch of an ambitious action plan in response to the well-being at work study. These initiatives, begun in 2016, are in line with the mandate given to the CEO a.i. and are integral to restoring trust between LIST and its employees.

In 2016, LIST's workforce saw renewed growth, sending out an important, positive signal. Following the management's corrective measures, our institute has once again become an employer of choice which, in the years ahead, will further strengthen its attractiveness in the eyes of current and potential employees alike.

At the same time, important milestones were set in 2016 and progress was made by our young institute. New collaborations with key partners and major players on the Luxembourg and international stage, such as the University of Luxembourg, VTT, Nanyang Technological University's Singapore Centre for 3D Printing (SC3DP), Aixtron, Enovos, ESA, NASA, PM-International, Roquette, Rotarex and Zeiss, are testament to the excellence of our research.

The multi-year agreement signed with Goodyear worth 41 million euros will provide us not only with the opportunity to work with a renowned manufacturer to design the tyres of tomorrow, but also to contribute more fully to the emergence of smart mobility and, in parallel, strengthen Luxembourg-based R&D.

In addition, the partnership with SES, drafted in 2016, will enable LIST to contribute to the development of innovative satellite communication products and services. These collaborative ventures show that we are gradually fulfilling the mission – to strengthen and diversify the Luxembourg economy through innovation, via research carried out at LIST, and act in the public interest – which we were given by the Luxembourg Government in December 2014.

2016 was also marked by the establishment of the National Composite Centre – Luxembourg (NCC-L). This technology platform, for which LIST is responsible, is the result of private and public participants in Luxembourg pooling their resources and expertise in the field of composites.

The aim of the NCC-L is to further galvanize the development and processing of innovative materials in Luxembourg.

In collaboration with manufacturers, it carries out research and innovation projects in order to develop pre-commercial applications. It is supported in equal measure through public and private funding.

LIST was also able to capitalize on its excellent results in the field of precision agriculture to create the Agroptimize spin-off, working with Belgian and French partners. This success exemplifies LIST's strategy: to support research excellence, driving innovation on behalf of Luxembourg.

LIST also made its ambition clear by preparing to welcome Prof. Jorge Sanz, a world-renowned expert in research applied to innovation systems used in the finance industry. This scientific visit confirmed the considerable opportunities available in the Business Analytics field. With many years in Silicon Valley and then the National University of Singapore, Jorge Sanz could therefore strengthen our competitiveness in this market.

Many steps have already been taken and we are on the right track to meet the target set by our trustees. LIST's path is clear for take-off, and therein lies the excitement!



Georges Bourscheid
Chairman of the Board of Directors



FOREWORD FROM THE CEO

A few months into my appointment as CEO a.i., this annual report gives me the opportunity to look back at the defining topics of 2016 for our institute.

Gabriel Crean, my predecessor, clearly set out what we should aim for: an even greater involvement of manufacturers, so as to steer the institute in the direction of public, societal and economic interest. This vision allowed a number of promising projects to be finalized, especially with Goodyear. Their signature, and their far-reaching scope (as mentioned by Georges Bourscheid, Chairman of the Board of Directors, in his editorial), are proof that LIST is gradually fulfilling its mission as a Research and Technology Organization (RTO).

These partnerships are in fact influenced by their characteristically open approach. Companies choosing us understand the benefit of turning to the tools we have to offer. As a result, at Goodyear our researchers get to participate in the company's innovations, ahead of the production process.

We are therefore contributing, along with other key players, to the economic diversification of Luxembourg. And our collaborations, like the one with NASA, are a remarkable showcase for the country. In some of the fields we work in, we are perceived as the best in the business. And for this very reason, we seek to apply our technologies through partnerships.

Our current performance agreement is due to expire at the end of the year. Discussions recently began with our supervising ministry with a view to drafting a new agreement for 2018-2021.

Based on the analysis of the previous term, we need to refine the institute's strategy for the coming period. It will naturally reflect, as indicated by Georges Bourscheid, Chairman of the Board of Directors, our desire to continue on the course set since 2015.

Work on this has already begun between myself and the Board of Directors' "Strategy" committee, the Collaborative Council – a body tasked with ensuring better involvement of employees in drafting the institute's strategy – and the directors concerned within our organization.

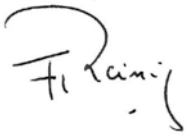
To continue to make progress and keep up with the times, LIST needs committed staff. This is why a large proportion of my work since taking up my position has been focused on the well-being of our employees.

LIST now has job categories for its RDI teams, as well as its support teams. A salary framework has been set for each job category. The very substantial budget allowance granted by the Board of Directors for this purpose made it possible to implement the Collective Labour Agreement measures.

This gave rise, in the end, to the creation of a new remuneration and career management system. It recognizes both years of service and performance, which is a necessity for an RTO as ambitious as ours.

The fully-fledged construction of LIST is not yet complete, however. My goal is to strengthen the structure of our organization and make it even more operational and efficient.

With this in mind, and faced with all the challenges we have yet to meet, I know that, over and above the Board of Directors and our supervisory ministry whose support is needless to say invaluable, I can count on LIST's employees. It is only with them and thanks to them that we will move onwards and upwards. Let me take this opportunity now to thank each and every person involved.



Dr Fernand Reinig
CEO a.i.



MILESTONES 2016

GOODYEAR

41 million euros towards smart mobility.

Funded by Goodyear with the support of the State, this five-year partnership is the most important ever forged in the country's history. It will ensure a R&D potential that is vital for the future of Luxembourg and the automobile industry in general. It will see the allocation of 38 full-time research positions and a significant number of doctorate/post-doctorate positions.

MS-SPACE

LIST's researchers are joining forces with experts from NASA's Ames Research Center for MS-SPACE, a large-scale project supported by the Luxembourg National Research Fund (FNR).

At the heart of this project, stemming from in-depth discussions between the US institution and LIST, there is a shared ambition: to adapt and pursue advances in mass spectrometry technology developed in recent years by our experts for space applications. Due to its compact size and high mass resolution, this technology – called FieldSpec – has the potential necessary to meet the demands of space exploration.

This initial collaboration between LIST and NASA offers new prospects for the years ahead. It paves the way for other joint projects and technology transfer between the two institutions.





AGROPTIMIZE

The Agroptimize company will market the results of several years of research conducted by LIST and the University of Liège.

It aims to become a major European player in Decision Support Tools (DST) and Precision Farming Tools (PFT). It will draw on LIST's expertise in crop protection and that of the University of Liège in modelling the use of inputs, in order to rapidly expand its product range.

BUILDING INFORMATION MODELLING (BIM)

LIST is very active in the field of construction and especially in BIM activities. The aim is to contribute to the development and adoption of BIM while focusing on various concerns such as the optimization of collaboration processes and the energy efficiency of buildings and districts.



| STRATEGY

SUPPORTING INDUSTRIAL AND SOCIETAL INNOVATION

AIMING FOR A STRONG IMPACT, TO IMPROVE QUALITY OF LIFE AND BUILD THE LUXEMBOURG OF TOMORROW

The Luxembourg Institute of Science and Technology (LIST) is a Research and Technology Organization (RTO) active in the fields of materials, the environment, and Information and Communications Technology (ICT).

By transferring technology to society as well as local companies, LIST has an important part to play in helping build the Luxembourg of tomorrow.

As a major driver of Luxembourg's economic diversification and growth through innovation, LIST supports the deployment of solutions in a wide range of sectors including:

Energy, Space, Agriculture and Viticulture, Mobility, Transport and Logistics, Finance, Manufacturing Industry, Renewable Resources, and Biotechnologies.

LIST develops innovative and competitive solutions in response to the key needs of domestic, European and international companies.

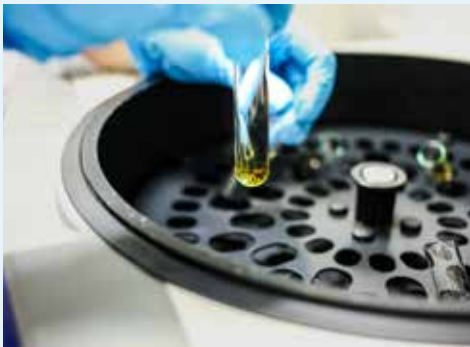
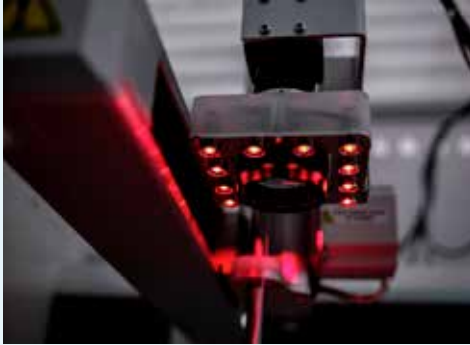
As a result, the institute plays a key role in strengthening Luxembourg's economy. LIST's objectives are in the general interest and their fulfilment benefits the public.

DIVERSIFYING OUR ECONOMY BY TRANSFERRING INNOVATION

The Luxembourg Government has clarified the competences and promoted the best possible coordination between participants in economic attractiveness. In conjunction with Luxinnovation, LIST provides its innovation portfolio to strengthen the coherence and appeal of Luxembourg's offering. It is for this reason that it takes part in economic missions organized by the Grand Duchy of Luxembourg.

In March 2016, the 2014-2017 Performance Agreement binding LIST and the State was amended. Public funding increased by 4.6 million euros from 154 million to 158.6 million euros and is intended to fund sectoral programmes, among other things.

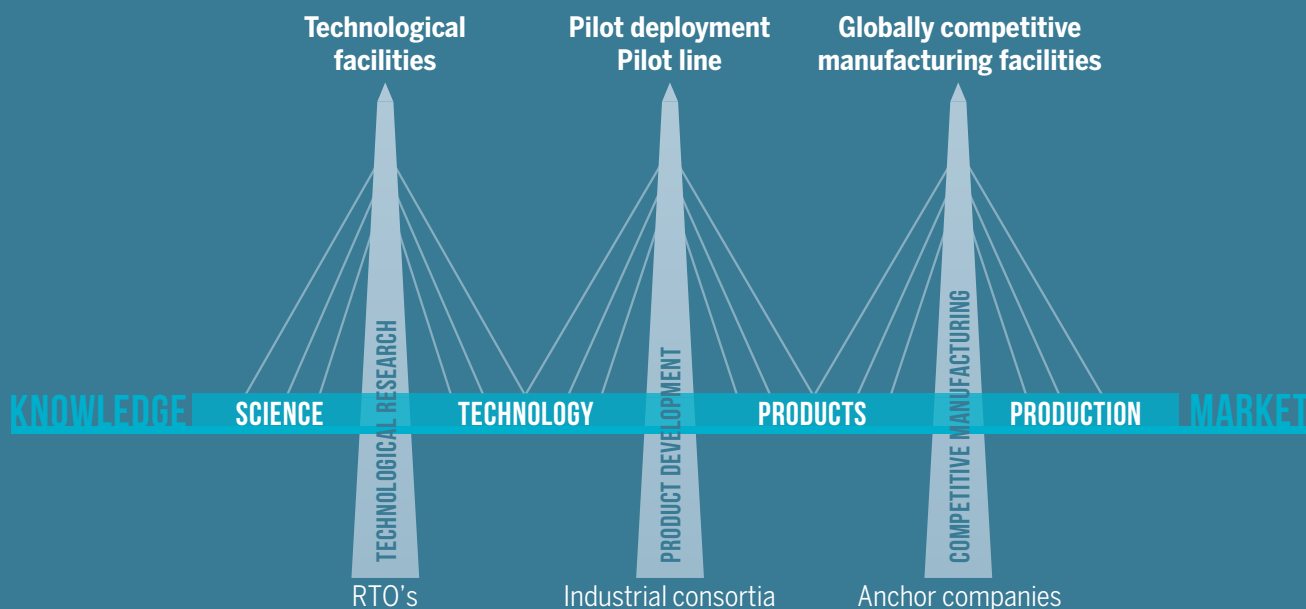
A new agreement for the 2018-2021 period is due to be negotiated in the coming months.



BUILDING A BRIDGE BETWEEN LUXEMBOURG RESEARCH AND BUSINESS

LIST is situated at the crucial junction between basic research and industrial application. As a result, it represents a vital link in the innovation chain, helping to create added value. It plays a bridging role between the scientific and entrepreneurial worlds, two spheres where dialogue is essential in the era of the knowledge-based economy. With this in mind, LIST works in close collaboration with other innovation players in Luxembourg, including:

- Manufacturers, clusters, and Small and Medium-sized Enterprises (SMEs),
- Funding and innovation promotion agencies such as the Luxembourg National Research Fund (FNR) and the National Agency for Innovation and Research (Luxinnovation),
- Various Luxembourg ministries,
- Research institutes such as the Luxembourg Institute of Health (LIH) and the Luxembourg Institute of Socio-Economic Research (LISER),
- The University of Luxembourg



SUPPORTING INDUSTRIAL AND SOCIETAL INNOVATION

TECHNOLOGY READINESS LEVEL (TRLs)

University	1. Basic principles observed
	2. Technology concept formulated
LIST	3. Experimental proof of concept
	4. Technology validation in laboratory
	5. Technology validation in relevant environment
	6. Demonstration in relevant environment
	7. Demonstration in operational environment
Market	8. System complete and qualified
	9. Successful mission operations
	10. Mass Production

Fundamental research
PUBLICATIONS



Upstream research

Technological research
PATENTS



Technological transfer

Industry development
PROTOTYPES



Market

Mass market products
PRODUCTS





PROGRAMMES

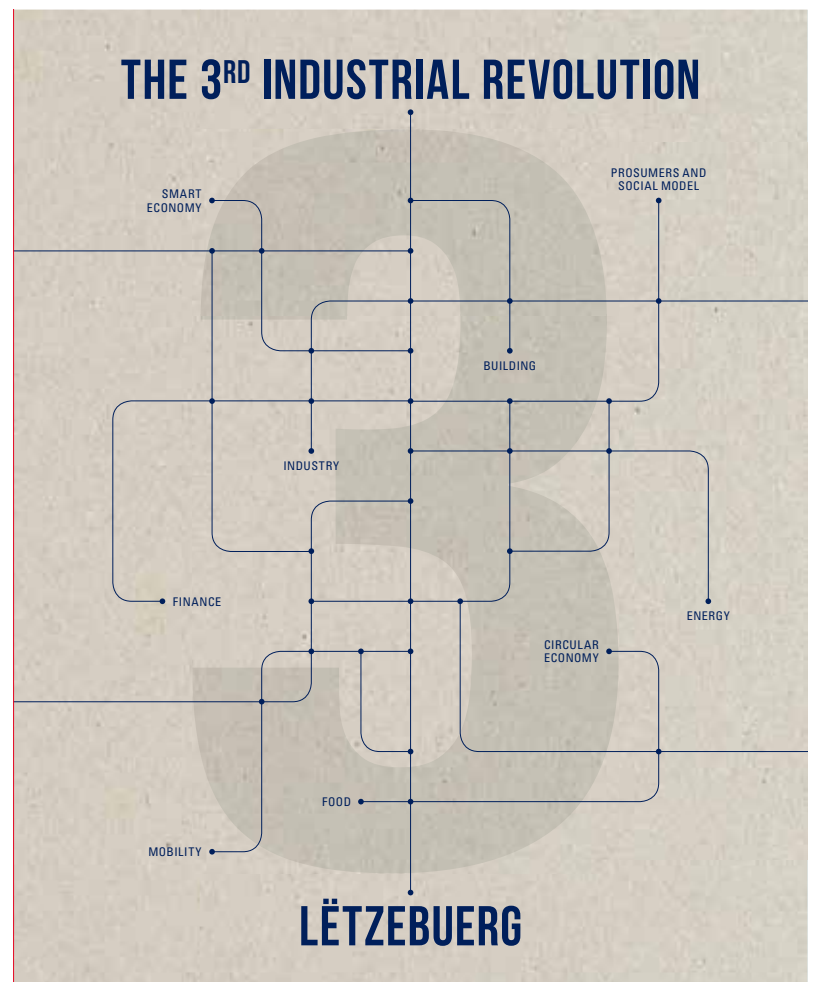
LIST aims to be a key player in the innovative and sustainable development of goods and services.

Its contribution to the implementation of public policies and improvement of industrial competitiveness must be reflected in reality by putting an innovative approach into practice. The “programme strategy” draws on the synergies and complementary inherent existing strengths developed by LIST’s three research departments. It plans, designs and exploits innovative and sustainable goods and services to meet economic and social challenges.

AN INTERDISCIPLINARY APPROACH FOR SUSTAINABLE GROWTH

Programmes offer LIST new opportunities to promote its human and technological strengths. As well as application-oriented technologies, programmes open up possibilities for LIST to offer integrated and multi-disciplinary solutions to its partners and clients, whether public or private. Through its Smart Cities, Smart Space and Smart Manufacturing programmes, LIST delivers a range of solutions which respond directly to user experience and adapt perfectly to socio-economic needs.

To carry out impactful research: this is the ambition that inspires us to anticipate, plan, implement and disseminate solutions developed as part of the programmes. These programmes target economic and societal needs. A strategic intelligence unit supports LIST’s departments to help acquire the requisite knowledge, through the use of technology and market analysis. LIST’s innovation capacity and potential are assessed and supplemented according to the environment and ecosystem in which it has to evolve. This process is the cornerstone of research programmes planning and implementation in order to deliver competitive and sustainable solutions.



VISION

LIST develops key technological components which shape a number of crucial infrastructures and economic activities, offering education, mobility, energy, water, healthcare and social services which improve citizens' standard of living.

LIST's Smart Cities programme is centred on the user. It targets communities where technologies are a means of guaranteeing sustainable solutions and services, economic growth and an improvement in living standards. Smart cities require the creation of an ecosystem where public authorities, users, citizens, companies and research institutions actively participate in providing new solutions.

OBJECTIVES

Cleaner energy technologies (Persephone), new logistics models (SUCCESS), new types of secure water systems (Water), innovation in construction (Building 2.0), low-pollution, soil-free farming, and automated, small-scale manufacturing (3D printing) will all be available in the near future. LIST will be steadfastly following these trends.

THE WAY FORWARD

Technologies influence behaviour. Digital and mobile technologies speed up the connection between service providers and users in a way that is more selective, quicker, more personal and more complete. Collaborative economy business models are starting to appear. They allow the more effective use of physical goods, such as cars or property, and provide city residents with new sources of revenue.

Information and Communication Technologies, the proliferation of sensors via the Internet of Things and the convergence of data standards are also coming together to offer new possibilities concerning the physical management and socio-economic development of cities.

LIST is integrating innovative digital and environmental technologies combined with wide-scale data analyses to improve:

- the environment, as well as the use and management of resources,
- the mobility of people and goods,
- the functionality of buildings, their construction and their maintenance,
- citizens' life experience.

SMART CITIES | HIGHLIGHTS OF 2016

PERSEPHONE

The main objective of PERSEPHONE is to position biomethanization in the bioeconomy and circular economy.

The project entails delivering new added value to existing agricultural units in order to make them sustainable by 2020-2030.

**SUCCESS**

The main impact of the project will be to reduce the detrimental consequences and delivery costs of freight and transport services linked to the construction supply chain in urban areas.

**NATURE4CITIES**

Nature4Cities will provide decision support for urban re-naturing using new collaborative models.

The project will support local authorities and urban planners in the sustainable development of urban areas and infrastructure.



VISION

Space exploration and the use of space resources have brought about a number of technological advances in fields such as science, medicine, materials, mobility, telecommunications, the environment, and security. Improving space technology capabilities, so as to grow these social and economic benefits, is a major objective of all countries wishing to explore space. Luxembourg has launched an internationally acclaimed and ambitious initiative in recent months – spaceresources.lu – the main purpose of which is to put forward an innovative legal framework to enable the exploration and exploitation of space resources. LIST is fully committed to this initiative and is helping to implement a number of projects, thanks in particular to the expertise of its MRT department.

OBJECTIVES

LIST is developing data analysis capabilities which draw on the use of Earth observation data (satellites and drones) and non-terrestrial observation (in situ data, crowdsourcing, social media, and socio-economic data) to enable the large-scale use of data and generate a socio-economic impact. In addition, LIST is developing high-performance materials in a critical space environment and a unique set of equipment dedicated to space applications.

THE WAY FORWARD

LIST is drawing on strong collaborative networks with public and private partners at national and international level to develop innovative space technology. We have consequently embarked on a dozen or so collaborations with the European Space Agency (ESA) via our MRT and ERIN departments. We also form part of the national initiative to position Luxembourg as a key player in the space industry. Firstly, by drawing on open source data from Sentinel satellites, LIST is developing data analysis capabilities with the aim of building an Earth observation operating platform and creating risk management applications. This platform aims to allow users to access a work environment containing the necessary data and resources to create innovative business opportunities. We also have expertise in developing advanced functional materials (anti-static coatings, conductive resins, etc.) and sensors able to operate in a critical space environment. In addition, LIST has developed expertise in the manufacture of high-tech scientific equipment, in order to provide specific characterization and testing services for use in a space environment.

SMART SPACE | HIGHLIGHTS OF 2016

SIGNING OF A COOPERATION AGREEMENT WITH SES

As part of this agreement drafted in 2016, SES and LIST will cooperate, via their international network of research partners with unique expertise in satellite communication (SATCOM), to transform the results of basic research into innovative space applications.

**COLLABORATION WITH NASA**

The aim is to adapt and pursue the development of mass spectrometry technology developed in recent years by LIST experts for space applications. Due to its compact size and high mass resolution, the FieldSpec tool, designed for an earlier project, has the potential to meet the demands of space exploration.

VISION

Industry plays a major role in any economy. Given the positive externalities in any other industry (generation of four additional jobs for each manufacturing job created), it is clear that the manufacturing sector is a key driver of Luxembourg's prosperity. But Smart Manufacturing is also a flagship initiative for the diversification of Luxembourg's economy.

At LIST, Smart Manufacturing combines advanced manufacturing capabilities with opportunities opened up by the dissemination and adoption of information technologies in production industries, whether manufacturing or construction. Advanced Manufacturing allows the manufacture of exclusive, sophisticated products which can give industry in Luxembourg a competitive advantage, contributing to growth and job creation. In addition, the digitization of the production industry is transforming product design, production, use, operation and after-sales service. Smart Manufacturing is also modernizing operations, processes, the energy footprint of factories, and supply chain management.

OBJECTIVES

LIST, in its three departments, covers a wide array of activities related to Smart Manufacturing. It provides a range of solutions drawing on the development, use and coordination of information, computing, software and modelling. The institute also relies on advanced materials and emerging capabilities activated by physical and biological sciences, such as nanotechnology, chemistry and biology. This entails both new ways of manufacturing existing products and the creation of innovative products as a result of new advanced technologies. LIST supports Luxembourg's ambition to gain a competitive edge in the global landscape.

THE WAY FORWARD

LIST is responsible for the activities of the National Composite Centre – Luxembourg (NCC-L). LIST's expertise in composite materials and processing is renowned, with a proven track record in national and European competitive and collaborative projects. The industrial composite materials sector is in fact one of Luxembourg's particular strengths, boasting companies with large R&D portfolios such as Delphi, DuPont, Euro-Composites, e-Xstream, and the Goodyear innovation centre in particular. Close collaboration with the latter has recently been strengthened, thanks to a long-term partnership agreement. In addition, LIST is developing a range of expertise in information technologies. All of this signals a new era of productivity and quality control. Data collection and exploitation are at the heart of each industrial and construction/infrastructure project, improving connectivity, and design, process, planning, supply chain management, operational performance and decision-making efficiency.

SMART MANUFACTURING | HIGHLIGHTS OF 2016

PARTNERSHIP BETWEEN LIST AND GOOD-YEAR

Together with LIST researchers, Goodyear engineers will focus on the development of tyres that are more environmentally-friendly in terms of the materials used, performance and manufacturing processes.



PARTNERSHIP BETWEEN LIST AND SC3DP FOR 3D PRINTING

LIST and this Singapore research centre internationally renowned for its research into 3D printing have pooled their cutting-edge skills to help achieve a major ambition: to explore the capabilities of 3D printing using composite polymer materials.

VISION

With its first-class IT infrastructure and telecommunications networks, Luxembourg is a world leader in the field of digital financial services, as well as a financial technology hub. In addition, the financial centre offers great potential as a base for companies working in the FinTech sector. At present, there are around 150 FinTech companies in Luxembourg, half of which provide an IT infrastructure or IT services. The other half are geared towards providing software or technology-based services to companies.

For LIST, this environment presents numerous opportunities and challenges. Innovations can be applied to speed up the digital transformation of the financial services sector. In order to be competitive, it is recognized that public and private players in Luxembourg cannot tackle all these challenges at once. Research and innovation resources in Luxembourg must be centred on a research programme which ensures Luxembourg's financial ecosystem is well-positioned among its global competitors.

OBJECTIVES

In 2016, LIST developed and refined its RDI strategy to align with the characteristics of Luxembourg's financial ecosystem, and with assets already in place as a result of collaboration with public and private participants. Our analysis suggests that innovative applications that support information-based services and advanced services for the financial sector notably involve technology or ICT. To meet the key challenges and opportunities of the Luxembourg financial sector, it is vital to place the fundamental interdisciplinary nature of systems at the forefront of thinking. People and expertise in companies, practices, processes within organizations, ecosystems and technological innovation need to be addressed in an integrated and holistic way. Consequently, LIST will be a driving force in the digital transformation of the financial sector.

THE WAY FORWARD

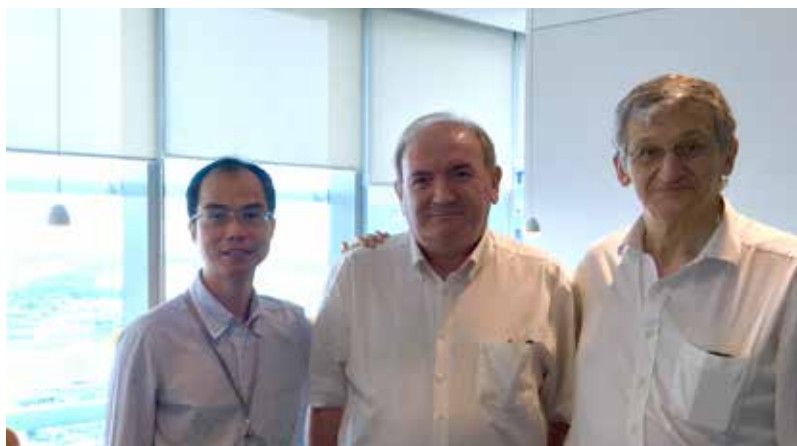
Two challenges go hand-in-hand with the need for a smart regulatory environment and the role of Business Analytics. Regulation should represent an attractive plus so that Luxembourg helps traditional banks (banks, funds and insurance companies) and new FinTech players to develop and adapt to the regulatory landscape, while at the same time ensuring that products and services are fair, reliable and easy to use. LIST suggests working with participants in Luxembourg (financial institutions, regulators and RegTech) to establish a competitive ecosystem which guarantees the right balance between regulation and innovation, as well as regulatory and implementation costs.

For the financial sector, one of the main drivers of digital transformation in companies has been the huge growth in the volume, variety and rate of data generation. In order to analyse and extract knowledge from big data in relation to business and corporate management needs, LIST will develop Business Analytics expertise as a mainstay for the ambitions above, thus reducing the gap left unfilled by conventional data analytics and artificial intelligence research.

SMART FINANCE | HIGHLIGHTS OF 2016

**COLLABORATIVE RESEARCH PROJECT
WITH THE CNPD**

In partnership with the Commission Nationale pour la Protection des Données [National Data Protection Commission - CNPD], LIST is developing a self-assessment tool for companies seeking to check their compliance with the new General Data Protection Regulation (GDPR).

**PARTNERSHIP WITH THE NATIONAL
UNIVERSITY OF SINGAPORE**

As part of the FNR AFR bilateral partnership programme with Singapore, a project has been launched concerning the establishment of a collaborative Business Analytics laboratory with a focus on regulatory technologies and wealth management.

**BUSINESS AND DATA ANALYTICS
PLATFORM**

A major ERDF project has been launched with the Ministry of the Economy concerning the phased exploration and roll-out of a Data Analytics Platform (including hardware, software and people's skills).





RESEARCH AND TECHNOLOGY

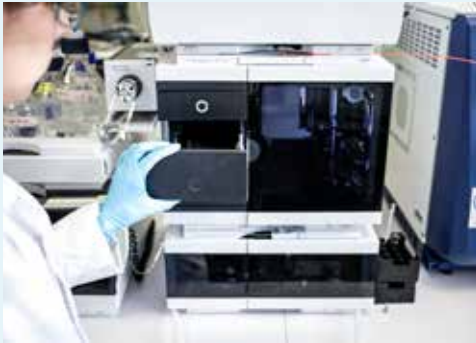
RESEARCH DEPARTMENTS

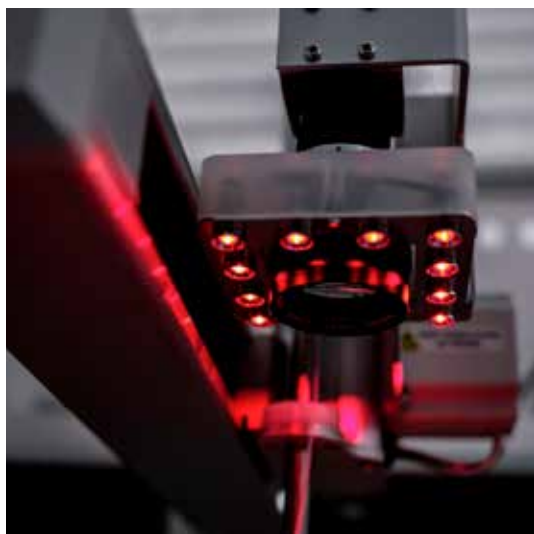
“ENVIRONMENTAL RESEARCH AND INNOVATION” (ERIN)

The ERIN department, made up of 170 life science, environmental science and information technology researchers and engineers, provides the requisite interdisciplinary knowledge and expertise to confront the major environmental challenges facing society such as climate change mitigation, ecosystem resilience, sustainable energy systems, efficient use of renewable resources, and environmental pollution prevention and control. In 2016, the ERIN department continued to implement its smart green vision geared towards pursuing scientific excellence in the understanding of complex environmental and biological systems and their interaction with the technosphere, so as to catalyse innovation aimed at sustainable natural resource management while integrating ICT breakthroughs. As a result, the department is positioned as a major contributor in implementing LIST's Smart Cities, Smart Space and Smart Manufacturing programmes, and in rolling out the Luxembourg Government's circular economy strategy.

HIGHLIGHTS OF 2016

- Launch of 41 competitive projects, including 10 as part of European programmes and 4 collaborative projects,
- Numerous scientific support activities, in particular for the Ministry of Sustainable Development and Infrastructure and the Ministry of Agriculture, Viticulture and Consumer Protection,
- 170 scientific publications in international journals, including 95 with an impact factor greater than 2,
- Supervision of numerous PhD students, 9 of whom successfully defended their thesis in 2016,
- Filing of 8 patent applications and creation of the Agroptimize spin-off, in the field of precision agriculture.







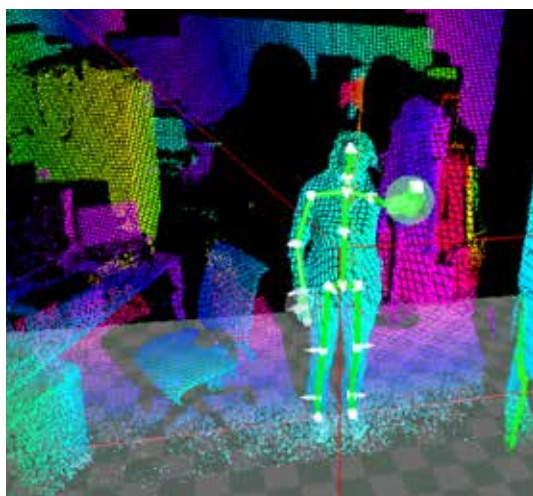
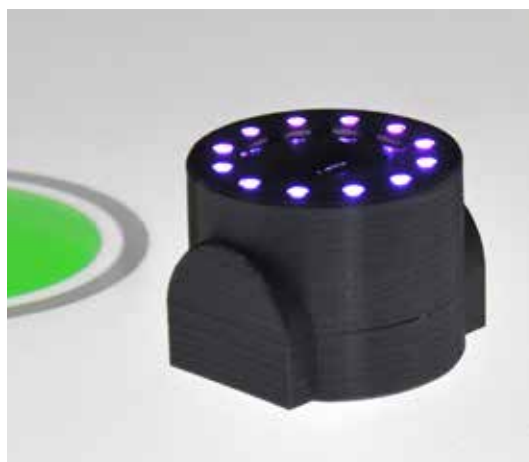
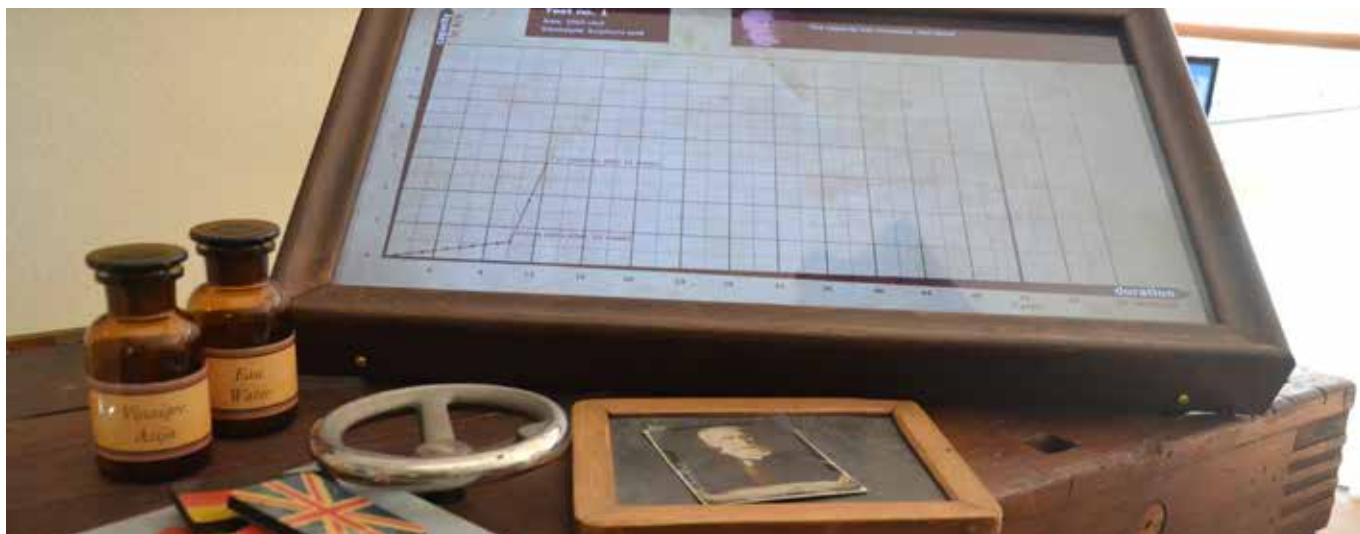
“IT FOR INNOVATIVE SERVICES” (ITIS)

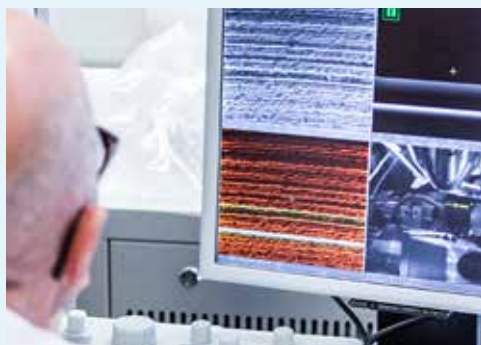
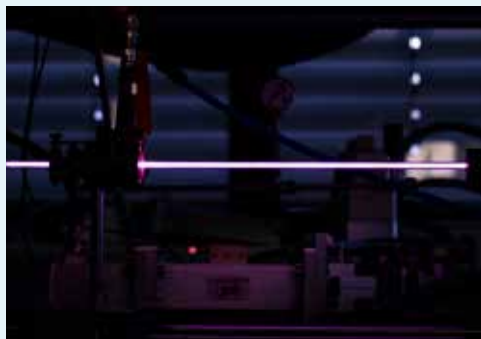
In 2016, the ITIS department continued to roll out the strategy introduced in 2015, focusing on the digital transformation of operations within organizations with the aim of improving their performance and innovation capacity. The strategy harnesses IT to develop analytics and decision-making tools that deliver greater organizational efficiency in terms of infrastructure, processes, people and business, within a traditional (private and public companies) and network (ecosystems, supply chain, crowd) environment. A key common thread in these tools is the use of big data to make the most appropriate decisions.

With this in mind, the Business Analytics strand has been significantly strengthened with the launch of a major project funded by the European Regional Development Fund (ERDF) and collaboration with the National University of Singapore (NUS). The range of tools developed is aligned with the priorities of LIST's various smart programmes. Particular emphasis has been placed on the development of technology platforms and demonstrators related to the fields of construction (Smart Cities) and regulation (FinTech).

HIGHLIGHTS OF 2016

- Start-up of the CoBaLab project, funded by the FNR, aiming to develop Business Analytics expertise in partnership with the NUS.
- Launch of the DAP project, funded by the ERDF, aimed at developing a national Digital Analytics platform.
- Launch of the 4DCollab project, funded by the FNR and the National Agency for Research (ANR) addressing collaborative uses of 4D/BIM models in a forward-looking ergonomic approach.
- Acceptance of a project funded by the FNR, as part of its CORE programme, in collaboration the University of Luxembourg and Volvo, concerning mobility and transport.
- Participation in TOOP, a new project funded by the European H2020 programme, aiming to improve the exchange of administrative information and documents between different public bodies within the European Union.





“MATERIALS RESEARCH AND TECHNOLOGY” (MRT)

Through its research into advanced materials and technologies, the MRT department contributes to the emergence of technologies that underpin companies' innovation processes.

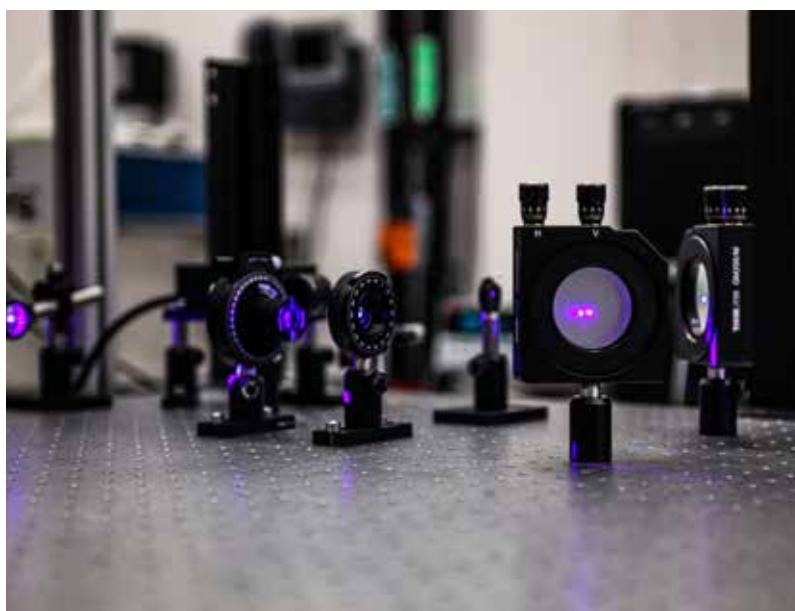
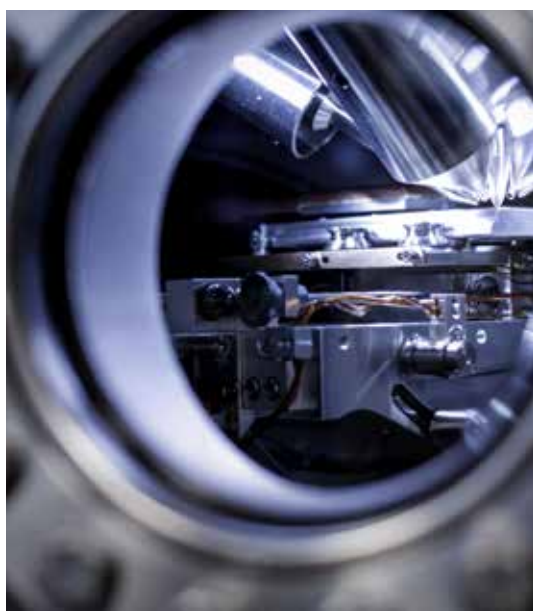
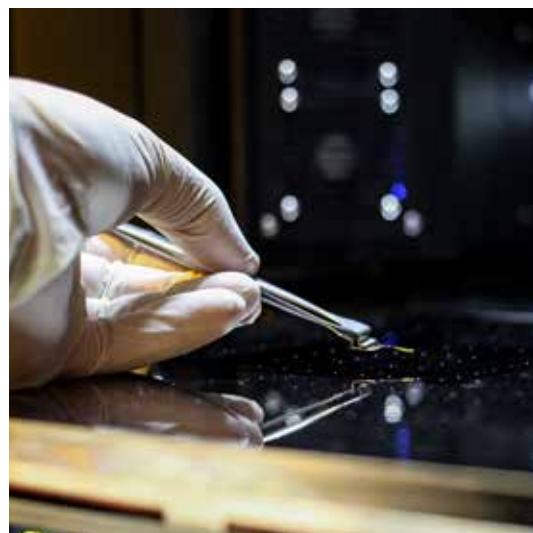
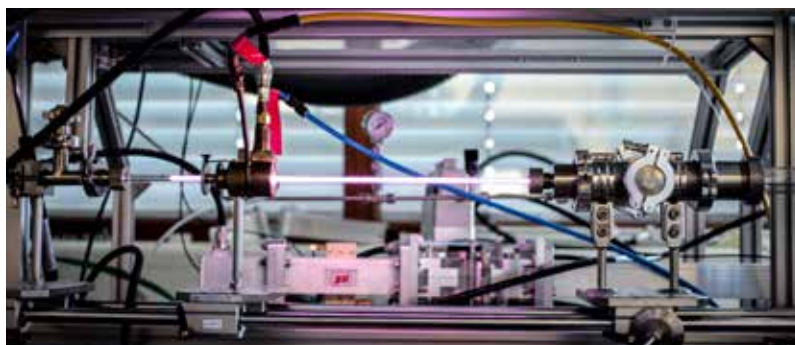
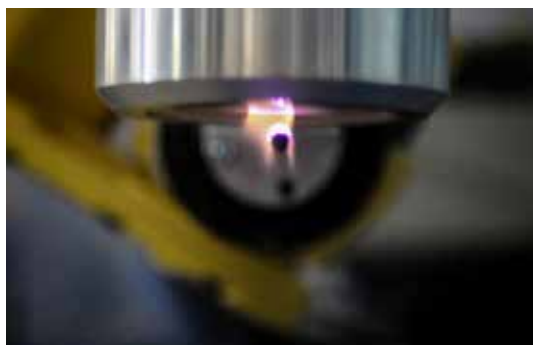
Its activities hinge on two thematic pillars: nanomaterials and nanotechnology, and sustainable composite materials. A central laboratory pools all of its cutting-edge equipment in order to have manufacturing processes for composite materials, polymers, thin film, nanomaterials and functional devices.

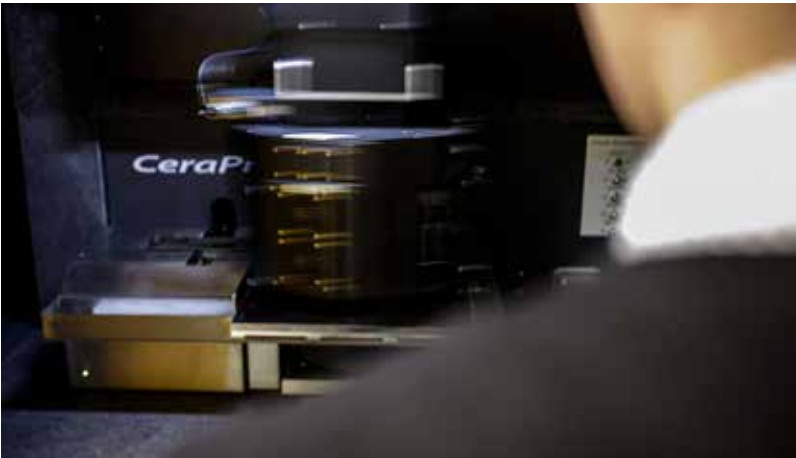
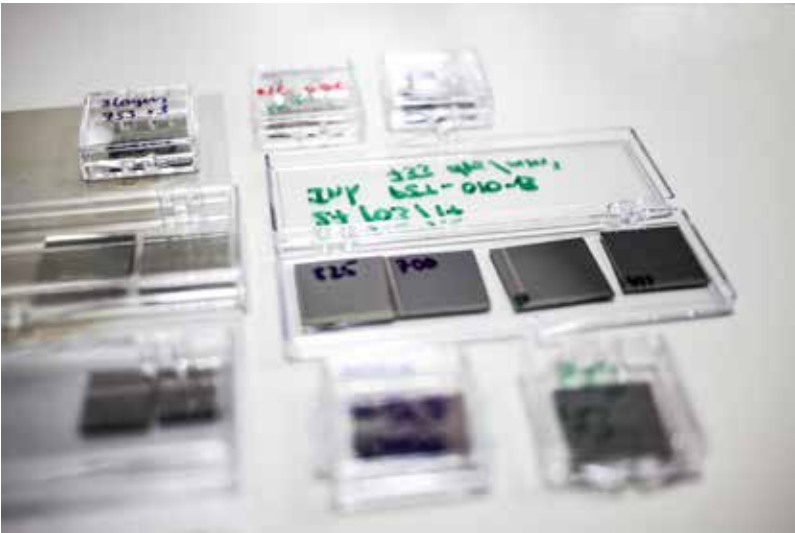
The department also has a platform making state-of-the-art characterization and testing tools available to both its own staff and other Luxembourg stakeholders. Lastly, the department leverages its charged particle beam expertise through the development of new nanoimaging and nanoanalysis technologies.

In 2016, the MRT department not only strengthened its industrial partnership and technological research commercialization activities but also stepped up its interaction with the University of Luxembourg through research, doctoral training and teaching activities.

HIGHLIGHTS OF 2016

- Support of Luxembourg industrial research with local participants such as Good-year, ArcelorMittal and International Lacquers, and boosting of its international reach thanks to bilateral research agreements with multinationals and the European Space Agency (ESA).
- Filing of 16 patents with the European Patent Office.
- Launch of the National Composite Centre Luxembourg (NCC-L) run by LIST with the creation of infrastructures intended to act as an accelerator for Luxembourg's composite materials industries.
- Award of co-funding by the FNR for three Public-Private Partnerships (PPP) with Luxembourg manufacturers for projects currently in the start-up phase.
- Major publications in prestigious international journals, such as Nature and Nature Communications, and a growing number of LIST experts invited to present their work at international conferences.
- Consolidation of the competitive project portfolio, thanks to projects supported by the FNR and acceptance of two large-scale H2020 projects.
- Organization and co-organization of workshops, conferences and symposiums in Luxembourg and abroad, raising the department's international profile.
- Acceptance of a project funded as part of the FNR's PRIDE programme, bringing together 20 PhD students from the University of Luxembourg and LIST's MRT department on the topic of Materials for Sensors and Energy Harvesting (MAS-SENA). This is the biggest research project jointly conducted by the two institutions to date.





NATIONAL COMPOSITE CENTRE - LUXEMBOURG

LIST established the National Composite Centre – Luxembourg (NCC-L) with the support of Luxinnovation and the Ministry of the Economy. This technology platform is the result of private and public participants in Luxembourg pooling their resources and expertise in the field of composites. Composites are found in particular in the automotive, aeronautics, electronics, telephony, sports and medical industries.

The aim of the NCC-L is to further galvanize the development and processing of innovative materials in Luxembourg. The NCC-L's key objectives are to:

- Play the role of catalyst at national level in the development and implementation of manufacturing technologies for advanced materials and composites,
- Establish research infrastructures and expertise in the field of composite materials in Luxembourg,
- Highlight independent RDI including collaborative research and technology and knowledge transfer, above all for national industry,
- Host and run joint laboratories with manufacturers.

In collaboration with manufacturers, the NCC-L carries out research and innovation projects to develop pre-commercial industrial applications.

HIGH-PERFORMANCE COMPUTING

To strengthen Europe's high-performance computing capabilities, the Luxembourg Government, backed by LIST and Luxinnovation, launched an "Important Project of Common European Interest" (IPCEI), together in particular with Germany, Spain, France and Italy. China and the United States currently dominate the global supercomputer rankings. Thanks to substantial investment, Europe is still in the race. This investment is strategic because supercomputers are used by an increasing number of government agencies, universities, research centres and industrial companies. They are necessary for an ever-growing range of operations in fields as diverse as security, healthcare, energy, water resources, mobility, climate, finance, space, agriculture and manufacturing output. Luxembourg wants to strengthen its industrial development and operational capabilities in all of these areas. To achieve this, with the support of LIST and Luxinnovation, Luxembourg is coordinating the IPCEI.

SUBSTANTIAL INVESTMENT FOR A CRUCIAL GAIN IN COMPETITIVENESS

Technology platforms are a prerequisite for advanced research and the successful development of industrial partnerships.

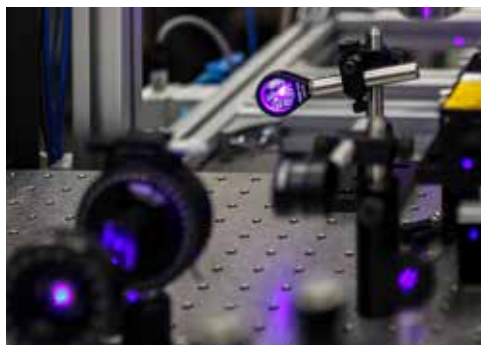
LIST ensures that the platforms are aligned with national strategic priorities and initiatives. As an RTO (Research and Technology Organization), LIST has chosen interdisciplinary, shared platforms.

OUR TECHNOLOGY PLATFORMS

Materials characterization and testing platform

A unique set of expertise and equipment combined in one platform for the advanced characterization and testing of materials, including molecular analysis, elementary and isotopic analysis, analysis of surface, structure, morphology and topography, mechanical testing and accelerated ageing, fire testing, and thermophysical analysis.

Main partners: companies in the manufacturing, construction, packaging, automotive, aeronautics, cosmetics and medical industries.



Environmental research and technologies platform

High-level expertise and fully-equipped laboratories for environmental analysis, genomics, transcriptomics, metabolomics and proteomics as well as an international-standard hydroclimatological and biodiversity measurement network.

Main partners: manufacturing companies, agri-food industries, pharmaceutical companies, universities, and biotech companies.



Development of Technologies around Connected Objects platform

A set of expertise and technologies around connected objects including natural interfaces, 3D printing, sensors and artificial intelligence, enabling designers to translate their ideas for new products and services into reality, with a specific focus on group decision-making, complex problem-solving, skills assessment and collaborative design.

Main partners: companies and organizations in the construction, logistics, mobility and healthcare sectors, and IT professionals.



New laboratory in Foetz

Since 2016, mechanical testing and accelerated ageing, along with fire performance testing, have been set up in new premises in Foetz, on the Technoport S.A. site. Designed to take the specific needs of these different activities into account, the new premises offer more secure and ergonomic working conditions, allowing LIST to benefit from better support for its own research activities, but also to continue strengthening its collaborative research offer to manufacturers.



ERIN

In 2016, LIST's department dedicated to ecoinnovation (ERIN) added eight priority patent filings to its intellectual property portfolio, including those described below.

Green chemistry/white biotechnology

ERIN was particularly active in this innovative industrial sector in 2016, with the filing of three priority patents.

Potential applications: food supplements, biosourced polymers, and biogas production.

Patents filed: LU93026, LU93402 and LU93439.

Environmental risk assessment

ERIN was able to demonstrate its leadership in the field of toxicological analysis, filing two major patents in cellular biology.

Potential applications: analysis of exposure to fine particles present as pollutants in the atmosphere.

Patents filed: LU93114 and LU93401.

Water treatment

Two patents were added to the existing portfolio in this field. One of these patent applications was also selected by the FNR for prototype development as part of a proof of concept funding arrangement.

Potential applications: breakdown of antibiotics still present in water discharged from conventional water treatment plants.

Patents filed: EP16174305.9 and EP16174309.1.

Biodiversity

The European Union is imposing specific biodiversity monitoring within Member States. As well as fulfilling a portion of these initiatives on behalf of the Government, the ERIN department is focusing on controlling the cost of these operations.

Potential application: adoption of traps combining remote individual identification and automated counting, for example for amphibians.

Patent filed: LU93388.

ITIS

Six patent applications were filed by ITIS in 2016 in the different fields described below.

Collaborative decision-making support

The ITIS department has developed methods and software for automatically capturing information generated by human participants and/or performed activities, and for immediately identifying different possible decisions so that choosing the best option is simple.

Potential applications: detecting problems and choosing possible solutions in the fields of construction, transport and healthcare.

Patents filed: LU93399, LU93360 and LU93392.

LIST must enable the transfer of research to companies, so that it can be applied and generate added value. The issue of intellectual property is therefore vital, particularly in the knowledge economy. Having an extensive portfolio of patents is an asset that strengthens the attractiveness of a country in the eyes of companies thinking about setting up a business there. According to studies, countries that are proactive in the area of Intellectual Property also benefit from a dynamic employment market and stronger economic growth.

For all these reasons, Luxembourg has adopted an offensive stance in terms of public intellectual property, particularly in fields which relate to its economic diversification strategy. LIST therefore files patent applications to protect its potential results.



Complex IT system protection

ITIS has developed methods allowing real-time risk analysis and rapid response to latent attacks. ITIS has also developed data protection and exchange methods as part of these complex networks. Among other things, these methods use blockchains.

Two patent applications were filed on this topic in 2016.

Potential applications: real-time triggering of countermeasures for complex communicating systems. Use of blockchains for data protection.

Patents filed: LU93398 and LU93377.

Big data analysis

Analysis and decision-making tools are increasingly based on large quantities of dynamically evolving data (Big Data). It is crucial that we are able to constantly adapt the knowledge that this data generates.

A patent application was filed on this topic in 2016.

Potential applications: automatic detection of changes to knowledge encoded in ontologies to be factored into a change management decision-making cycle.

Patent filed: LU93179.

MRT

Sixteen patent applications were filed by MRT in 2016 in various fields, including the following:

Mass spectrometry modules

LIST has developed various additional modules for secondary ion mass spectrometers. The aim was to improve the way these analysis instruments operate, minimize aberrations and improve imaging quality.

Four patent applications were filed in this field in 2016.

Potential applications: imaging, characterization, surface analyses.

Patents filed: LU92970, LU92980, LU92981 and LU93151.

Plasma-assisted deposition techniques

Plasma technologies help improve the deposition of functional coatings on certain specific substrates. To meet industrial needs, several plasma reactor configurations have been designed and patented by LIST.

Potential applications: functional coatings (e.g. anti-corrosion).

Patents filed: LU93221, LU93222 and LU93273.

Sensors, energy recovery and transparent electronics

Several research projects resulted in new materials, including oxides, which help build sensors and/or transparent electronics.

Potential applications: sensors, water treatment and decontamination, transparent heating, transparent electronics.

Patents filed: LU93084, LU93232, LU93235, LU93236, LU93237 and LU93243.



COOPERATIONS AND PARTNERSHIPS

In 2016, two noteworthy projects were finalized with research and innovation players in Luxembourg.

In February 2016, a collective framework agreement was signed between the three Public Research Centres and trade unions. This document is the first of its type signed in Luxembourg and represents the culmination of negotiations conducted by the three institutes (LIST, LIH and LISER) and trade unions to define the basis of a common framework for public research sector employees in Luxembourg.

In addition, an agreement now regulates joint doctoral training procedures between the University and research institutions. As a result, supervision of PhD students may be provided by one of the signatory institutions and doctoral degrees will be awarded by the University.

1. LIST
2. Luxembourg National Research Fund (FNR)
3. Luxembourg Institute of Socio-Economic Research (LISER)
4. University of Luxembourg
5. Technoport
6. Luxinnovation

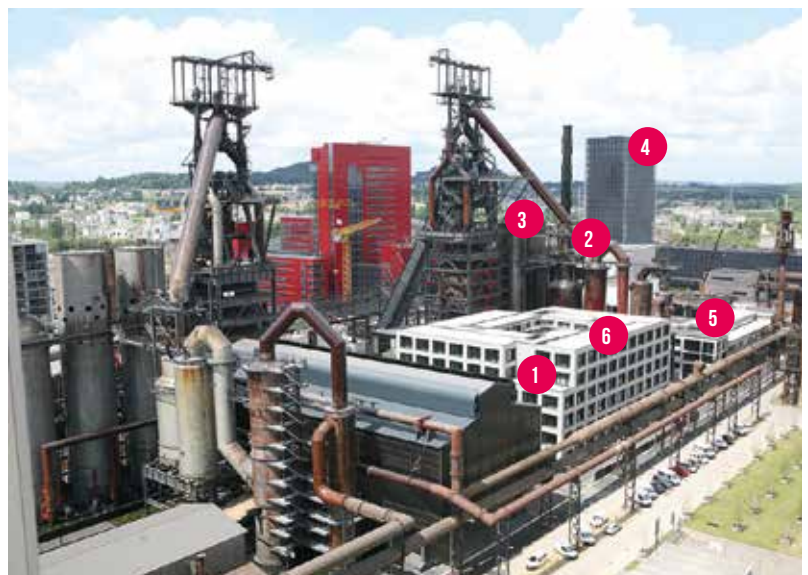
NATIONAL COOPERATION

PROJECTS SUCCESSFULLY COMPLETED WITH RESEARCH AND INNOVATION PLAYERS IN LUXEMBOURG

Luxinnovation and clusters: LIST works closely with Luxinnovation and industrial clusters to set up sustainable partnerships with companies. Conferences and working groups were held throughout the year to align strategies. The two partners are working together on the major HPC supercomputer project for Europe. (page 31)

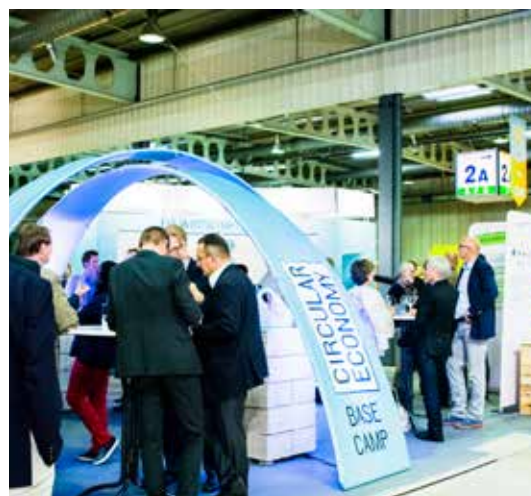
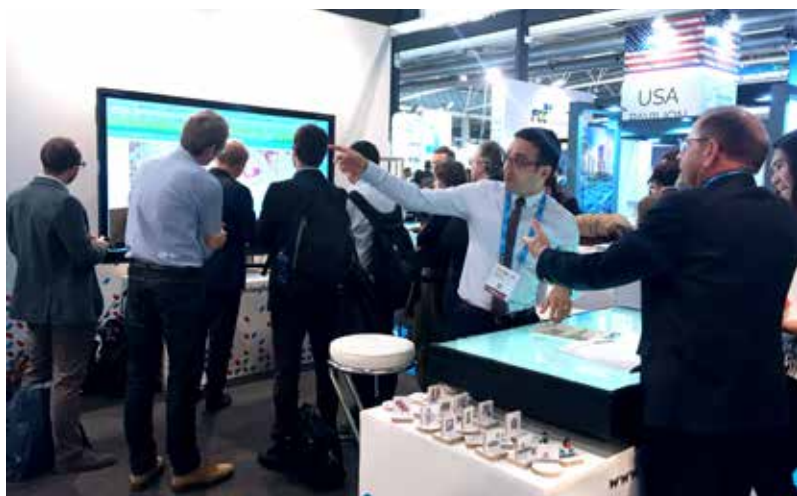
Luxembourg National Research Fund (FNR): Collaboration developed in 2016 by way of ten new projects, taking the number of LIST projects co-funded by the FNR to 64. In addition, as in 2015, LIST participated actively in the various research promotion activities organized by the FNR with younger members of the public, such as the Science Festival and the “Chercheurs à l’Ecole [Researchers at School]” initiative.

A stronger partnership with all research and innovation players in Luxembourg was made possible thanks to, in particular, to their concentration on a single site – the Belval Innovation Campus – helping to build and sustain the momentum of initiatives from the design phase through to implementation.





LUXEMBOURG
LET'S MAKE IT HAPPEN



INTERNATIONAL COOPERATION

One of LIST's objectives is to support and promote "Made in Luxembourg" innovation by growing its European and international dimension. Within Europe, LIST is an active member of several European networks, including the European Association of RTOs (EARTO, www.earto.org). Aziz Zenasni, Director of Programmes at LIST is a member of the Board of Directors of EARTO. LIST wants to develop its cooperation and discussions with other European RTOs. It is important to note that half of LIST's activities are at the European level.

Internationally, LIST is involved in various Ministry of Foreign Affairs programmes to support international partnership initiatives between Luxembourg and partner countries in the field of technology transfer. In addition, LIST was heavily involved in promoting innovation in Luxembourg in 2016, having signed various bilateral agreements with foreign partners (European and international) as illustrated below.

PROMOTING "MADE IN LUXEMBOURG" INNOVATION

GEOGRAPHICAL BREAKDOWN OF INTERNATIONAL AGREEMENTS SIGNED IN 2016



A PRESENCE ON ALL FRONTS

13 May

Cooperation agreement signed with VTT



27 June

Agreement reached with the Singapore Centre for 3D Printing (SC3DP)



25 July

Collaboration agreement finalized with NCC-UK





NUMBER OF AGREEMENTS
PER COUNTRY

World	
USA	1
Singapore	1
Morocco	1
Tunisia	1
Australia	1
Europe	
Finland	6
France	32
Spain	6
UK	5
Switzerland	6
Germany	12
Belgium	17
The Netherlands	8
Turkey	4
Greece	2
Austria	3
Hungary	3
Ireland	3
Portugal	1

23 September

Major circular economy stakeholders brought together at National Ecology Fair



26 October

Joint doctoral training with the University of Luxembourg, LIH and LISER launched



17 November

Signing of historic multi-year partnership with Goodyear



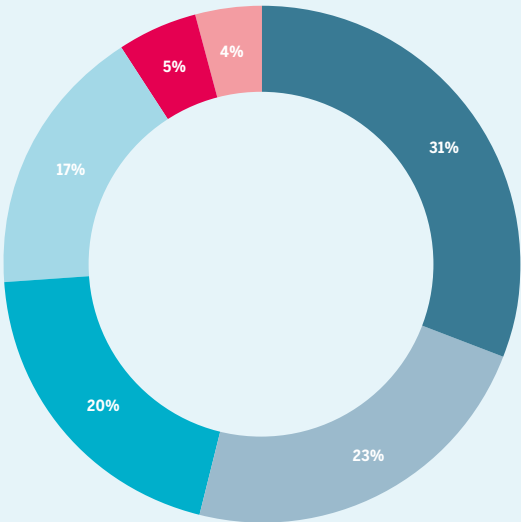
LIST's mission places particular emphasis on strengthening Luxembourg's industrial ecosystem through public-private partnerships. To this end, the institute forges and pursues its partnerships with SMEs and major groups. In 2016, 60% of agreements signed were with Luxembourgish and European companies. To realize these partnerships, LIST works closely with the Luxinnovation agency, industrial clusters and the National Research Fund.



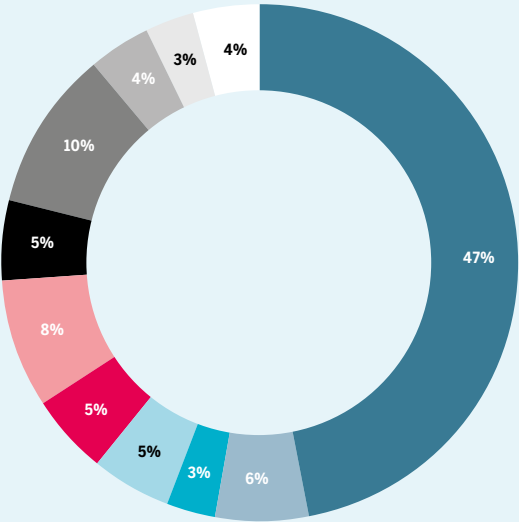
PUBLIC-PRIVATE PARTNERSHIPS

STRENGTHENING THE GRAND DUCHY'S INDUSTRIAL ECOSYSTEM

1. BREAKDOWN OF AGREEMENTS SIGNED IN 2016 BY TYPE OF PARTNER



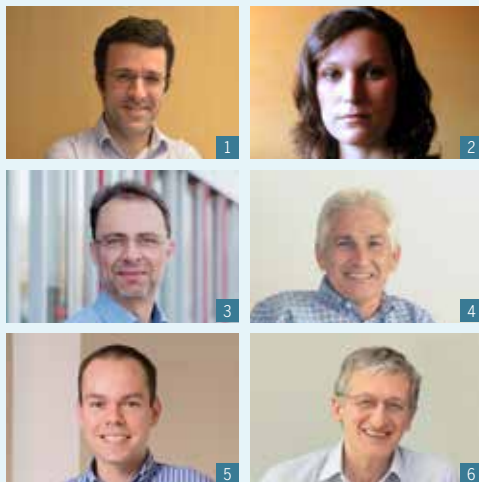
2. AGREEMENTS SIGNED WITH COMPANIES IN 2016 PER SECTOR





**SCIENTIFIC
EXCELLENCE**

LIST aims to contribute to the diversification and strengthening of Luxembourg's economy. This drive goes hand-in-hand with a continual focus on high scientific standards. An RTO role, geared towards industrial applications, is therefore fully compatible with the transfer of expert scientific knowledge. This helps extend the international reach of Luxembourg-based research.



ILLUSTRATIONS OF LIST'S SCIENTIFIC EXCELLENCE

SCIENTIFIC PUBLICATIONS

In 2016, LIST researchers published 207 scientific articles with an impact factor equal to or greater than two in international journals and conference proceedings. Some publications were of particular note.

In addition, many LIST researchers took part in scientific journal review committees or international scientific conference programme committees as members.

SPECIAL PUBLICATIONS

"Nature" (FI 38.138): "Negative Capacitance in multidomain ferroelectric superlattices" (Jorge Iñiguez) ¹

"Chemical Reviews" (FI 37.369): "Free-Radical-Induced Grafting from Plasma Polymer Surfaces" (Sergey Ershov ⁵, Youssef Habibi, Philippe Dubois ⁴)

SCIENTIFIC VISITS

The hosting of six scientific visitors demonstrates the positive dynamic of LISTs academic network:

- Prof. Ekhard Salje, University of Cambridge (United Kingdom),
- Dr Ingrid Canero Infante, École Centrale Paris (France) ²,
- Prof. Markus Casper, University of Trier (Germany), ³
- Prof. Jorge Sanz, National University of Singapore (Singapore), ⁶
- Dr Eng Chew, University of Technology, Sydney (Australia),
- Dr Brahim Dkhil, Centrale Supélec (France).

Bruno Printz

"Influence of copper nutrition on alfalfa cell wall differentiation through a proteomic approach", doctoral thesis, Université Catholique de Louvain, 22/01/2016

Vishal Khetan

"High temperature oxidation and wear properties of magnetron sputtered AlTiTaN based hard coatings", doctoral thesis, Université Libre de Bruxelles, 27/01/2016

Rodolphe Mauchauffé

"Elaboration of green bioactive surfaces by combining functionalized plasma layer deposited at atmospheric pressure using a Dielectric Barrier Discharge and covalent immobilization of biomolecules", doctoral thesis, University of Liège, 05/02/2016

Hella Faller

"Organizational subcultures and enterprise architecture effectiveness: an explanatory theory", doctoral thesis, Radboud University, 04/03/2016

Youssef Abdelsadek

"Détection de communautés basée sur la triangulation de graphes : algorithmes, visualisations et application aux réseaux de tweets" [Detection of communities based on graph triangulation: algorithms, visualisations, and application to tweet networks], doctoral thesis, University of Lorraine, 31/03/2016

Sandra Hoffmann

"A parametric level set method for the design of distributed piezoelectric modal sensors", doctoral thesis, University of Trier, 04/05/2016

Sébastien Klein

"Model development to evaluate the effects of environmental particles on the lung", doctoral thesis, University of Trier, 25/05/2016

Claude Gangolf

"Models and methods for automated credit rating prediction", doctoral thesis, University of Saarland, 31/05/2016

Hanna L. Lokys

"The combined impact of air pollution and thermal stress on human morbidity", doctoral thesis, University of Münster, 17/06/2016

Elorri Igos

"Life cycle assessment of wastewater treatment solutions: How to consider pollutants removals benefits", doctoral thesis, University of Trier, 13/07/2016

Jonathan Crepellière

"Mela organic chemical vapour deposition of p-type Delafossite CuCrO₂ Semiconductor thin-film: characterization and application to transparent p-n junction", doctoral thesis, University of Luxembourg, 27/09/2016

Olga Ishchenko

"Elaboration of plasmonic nano-composites and study of their specific catalytic activities", doctoral thesis, University of Strasbourg, 30/09/2016

In 2016, together with the University of Luxembourg and foreign universities, LIST supervised 72 PhD students. 20 PhD students successfully defended their theses in 2016.

Guillaume Nataf

"New approaches to understand conductive and polar domain walls by Raman spectroscopy and low energy electron microscopy", doctoral thesis, University of Luxembourg, 05/10/2016

Mads Weber

"Electronic and structural properties of bismuth – and rare earth ferrites", doctoral thesis, University of Luxembourg, 24/11/2016

Eleni Giannopoulou

"The role of research and technology organisations in open service innovation", doctoral thesis, University of Strasbourg, 25/11/2016

Sylvain Legay

"Subway: unraveling genetic components of suberin production in apple", doctoral thesis, Université Catholique de Louvain, 02/12/2016

Olivier De Castro

"Development of a versatile high-brightness electron impact ion source for nano-machining, nano-imaging and nano-analysis", doctoral thesis, University of Paris-Saclay, 07/12/2016

Blandine Fauvel

Assessment of viral particle occurrence, transport and fate in an urbanized watershed: influence of viral and hydroclimatological characteristics", doctoral thesis, University of Lorraine, 12/12/2016

Laura Puchot

"Cardanol: a bio-based building block for new sustainable and functional materials", doctoral thesis, University of Cergy-Pontoise, 14/12/2016

Emna Mezghani

"Towards autonomic and cognitive IoT systems, application to patients' treatments management", doctoral thesis, INSA Toulouse, 15/12/2016

Gilles Rock

"Thermal infrared imaging spectroscopy", doctoral thesis, University of Trier, 19/12/2016

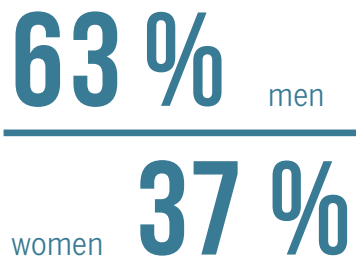


HUMAN RESOURCES

KEY FIGURES

LIST'S RESULTS ARE ACHIEVED THANKS TO ITS PEOPLE

LIST's success hinges on the qualities, investment and motivation of our people. They are the backbone of our institute and vital to its operation.



74 %

innovation
researchers or
specialists

65 | PhD students
helping LIST
retain a link
with academia

64 | number of
people hired
in 2016

36

nationalities working
together to drive
innovation

employees | 534



| **ANNUAL ACCOUNTS**

APPROVAL OF ACCOUNTS

The accounts were audited by statutory auditors PricewaterhouseCoopers and approved by the Board of Directors during their meeting of 28 April 2017.

The full financial report is available at www.list.lu

BALANCE SHEET AS AT 31 DECEMBER 2016

Assets (in euros)	2016	2015
Fixed assets		
Intangible fixed assets	178.701,21	190.047,32
Concessions, patents, licences, trademarks and similar rights and assets if they were acquired for valuable consideration and need not appear under C.I.3	178.701,21	190.047,32
Tangible fixed assets	14.815.945,11	13.250.243,57
Land and buildings	2.021.156,61	2.747.521,77
Plant and machinery	10.438.969,89	9.175.286,87
Other fixtures and fittings, tools and equipment	680.299,57	725.539,78
Payments on account and tangible assets under development	1.675.519,04	601.895,15
Financial fixed assets	872.716,17	872.716,17
Shares in affiliated undertakings	513.550,45	513.550,45
Amounts owed by affiliated undertakings	359.165,72	359.165,72
Total fixed assets	15.867.362,49	14.313.007,06
Current assets		
Receivables	25.223.202,11	24.389.610,97
Trade receivables	4.028.928,35	5.697.123,39
Other receivables	21.194.273,76	18.692.487,58
Transferable securities	0,00	0,00
Cash at bank and in hand	63.731.616,91	50.824.160,88
Total current assets	88.954.819,02	75.213.771,85
Accruals	511.169,10	357.271,35
Balance sheet total (assets)	105.333.350,61	89.884.050,26
Equity & Liabilities (in euros)	2016	2015
Equity	71.647.297,21	65.751.395,99
Capital contribution	25.196.617,51	25.196.617,51
Profit or loss brought forward	40.554.778,48	36.585.854,87
Profit or loss for the financial year	5.895.901,22	3.968.923,61
Provisions	748.378,25	605.845,18
Provisions for tax	523.859,25	436.809,16
Other provisions	224.519,00	169.036,02
Liabilities	32.207.344,81	22.748.451,13
Payments received on account of orders where not separately deducted from inventories	23.867.014,77	15.377.776,49
Debt on acquisitions and provision of services	3.883.619,75	1.805.046,36
Other debt	4.456.710,29	5.565.628,28
Accruals	730.330,34	778.357,96
Balance sheet total (equity & liabilities)	105.333.350,61	89.884.050,26

PROFIT AND LOSS ACCOUNT FOR FY 2016

	2016	2015
Net turnover	5.752.102,91	7.044.909,05
Other operating income	56.660.075,33	56.511.363,71
Raw materials and consumables and other external expenses	-13.774.679,82	-13.830.129,53
Raw materials and consumables	-5.380.390,76	-3.498.444,32
Other external expenses	-8.394.289,06	-10.331.685,21
Staff costs	-38.053.884,43	-41.414.498,40
Salaries and wages	-33.640.344,66	-36.382.593,91
Social security expenses	-4.400.336,67	-4.990.951,72
covering pensions	-2.558.139,77	-2.877.682,82
other social expenses	-1.842.196,90	-2.113.268,90
Other staff costs	-13.203,10	-40.952,77
Value adjustments	-3.582.496,62	-3.439.741,75
on formation expenses and intangible and tangible assets	-3.589.416,85	-3.416.920,84
on current assets	6.920,23	-22.820,91
Other operating expenses	-1.160.432,09	-1.017.540,08
Other interest and financial income	79.856,11	208.733,47
derived from affiliated undertakings		
other interest and financial income	79.856,11	208.733,47
Value adjustments in respect of financial fixed assets and in respect of transferable securities held as current assets		-34.014,40
Interest and other financial expenses	-24.640,17	-60.158,46
concerning affiliated undertakings		
other interest and financial charges	-24.640,17	-60.158,46
Profit after income taxes	5.895.901,22	3.968.923,61
Profit for the financial year	5.895.901,22	3.968.923,61





| ORGANIZATION

LIST IN FIGURES

(as of 31.12.2016)

119

| Projects undertaken
with international
partners

5

| Ministries
placing their
trust in LIST

17

| Multinationals drawing
on our expertise

LIST AT A GLANCE

BOARD OF DIRECTORS



Photo from left to right: Nicolas Gengler, Marie-Christine Mariani, Eva Kremer, Etienne Jacqué, Gaston Schmit, Isabelle Kolber, Georges Bourscheid, Diane Wolter. (Absent: Hubert Jacobs Van Merlen, Amal Choury)

Georges Bourscheid

Chairman of the Board of Directors

Hubert Jacobs Van Merlen

Vice-Chairman of the Board of Directors

Amal Choury

Member, CEO of eKenz

Nicolas Gengler

Member, Professor at the University of Liège

Etienne Jacqué

Member, Chief Engineer Europe, DELPHI Powertrain Systems

Isabelle Kolber

Member, Head of Laboratory at SEBES

Eva Kremer

Member, Deputy Director of SNCI

Marie-Christine Mariani

Member, Founder and CEO of MCM Steel

Diane Wolter

Member, former philanthropy advisor at the Banque de Luxembourg

Gaston Schmit

Government Commissioner, Principal Government Counsellor at the Ministry of Higher Education and Research

MANAGEMENT



Dr Fernand Reinig
Chief Executive Officer a.i.

DEPARTMENTS AND PROGRAMMES



Prof. Dr Lucien Hoffmann
Director, Environmental Research and
Innovation (ERIN)



Prof. Dr Eric Dubois
Director, IT for Innovative Services
(ITIS)



Prof. Dr Jens Kreisel
Director, Materials Research and
Technology (MRT)



Dr Aziz Zenasni
Director of Programmes

9

European instruments
co-funding our research
activities

207

Scientific
articles
published in
2106 with an
impact ≥ 2

+ 20 % | Patents
filed
in 2016

IMPRESSUM

Editor

Luxembourg Institute of Science and Technology

Layout

Luxembourg Institute of Science and Technology

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