

# ACCESSING THE **ENTERPRISE IRELAND TECHNOLOGY GATEWAY NETWORK 2017**

A guide for companies



**#GlobalAmbition**

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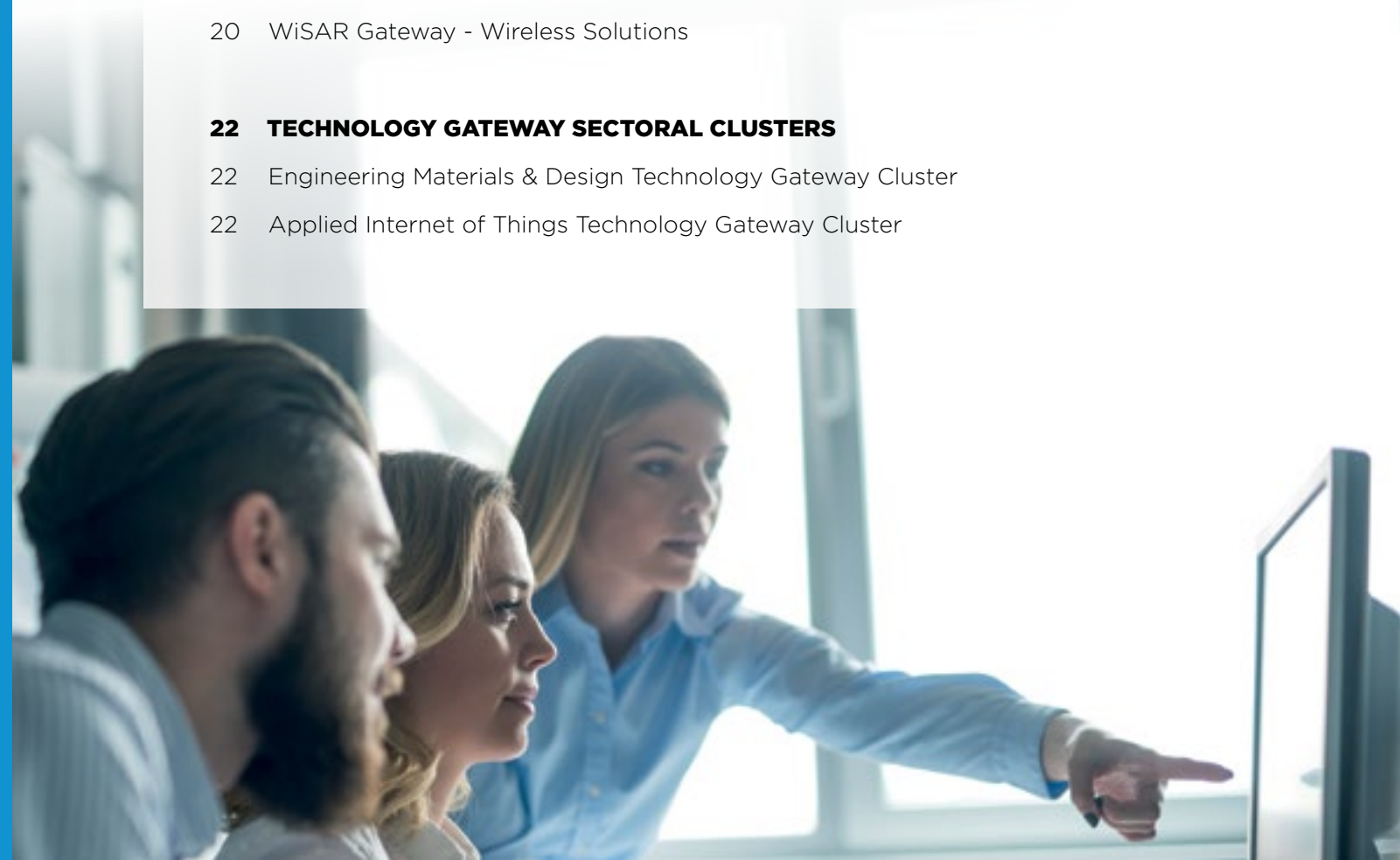
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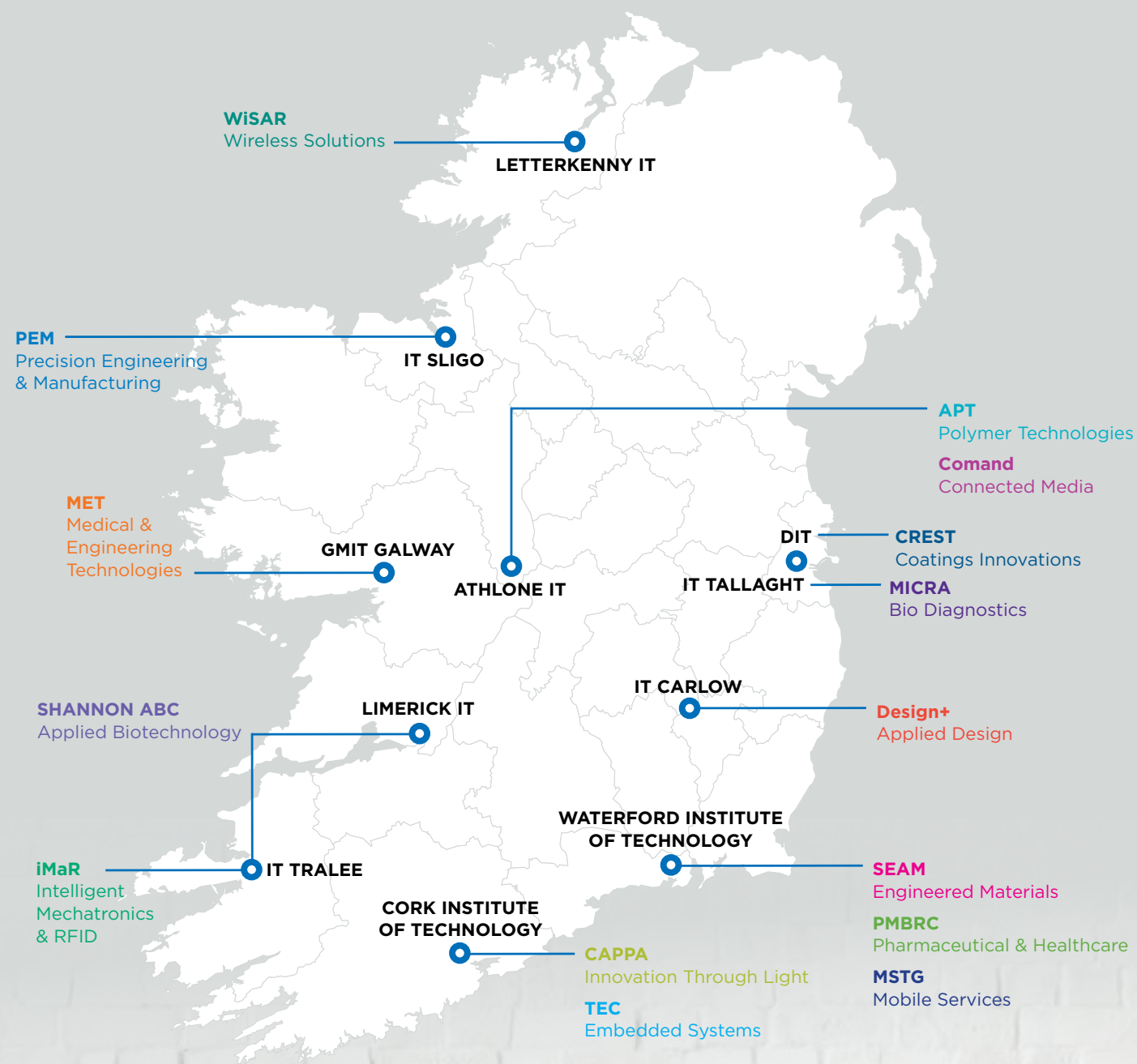
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**FIGURE 1** PROFILE OF TECHNOLOGY GATEWAY INDUSTRY COLLABORATORS



## INTRODUCTION TO THE TECHNOLOGY GATEWAY NETWORK

### NEAR-TO-MARKET SOLUTIONS FOR BUSINESS AND INDUSTRY

Companies all over Ireland are using Technology Gateways to develop new or better products and services and smarter ways of doing things. Through the Technology Gateway Network, they are leveraging the expertise of over **300 industry-focused researchers**, together with the specialist equipment and facilities of the 11 institutes of technology, to access near-to-market innovation and solutions.

Since 2013, over **900 Irish based companies** have used Technology Gateways to complete more than 2,000 innovation based projects at a total value of 19.4 M, **48% of which has come directly from industry.**

### FROM POLYMERS AND PHOTONICS TO MOBILES AND MECHATRONICS

This publication provides a guide to the **15 specialist gateways** within the Technology Gateway Network. Each Technology Gateway focuses on key technology areas **aligned to industry needs**. These range from polymers and photonics to mobiles and mechatronics and everything in between – materials, industrial design and precision engineering – to biotechnology and pharmaceuticals – right through to embedded solutions and wireless services. Each Gateway acts as a portal to the industry focussed capability across the network and beyond to the wider research infrastructure in Ireland. To optimise the power of the Network 3 clusters were established to deliver market lead innovation solutions for Irish companies, in the areas of Applied Internet of Things, Materials & Engineering and Food and Beverages.

Within each Gateway, a dedicated **Gateway Manager** and a team of sector specific business development staff act as the **key contact points** for industry and manage the successful delivery of projects **on time and within budget.**

### INNOVATION SOLUTIONS DELIVERING BIG IMPACTS

Technology Gateways are used by companies of all sizes, but especially SMEs. Typical projects focus on the development of a new product or service or the optimisation of a process. The project sizes vary in size from small short term (90% of projects are €5-10,000) to larger projects up to €200,000 typically funded from the Enterprise Ireland Innovation Partnership Programme. For businesses – and for Ireland Inc – the impact of these collaborations can be big.

A Review by Frontline Consultants in 2016 on the impact of the Technology Gateway Network for partner companies found that:

- 63% of companies reported the development of new products
- Improved technological knowledge (88%) and increase in the overall value of the company (46%) were the top two benefits cited
- 71% of companies cited the development a culture of innovation within the company due to the Gateway collaboration
- Over one-third (39%) of companies managed to access further capital to develop their business
- 19% of companies report that they could not have grown or would not have survived without the support of the Technology Gateway

Moreover, successful collaborations often result in the Gateway becoming an extension of the company's R&D facility over time, as it partners with the business along the innovation journey towards increased growth, sustainability and competitiveness.

Gateway Managers are always happy to discuss potential collaborations with industry, so for more information, read through this guide, visit **www.technologygateway.ie**, follow us on Twitter @ EITechGateway or simply get in touch.



FIGURE 2 PROFILE OF TECHNOLOGY GATEWAY INDUSTRY COLLABORATORS

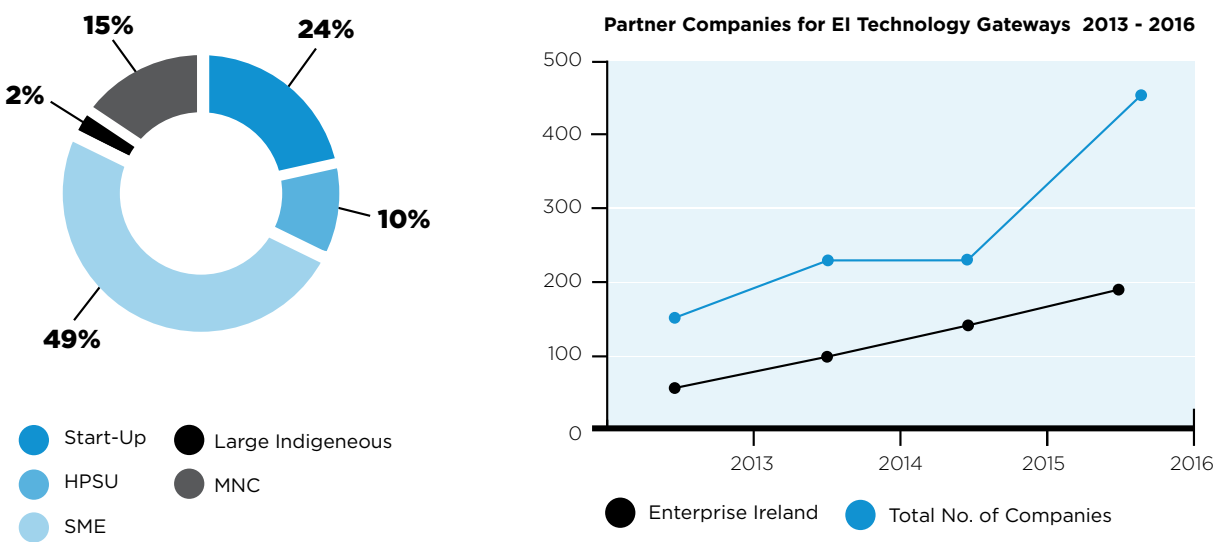
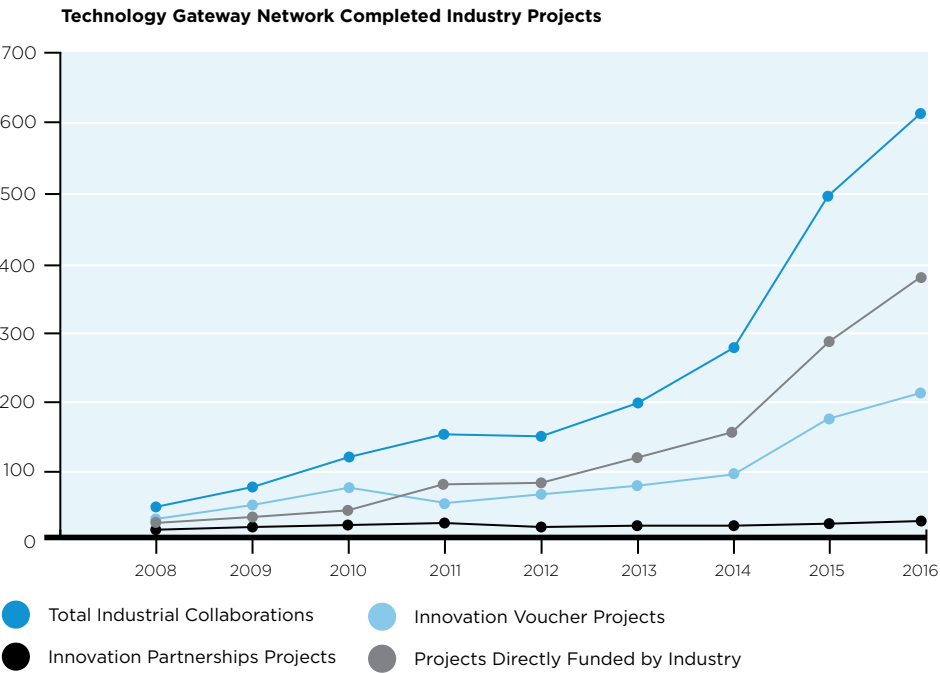


FIGURE 3 DEMONSTRATION OF THE INCREASED LEVEL OF INDUSTRIAL COLLABORATION 2008 TO 2016



Project Type	2008	2009	2010	2011	2012	2013	2014	2015	2016
Total Industrial Collaborations	36	69	117	150	150	208	279	476	618
Innovation Voucher Projects	20	55	75	52	64	71	107	166	212
Innovation Partnership Projects	2	5	8	18	11	19	18	21	34
Projects Directly Funded by Industry	14	9	34	80	75	118	154	289	372



# PROFILE OF THE GATEWAYS



## THE APT GATEWAY

**The APT Gateway** is based on the Athlone IT campus. APT is providing polymer technology solutions for companies in the medical, composite, recycling and pharmaceutical sectors. APT provides industry with access to:

- Pilot and Production scale Injection Moulding, Blow Moulding, Thermoforming, Extrusion and Compounding lines and 3D additive printing.
- Advanced Analytical Facilities for materials research, testing and troubleshooting.
- Design, Rapid Prototyping and Micro-Moulding Capabilities.

## THE CAPPA GATEWAY

**The CAPPA Gateway** based in CIT is applying light based photonic technologies for near to market problems for industrial partners seeking solutions for:

- New Photonics Devices
- Med Tech & Pharmaceuticals
- Food & Beverages
- Manufacturing Technologies

### CASE STUDY OPTIMISATION OF NEW LAB EXTRUSION EQUIPMENT

Athlone Extrusions, based in Westmeath are a thermoplastic sheet extruder and compounder founded in 1971. The company maintains sales offices in Ireland, England and the Netherlands and exports co-extruded sheets for the automotive, sanitary and furniture markets to over 50 countries worldwide. Its manufacturing facility in Westmeath of 14000 sq. metres houses the extrusion division consisting of fourteen sheet and film lines, all with co-extrusion or multi-layer capability, and the masterbatch and compounding division, containing seven compounding extruders. The plant capacity is currently 36,000 tonnes p.a. The company's continued growth is achieved through an ongoing investment in the production facility to expand capacity, a focus on efficiency through technical innovation, coupled with a focus on new product development and material innovation.

Athlone Extrusions have a long working relationship with the APT Gateway in AIT. APT continues to provide material analysis support for production optimisation and new product development activities within the company. In addition, Dr Zhi Cao, a Research Engineer based in APT was recently seconded into the Athlone Extrusions facility to provide support with the installation and optimisation of new lab extrusion equipment. Mark Hallinan, Technical Manager of the Colour Division at Athlone Extrusions (a former graduate of the polymer research department in Athlone IT with over fifteen years' experience working in the polymer materials field), leads a technical team

conducting new product development & research into innovative new products for the thermoforming industry. Over the past number of years, Mark has expanded the Labs at Athlone Extrusions, adding advanced material testing capabilities having seen their effectiveness through numerous collaborations with Athlone IT.

*"We frequently use the team in APT for specialist polymer testing and investigations beyond the capabilities of our own lab here in Athlone Extrusions, and consistently find their support invaluable. A real synergy exists in the relationship between APT and Athlone Extrusions, with APT providing advanced material science capabilities and some specialist equipment for product development and our team here, frequently providing APT with colour masterbatch and thermoforming sheet for their research needs."*

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### CASE STUDY DEVELOPMENT OF A SWALLOWABLE CAPSULE FOR DETECTION OF INTESTINAL BLEEDING

Enterasense is a High Potential Start-up company based in Galway that is developing an ingestible biosensor that detects bleeding in the gastrointestinal tract in real time without requiring a complicated intervention. The company approached CAPPA with a view to developing the optical elements of this swallowable pill to be used for the detection on intestinal bleeding post-surgery. The unit had to be small enough to fit inside a pill shaped container which the patient would ingest. Some initial work had been done to source a simple solution by the company from which they wanted to develop a working design.

Through a combination of an Enterprise Ireland Innovation Voucher and subsequent 100% funded projects from the company, CAPPA investigated a variety of ways in which the signal detection could be improved, implementing bespoke LEDs, filters and detector systems. CAPPA also investigated appropriate layouts of the optical components in order to produce the most efficient design. CAPPA also partnered with its sister Gateway in CIT, TEC to assist in the development of the driving, measurement and output electronics required for the unit. Several small evaluator models were constructed along with a Bluetooth interface to monitor the unit's operation in an artificial environment. The company now had a demonstrator to exhibit at a high profile medical device conference in the US. Following on from feedback with the clinicians present the company is hoping to progress the products development by further enhancing its capability, robustness and operation.

*"CAPPA helped us to better understand the challenges of the technology and identify the most effective way to develop and test a functional prototype. The result of this collaboration was a functional demonstrator which helped us to pitch the device to our customers and get valuable feedback from them. The team in CAPPA is extremely skilled and they delivered a high-performance prototype. In particular, we really appreciated the fact that the team listened to our direction and worked with us to deliver exactly what was needed. The team responded quickly to changes and offered innovative solutions to overcome problems and challenges met during the project. We found the experience very positive and we encourage other companies who need to up-skill their teams to work with CAPPA."*

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## THE COMAND GATEWAY

**The COMAND Gateway** based in AIT is delivering solutions for the software industry across multiple media platforms. The industry focussed technology offer from COMAND includes

- Cloud Media Platform: Leverage media processing in the cloud and end user
- Media Systems: Intelligent and Cross Platform Multimodal Development
- User Interfaces: multimodal interfacing
- Real Time Data Analytics
- Interoperability of the Internet of things

### CASE STUDY CLOUD BASED SMART IMAGE RECOGNITION PROCESSING SOLUTION

Visual ID, an SME based in Dublin, provide virtual content production systems for print and digital outputs for the fast-moving grocery market. Their products allow customers to store, collaborate, distribute, produce and personalise their digital marketing materials. These materials can then be deployed to Print, Social Media, Digital Screens and the Web. Visual ID's online digital asset management system stores hundreds of thousands of digital images of products from different brands. The number of images is constantly increasing as clients upload new images and alterations continually occur to branding and product specifications. Most images are provided with little or no naming protocols making them impossible under current norms to search and locate and re purpose. To name and index these images and eliminate duplications and similarities, manual intervention is required under the current systems. The costs associated with this manual process are excessive and extremely inefficient.

The COMAND Technology Gateway in cooperation with Visual ID, designed a cloud based smart image recognition processing solution for the Visual ID digital asset management system. The solution provides a scalable and efficient system with the ability to utilise smart machine learning, identify images by brand and variant by using the newly developed smart image recognition system. A special learning algorithm has been developed for machine learning of new brands, identification and indexing of near duplicate images, to interpret

graphical and normal text and associated with the image to more readily facilitate service requests to the virtual infrastructure.

*"The manual processes we used have now been replaced by an automated system which is faster cheaper and transparently scalable. This system provides the company with a distinct advantage over our competitors in the marketplace. We see this development as a stand-alone commercial opportunity to market it to Brand owners and the greater retail market worldwide."*

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## THE CREST GATEWAY

**The CREST Gateway** based in DIT delivers coatings innovation solutions for industry in the engineering, construction, healthcare and biomedical industries. CREST offers companies expertise in:

- Coatings and surface treatments on construction materials
- Protective Coatings for challenging environments
- Surface treatment of metal components
- Coatings for Environmental Applications
- Biomedical Devices

### CASE STUDY ENGINEER TRAINING COURSE IN PROTECTIVE COATINGS

ESB International (ESBI) is a leading global engineering consultancy specialising in the utility sector. ESBI invests in, develops, designs, operates and maintains power stations both nationally and internationally, and also trades electricity in competitive European energy markets. Employing over 1,100 professional staff between its offices in Ireland and abroad, ESBI has completed projects in over 120 countries. Since 2005 ESBI have been regular clients of CREST with particular needs in the area of corrosion prevention. Following remediation works the management team in ESBI identified technical needs in the area of coatings and inspections. Following discussions with the CREST Gateway team in December 2015 a training plan was outlined and schedule put in place.

In August 2016 eleven senior engineers started a bespoke training course in Protective Coatings. Over the course of four Mondays the staff were introduced to coating technology and surface treatments during the morning and practical sessions in the afternoon. Using current ESBI coating systems, the staff were trained to evaluate and assess their suitability on pristine, contaminated and badly corroded surfaces. The coating challenges faced during the course were designed to mimic those experienced in the field. A company visit to Galco Steel was also included. Galco treat products from Irish companies, such as Meath Metals, that are eventually used by ESBI.

The engineering team were exposed to the practical aspects of a range of surface treatments and coating technologies. Equipped with new tools, the team are now confident that they can take

necessary preventative steps in their specifications, in identifying and treating localised corrosion failures before they require substantial remediation.

*"This training has added another level of expertise for the ESBI senior engineers from Asset Management Services and HV Design; they can quickly identify suitable coatings, failures and potential treatments during the course of their work, both during the asset lifetime on site and feeding back to the design and specification stage."*

**Stewart Flood, ESBI Engineering, Electrical Engineer, Stations Maintenance, Asset Management Services**

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## THE DESIGN+ GATEWAY

**The Design+ Gateway** based in IT Carlow is applying its Industrial Design capabilities for companies from the Engineering, ICT & Software and Bio Lifescience sectors based in the midlands, southeast and nationally. The technology offer to industry is

- **Engineering:** Prototype design and scale to manufacture
- **ICT & Software:** Integration of user experience and interface design
- **Bio Lifesciences:** product design orientated by end user needs

## THE iMaR GATEWAY

**The iMaR Gateway** based in IT Tralee is applying its core expertise in the areas of hardware (mechatronics, robotics, control systems), software (data management and intelligent systems), IoT (RFID, Sensors) and data analytics to deliver increased productivity in the manufacturing, agriculture and process sectors to industry partners. iMaR Technology Offering is:

- Intelligent mechatronics, process automation and robotics for agricultural technology and advanced manufacturing
- Industrial Internet of Things, RFID and Data analytics for Industry 4.0

### CASE STUDY DEVELOPMENT OF A HAMSTRING TESTING DEVICE

NJ Doherty Solutions is a Enterprise Ireland High Potential Start Up based in Kilkenny. The company's product is The Hamstring Solo, a fitness and testing apparatus for professional sports teams. Hamstring injuries are the number one injury in elite sport. Current exercise methods are not measureable and are often completed incorrectly prolonging the injury. The Hamstring Solo allows athletes to complete the exercise in the correct way.

Design+ engaged with NJD Solutions at the early stage of design and prototype development through an Enterprise Ireland Innovation Voucher. The task for Design+ was to redesign the existing prototype for batch production with considerations for manufacturing methods and material selection. The working mechanism, which allowed for the hamstring solo to be also used as testing apparatus needed to be developed and solutions sought for the design issues it presented in the earlier prototypes.

On conclusion of the project, Design+ provided the company with a set of technical drawings of the product components and assemblies, along with corresponding 3D computer-generated models. NJD has subsequently manufactured the improved product using the Design+ project outputs and secured sales with the IRFU, SARACENS FC, the reigning champions of the English Rugby Premiership, the *Anglo-Welsh Cup* and the European Rugby Champions, West Bromwich Albion FC their impressive season is boosted by the lowest injury rate in the premiership, numerous UK and European football clubs, Inter-county hurling and football GAA teams.

*"The visual presence of the product was also addressed, designing the overall colour pallet and feel of the product. The feet and end caps of the product were also given a distinguishing design along with the kneeling pads. Addressing the visual presence of the product ensured that the physical design communicated strength and technical excellence. The development was carried out in conjunction with the Institute's rehabilitative science research group combined with design thinking."*

**NJ Doherty, CEO NJD Solutions**

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### CASE STUDY INTERNET OF THINGS ENERGY SENSOR FOR INJECTION MOULDING MACHINES

The iMaR team undertook a review to develop a bespoke sensor system to optimise efficiency for the injection moulding process. This entailed a state of the art review of the available off the shelf technologies applicable to this application. A specified requirement was to develop the capacity for high speed data capture with a sufficient on board memory capacity. iMaR then assessed how this system would integrate into an open communications architecture for devices in the injection moulding process. The performance specifications of the selected components were benchmarked against the relevant performance standards for this application. Finally, a component cost analysis was undertaken.

iMaR delivered a detailed report of the research conducted along with the selection of appropriate current sensor technologies which can be integrated on a plastic injection moulding system. The project enabled the company to progress their development of an Industrial IoT based solution for the monitoring of in process quality testing for the plastic injection moulding process.

*"iMaR provides a professional service to a tricky set of questions. During the project I was asked relevant questions which had positive effect on the outcome. The final report was well laid out with all the work packages completed. Conclusions and options that were not obvious during the project were presented in a logical fashion. The options presented gave impetus to other avenues of investigation. I was very pleased with the outcome of the project to the extent that a second project is in the works. I have recommended iMaR to other business owners and am happy to be contacted by prospective customers to share my experience."*

**John Ryan, Plastic Pressure Ltd**

**Daniel Riordan, iMaR Gateway Manager**

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## THE MET GATEWAY

The **MET Gateway** based in GMIT has a technology offer for the medical device and engineering companies based in the West of Ireland and nationally which consists of:

- Medical Imaging Technologies
- Biomedical Engineering Technologies/Solutions
- Data Analytics and Visualisation
- Design Engineering/Verification

### CASE STUDY CLINICALLY RELEVANT CARDIOVASCULAR MODELS FOR THE DEVELOPMENT OF TECHNOLOGIES TO TREAT CHRONIC TOTAL OCCLUSION

Capsos Medical is a High Potential Start-Up medical device company based in Galway that design & develop medical devices to penetrate total occlusion of blood vessels. The company has developed a patented balloon catheter & guidewire combination device called CapBuster to facilitate the treatment of chronic total occlusions (CTO). CapBuster re-opens the most resistant total occlusions where a calcified cap has formed on the surface of the blockage. This new device utilises standard tools and techniques used in all angioplasties in every Cath lath in the world.

Currently, 50% of CTO's are managed with medications, whilst approximately 40% are treated with bypass surgery, which is an invasive procedure with high surgical costs associated. No clinically relevant CTO's was commercially available that replicates the specific anatomical challenges relevant to test the company's device. MET Technology Gateway and Capsos Medical collaborated on an Enterprise Ireland innovation partnership project to address the technology gap by developing an in vitro simulation system for testing the performance of their product.

MET researchers gathered the relevant clinical data and designed and developed various CTO's plaque configurations, which were incorporated into clinically relevant coronary vessels. Following the vascular replication, MET designed a state of art customised in vitro simulation system with interchangeable vascular sections which was fluoroscope compatible.

By providing a highly realistic CTO model and a simulated use environment, the company could carry out design verification studies to evaluate and optimise their prototypes. This customised simulated system accelerated the product development cycle and reduced significant costs associated with pre-clinical animal testing. The capabilities developed through this project enabled Capsos Medical to design a CTO treatment device that performs in a fashion superior to other products in the market. Since completion of the project, GMIT has maintained a high level of interaction with the company and has generated various models with varying CTO properties.

*"This project enabled Capsos to test our CTO treatment device (CapBuster), in an environment that accurately simulates challenging in-vivo conditions, and to evaluate and refine our designs rapidly and effectively, shortening the development cycle and therefore reducing the development cost."*

**Brendan McLaughlin CEO CAPSOS Medical**

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## THE MICRA GATEWAY

The **MICRA Gateway** based in IT Tallaght delivers solutions for companies in the in-vitro diagnostics, environmental, food and pharmaceutical sectors with expertise in:

- Sensor prototyping and manufacturing
- Materials development and characterisation
- Immunoassay platform development
- Enzyme biosensors for human & animal health care
- Biosensors for the rapid and sensitive detection of bacteria

### CASE STUDY BEE HIVE HEALTH - DEVELOPING REAL-TIME MONITORING SOLUTIONS

Advance Science is an Údarás na Gaeltachta company based in Connemara in the West of Ireland, with offices located in the National University of Ireland, Galway (NUIG). The company is committed to safely improving bee health worldwide and to make new technologies available to beekeepers. Its goal is to create a more sustainable future for bees and pollinators. The company has a clear research focus and strives to provide innovative, effective and practical solutions that are cost competitive for the beekeeping industry. The company is focusing on the areas of disease, nutrition and gut health.

The Bee Hive Health Project drew on the expertise of MiCRA Biodiagnostics in the R&D of bio- and electro-chemical sensors. The project partners outlined an ambitious programme to design and engineer sensor technology to facilitate detection and differentiation between specified target entities – or biological markers of the health of the bee hive. They sought to develop a solution capable of performing with high analytical sensitivity and low time-to-result. A variety of chemical analysis techniques were validated for their detection capabilities including molecule differentiation and concentration dependence for the relevant signalling molecules. The research led to the development of prototype sensors and incorporated testing of early-stage prototypes in a live beehive environment.

*"We were delighted with the outcome of this short turn-around research engagement. The results achieved went beyond our expectations and vastly exceeded the initial scope and objectives of the project. We are excited at the possibilities and look forward to further advancing these concepts under future research collaborations with the team at MiCRA."*

**Dara Scott, Managing Director, Advance Science**

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## THE MSTG GATEWAY

The **MSTG Gateway** based in WIT collaborates with companies involved in delivering mobile services primarily for smart phones and tablets. MSTG's technology offer is based upon expertise in:

- Distributed & cloud-based mobile services
- Next generation IP based voice and video
- Virtual and Augmented reality services
- Location, context, smart space and social service enablers
- Data science and mining

## THE PEM GATEWAY

The **PEM Gateway** based in IT Sligo has a technology offer for industry in precision engineering, manufacturing and materials targeted at companies based in the North West and nationally which consists of:

- Precision Engineering and Design
- Manufacturing Process Modelling and Simulation
- Advanced Process Monitoring and Control
- Advanced Material Syntheses and Characterisation

### CASE STUDY DEVELOPMENT OF CLOUD STORAGE CAPABILITY

Waterford Technologies, an Enterprise Ireland client company was founded in 2000 and has offices in the UK, US, Ireland and the Middle East. The company provides Data Management solutions for Email and File Archiving and Fax Solutions for an extensive array of clients across all sectors including Legal, Financial, Health, Education and Government.

The company wanted to enhance their 'File Archiver / Analyser' product to use cloud storage instead of archiving files on conventional storage servers. For a continuously increasing customer base and emerging market challenges they also wanted to re develop their product to be more scalable, reliable, efficient and secure.

MSTG worked with Waterford Technologies to understand in detail their existing business and ideas for creative innovation and developed a comprehensive file archiving and analysing solution to fit their vision and requirements. MSTG delivered the solution with modern and innovative cloud storage features compatible with Microsoft Azure, Amazon S3 and S3- Compatible cloud storage vendors.

The solution has re-incarnated their file archiving product and helped the company stay up to date and competitive in an emerging cloud storage market. The cloud storage functionality has helped Waterford Technologies to attract new customers as well as improved existing customer retention.

*"We were very impressed by the skills and professionalism of the MSTG Gateway, the speed which they engaged with us and how they understood our product, our business requirements and the directions we wished to go in with the new cloud service. Our partnership with MSTG in the development of MFA generation 2 has produced some impressive results so far and we are keen to expand this partnership in the future."*

**Lorcan Kennedy, CTO, Waterford technologies**

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### CASE STUDY DEVELOPMENT OF A DRY RIDGE ROOF TILING SYSTEM

Northwest Aluminium is an SME based in Donegal that manufactures and distributes Roofing and Ventilation Products. The company sought expertise from the PEM Gateway in IT Sligo through an Enterprise Ireland Innovation Voucher to further develop their dry ridge roofing system for a range of roof types including plain tile and slate mediums. The work entailed developing a 3D model of the attachment mechanism for ease of understanding to the end user. The existing drainage gasket was also optimised to present its functionality when fixed.

PEM also identified ancillary opportunities and accessories that can be introduced into the current roofing fixing product line. The Gateway designed and developed a jointing solution for Northwest's slate dry verge product to overcome site fixing issues. This entailed creating 3D printed prototypes for a straight and apex jointing solution to replace "quick fix" on-site methods for jointing currently employed. The series of 3D prototypes of variable dimensions were tested alongside the company's existing range of verge components with satisfactory results.

*"From our perspective the outcome from working with PEM and Enterprise Ireland enabled us to develop prototypes for a new product concept that we wouldn't have been able to produce in house. The prototypes that were developed have now gone into pre production and will be launched within the next few months after testing. As a result of the innovation voucher, we have now decided to continue this collaboration with PEM and increase our investment in R & D by embarking on an ambitious Innovation strategy that will be implemented on a continuous basis into the future. Innovation is paramount to our companies future success"*

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## THE PMBRC GATEWAY

The **PMBRC Gateway** based in WIT is delivering solutions for industry in the pharmaceutical and healthcare sectors in areas such as drug delivery, process technology, biotechnology, biomedical and separation science with expertise in:

- Physico-chemical characterisation of materials.
- Advanced analytical capability.
- Formulation, process development and drug delivery

### CASE STUDY ANALYTICAL CHARACTERISATION OF ACTIVE PHARMACEUTICAL INGREDIENTS

TopChem Pharmaceuticals, an Enterprise Ireland client company based in Co. Sligo was established in 2006 and is a GMP (Good Manufacturing Practice quality standard) supplier of active pharmaceutical ingredients (APIs) to the pharmaceutical sector worldwide. The company has a pipeline of new products under development for future commercialisation. Topchem targets niche, low-volume, high-value generic products that are not available on the open market. TopChem has its own in-house R&D expertise in the synthesis of these products to the necessary quality standards. TopChem partners with other companies (such as Mylan, Perrigo, Sandoz) to bring the formulated product to the market. TopChem have an ongoing requirement to generate API products with the correct chemical and solid-state properties for their customers. These properties may include particle size, crystal polymorph, surface area, morphology, flow characteristics and impurity profile. These factors can have a significant impact on the performance of the finished medicine, particularly around bioequivalence to the innovator product.

The PMBRC has a wide range of equipment to measure these critical properties which are not available to TopChem in-house. Some of the techniques used include solid-state NMR, modulated Differential Scanning Calorimetry (mDSC), thermogravimetric analysis (TGA), dynamic vapour sorption (DVS), laser diffraction particle size analysis, and a range of chromatography and associated analytical equipment. Importantly, as a Gateway with active research projects in this area, the PMBRC has the level of expertise required to support TopChem in their product development.

*"We are very pleased with our engagement with the PMBRC. The PMBRC team have proved to be a key research partner in our new product development."*

**Dr. Dónal Coveney, Managing Director,  
TopChem Pharmaceuticals**

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## THE SHANNON ABC GATEWAY

The **Shannon ABC Gateway** is based on the IT Tralee & Limerick IT campuses and develops new processes and novel products from bio-resources, transferring these solutions to Biotech, Food and Life Science industries. Shannon ABC has expertise in:

- Bio-Prospecting & Bio Processing: Screening, extraction, characterisation and testing of bioactive molecules, as well identifying routes to scale-up.
- Analytical and Research Services: Expertise and state of the art facilities and equipment are available to assist companies to address specific challenges.

### CASE STUDY COMPANY COLLABORATION TO DEVELOP A BESPOKE SEA MINERAL DRINK PRODUCT

IASS (Irish Atlantic Sea Salt) is an SME based on the Beara Peninsula producing the only Irish made, gourmet sea salt. The company launched its first product onto the market place in early 2011 and won a Great Taste Gold Star in 2012. 3 years of process and product development has produced a very high quality, pure sea salt flake product. The company also produces a high quality distilled water and a pure sea mineral compound as a by-product from this process which Irish Atlantic Sea Salt believed could be developed into new products thereby creating a new income stream for the company.

The company collaborated with Shannon ABC to identify opportunities for these by-products and the Gateway identified a potential opportunity to collaborate with NUE Water and provided introductions for the companies. NUE Water are an SME based in Carlow and were established in 2013. Nue Water produce a lightly flavoured water with natural fruit, herbs and spices; with no additives, calories, sweeteners or preservatives. The company had previously worked with Shannon ABC on shelf life and favouring investigations.

NUE's Water product development team developed a range of healthy beverages containing this unique Irish Atlantic Sea Minerals containing over 60 essential micronutrients which work as a natural electrolyte beverage. Through this collaboration of companies and Shannon ABC, a unique product has been developed. Once it was brought to market it has been received a very positive response. To date the product has been given a national listing by SuperValu and can be found in such corporations as Google HQ.

*"Shannon ABC have proven to be an invaluable part to NUE Water's business development and also to the product expansion for IASS. With their continuing help and support, two Irish companies have come together to produce a very unique product with an exciting future. Thank you to Tim and all the team."*

**Colin Tierney, Owner of NUE Water**

**Tim Yeomans, Shannon ABC Gateway Manager**

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## THE SEAM GATEWAY

The **SEAM Gateway** based in WIT provides engineering material solutions for industry in sectors such as Bio-medical devices, Pharmaceuticals, Micro-Electronics, Precision Engineering & Construction with expertise in:

- X-Ray Micro-tomography (XMT): 3D Non-destructive characterisation
- Finite Element Analysis: 3D Software Modelling
- 3D Metal Additive Manufacturing
- Materials & Precision Engineering: Engineering Design & Characterisation
- Bio Medical Engineering: Medical Device Design Optimisation & New Material Assessment

### CASE STUDY REDESIGN OF IMPELLER SECTION OF SHAFT COMPONENTS TO IMPROVE THEIR LIFE TIME

Sulzer Pumps Ireland based in Wexford has a wide range of pump manufacturing capabilities including machining, assembly, motor winding, packaging and shipping of submersible pumps ranging from 100 W to 52 kW from the submersible wastewater segment. There is a Product research and development team located on site and the plant in Wexford is home to a state-of-the-art product testing facility. The facility in Wexford has a long tradition in manufacturing wastewater pumps since 1973 and it has developed into the largest producer of submersible pumps of the ABS product brand. The Wexford facility currently employs 270 people.

The SEAM Gateway collaborated with the company to analyse and redesign the impeller section of various shaft components as far as the main bearing section using Finite Element Analysis (FEA). SEAM undertook FEA analysis on the current design before proceeding on to investigating a number of design options and then selecting the most suitable solution to provide improved life time of the shaft component. Validation of the finalised design is currently ongoing at Sulzer. The partnership provided Sulzer with access and expertise to expensive computer simulation software which is greatly more cost effective than having such facilities in house. The collaboration with SEAM has provided Sulzer the opportunity to refine and fully explore design concepts without the cost of building full scale prototypes.

*"SULZER's contact with SEAM began in September 2015 with the re-design of a rotorshaft on the XFP PE3 submersible, solids-handling sewage pump. This is the second largest pump built at the SULZER plant in Wexford with P2 of 22kW. Each report from SEAM contained analysis, inferences and recommendations which is a great benefit and truly collaborative. Throughout the process there have been helpful discussions and exchanges of information as required, avoiding delay. SEAM provide a complete materials investigation, design support and failure analysis service."*

**Ben Breen Sulzer, Technical Manager**

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## THE TEC GATEWAY

The **TEC Gateway**, based in Nimbus Centre at CIT, has a team of 40+ hardware and software researchers working with companies who require technical expertise in Smart Technologies, Internet of Things and Cyber Physical Systems. TEC supports all levels of innovation from idea-filtering to prototype development and commercialisation. TEC specialises in the following domains:

- Industry 4.0
- Smart Cities
- Energy
- Applications in Ed-Tech, Agri-Tech, Security and eHealth
- Water, Maritime and Environmental

### CASE STUDY SMART SHELVING PROTOTYPE USING RFID TECHNOLOGIES

ISR Technics Airfoil Services is a multinational company based in Cork which provides turbine engine hot section component repair services for blades and vanes on GE, CFMI, Snecma, Pratt & Whitney and Rolls Royce large commercial airline engines. Boxes of blades were processed by personnel but there was little monitoring on whether this is done in the right sequence or how long it lasted. This led to several problems, e.g. high priority jobs may remain unfulfilled, there was no scheduling and therefore room for optimisation and there was no clear view on jobs being delivered.

With the company, TEC Gateway created a solution for a smart shelf where RF antennas are placed on each position. Boxes of blades have leaflets with RFIDs that monitor their introduction or removal to the shelf. An interface allows the supervisor to indicate priorities for processing the box of blades based on time left to deliver and resource availability. Any data for the processing of boxes is kept so in the future this data can be used for the scheduling of jobs. The smart shelf solution will help SR Technics to optimise their supply chain and also minimise mistakes such as processing a box with low priority. It will allow remote monitoring and configuring of smart shelf thus eradicating the need for physical checking by a supervisor around the plant.

*"We are working with TEC Gateway to develop new Inventory Management Software for turbine component repair and manufacture. Great progress was made during software/hardware development and results from early field trials look good!"*

**David Rainsford, Manager/Specialist SR Technics**

**Richard Linger, TEC Gateway Manager**

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## THE WISAR GATEWAY

The **WiSAR Gateway** based in LyIT provides solutions to Irish industry for The Internet of Things (IoT) using expertise in wireless, embedded systems and related software. WiSAR offers this expertise to companies in the following sectors:

- Wearable Tech: Healthcare, Sport & Tourism
- Remote monitoring: Industrial control, Transport, Environmental, Marine
- Power electronics: Renewable Energy and Electric Vehicles
- Communications: WLAN, Zigbee, Bluetooth, UWB, RF and Microwave

### CASE STUDY SMART WHEELCHAIR FOR PRESSURE SORES PREVENTION

LC Seating, established in 2008 in Grange Co. Sligo is a medical supplier company specialising in the provision of all types of rehabilitation and seating products. The company operates throughout Ireland, primarily dealing with occupational therapy / seating clinics by providing engineered solutions for a variety of complex seating needs. People with mobility issues can develop pressure sores from sitting in the one position for extended periods of time. Pressure sores when formed can be difficult to treat, so their prevention is of critical importance and this is achieved through regular movement of the person to alleviate the build-up of pressure. LC Seating and the WiSAR Gateway in LyIT, through an Enterprise Ireland Innovation Partnership Project developed a 'prototype smart cushion' that can detect and monitor the pressure build up and then send wireless alerts to a monitor giving a local reminder to a paralysed person or carer when it is time for their position to change.

Key to the approach taken was the utilisation of smart fabrics that change their electrical properties when stretched providing a signal which can be processed. WiSAR performed extensive research into the identification of suitable pressure sensor fabrics, which were then tested for accuracy and repeatability. A prototype was developed consisting of a bespoke pressure-sensing mat, a wireless data acquisition unit and a wireless base station. Pressure across the cushion surface is represented on a monitor in the form of a heat map which allows real time adjustment of the patient's position to optimise pressure distribution. Thus, the developed prototype can be used as either a pressure monitoring system or a visual pressure mapping system.

*"It's been a very good experience. These devices can be tested in occupational therapy departments. Our aim was to develop wireless alert systems with WiSAR, which will be much more affordable than what's out there at the minute. Embarking on this new venture is exciting and we're pleased to be funded by Enterprise Ireland - it's a strong vote of confidence."*

**Luke Conway, Managing Director, LC Seating**

**Stephen Seagate, WiSAR Gateway Manager**

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## TECHNOLOGY GATEWAY SECTORAL CLUSTERS



**EMD IRELAND**  
(ENGINEERING, MATERIALS & DESIGN)

**EMD (Engineering, Materials & Design) Ireland** is a cluster of six Enterprise Ireland Technology Gateways operating within the engineering, materials and design sector. The cluster provides a range of expertise for companies who are looking to access research and development within these areas. The cluster can connect with over 300 industry researchers in areas such as Precision Engineering, Biotechnology, Polymers, Protective Coatings, Prototype Design, Medical Imaging Technologies and 3D Metal Additive Manufacturing

**THE EMD IRELAND TECHNOLOGY GATEWAY CLUSTER CONSISTS OF:**

**APT:** Applied Polymers  
(Athlone Institute of Technology)

**CREST:** Innovative Coatings  
(DIT)

**Design: +** Applied Design  
(Institute of Technology Carlow)

**MET: Medical & Engineering**  
(Galway Mayo Institute of Technology)

**PEM: Precision Engineering and Manufacturing:**  
(Institute of Technology Sligo)

**SEAM: Materials & Engineering**  
(Waterford Institute of Technology)

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**THE APPLIED INTERNET OF THINGS**  
(A-IOT) CLUSTER

**The Applied Internet of Things (A-IoT) Cluster** is a consortium of five of Enterprise Ireland's Technology Gateways, providing a single point of contact for companies looking to access technical capabilities for Internet of Things (IoT) research and development. Via the cluster, industry can connect with 300 research professionals in software, hardware, communications/networks, data analytics, control, UI/UX and trialling. The A-IoT Cluster is open to all companies, of any size, nationally and internationally.

**THE A-IOT TECHNOLOGY GATEWAY CLUSTER CONSISTS OF:**

**TEC Technology Gateway**  
(Cork Institute of Technology)

**IMaR Technology Gateway**  
(Institute of Technology Tralee)

**WiSAR Technology Gateway**  
(Letterkenny Institute of Technology)

**MSTG Technology Gateway**  
(Waterford Institute of Technology)

**COMAND Technology Gateway**  
(Athlone Institute of Technology)

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**FURTHER INFORMATION**



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Enterprise Ireland is the government organisation responsible for the development and growth of Irish enterprises in world markets. We work in partnership with Irish enterprises to help them start, grow, innovate and win export sales in global markets. In this way, we support sustainable economic growth, regional development and secure employment.