

2017

From R&D projects to products



From **to** PROject
to PROduct

Products commercialized or in the progress of commercialization as a result of R&D projects certified by Minalogic.



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Projects Key Figures

67 projects have been completed, with quantifiable results:

- **482** million total budget
- **183** million in government subsidies
- **176** patents applications filed
- **676** articles published, one-third in international journals
- **706** jobs created
- Total work of **2,900** man-years
- Total investment of more than **187** million in equipment & infrastructure
- Direct revenue attributed to our projects:
 - » **€437** million already generated
 - » **€1.6** billion in the first three years
 - » **€3.6** billion three years post-project

The
PRODUCTS

ADEUNIS RF

SELF-POWERING SENSOR

Product description

One of the major challenges for M2M IoT sensors is power.

Adeunis RF is constantly assessing the latest energy-harvesting technologies to determine their level of maturity. This project was set up to assess three energy-harvesting technologies: solar, thermal, and vibration.

Product history

The project resulted in a functional demonstrator for use implementing and assessing the three technologies. The main technical issue is the compatibility of the energy-harvesting system with the type and brand of electronics used. To use these systems to create self-powering sensors offering optimal yields, some design and customization work will be required.

In terms of cost, the energy-harvesting systems studied are more expensive than traditional battery-based power supply solutions. Therefore, the technologies are not yet mature enough to be integrated into Adeunis RF's products.

However, the project did position Adeunis RF to take full advantage of these systems when they are mature enough and the company is keeping a close eye on developments.

Company

Adeunis RF designs and manufactures ready-to-use connected objects and wireless solutions for the M2M, audio, and IoT (Internet of Things) markets.

For more than two decades, Adeunis RF has been supporting its customers through products that leverage the latest technologies and a range of innovative solutions.

Adeunis RF products meet the infrastructure and network needs of the building management, energy, transportation, and industrial markets.

- > **Year founded:** 1993
- > **Headcount:** 43
- > **Revenue:** €9 million (2015)
- > **Website:** www.adeunis-rf.com

- > Project financed by the **IRT Nanoelec Easytech program**, administered by Minalogic
- > Public sector financing from:
Auvergne-Rhône-Alpes Regional Council, Isère General Council, The Grésivaudan Valley Intermunicipal Authority
- > **Developed in conjunction with** Grenoble INP Esisar

ADIXEN VACUUM PRODUCTS

A204H

A line of pumps offering an extended lifespan



Product description

The A204H pump line belongs to the company's new Series 4 generation of dry primary pumps developed for the most demanding applications. The new line integrates several innovations intended to boost the product's overall lifespan:

- New materials selected for their capacity to withstand corrosion
- An extended operating temperature range that limits the amount of sediment, reducing wear and tear on the pump
- A new monitoring system with features like support for new sensors, operating logs, new alert/alarm algorithms, and an energy-saving mode

The company's Series 4 meets the most stringent etching and CVD specifications, making it suitable for semiconductor, flat-panel display, and LED applications.

Product history

Adixen Vacuum Products has been manufacturing multi-stage roots pumps since 1992. These dry primary pumps earned Adixen a position on the semiconductor, flat-panel display, LED, and solar markets. The low-pressure processes used in these industries produce gases that are compressed by the pump, transforming them into solids (sediment) that cause both corrosion and wear on the pump's mechanical parts, shortening the pump's lifespan.

One of the goals of the Minalogic Textuled2 project (November 2011–April 2014) was to find a solution to this problem. Specifically, project partner Corial uses sapphire etching equipment to manufacture its high-brightness LEDs, and the process creates byproducts that, over time, are detrimental to the equipment's Adixen primary pumps.

The Textuled2 project covered the engineering and development work that ultimately resulted in new technology capable of limiting the formation of these harmful byproducts and improving how the etching equipment and pump work in tandem (through machine-to-machine communication).

Adixen's 204H pump, which leverages these new developments, will replace previous generations of multi-stage roots pumps for the LED and other markets where processes are becoming increasingly damaging due to higher volumes and new materials. The pumps also meet customers' demand for integrated, communicating solutions.

Company

Adixen Vacuum Products, based in Annecy, France, is a subsidiary of Pfeiffer Vacuum. The company boasts R&D, production, and service units, all focused on vacuum technology and contamination control and treatment systems commercialized under the Adixen by Pfeiffer Vacuum brand for the semiconductor, analytics, R&D, coating, nuclear, healthcare, pharma, and other industries.

- > **Year founded:** 1961
- > **Headcount:** 574
- > **Revenue:** €144 million
- > **Website:** www.pfeiffer-vacuum.com
www.adixen.fr

- > **R&D project behind the product:**
Textuled2
(French Single Interministerial Fund 12th grant round)
- > **Budget:**
€1.1 million under the project
- > **Time to market:**
12 months hardware and software & **12** months testing and validation
Total **24** months
- > **Revenue:**
€300K annual sales for the A204H pump, plus indirect additional revenue for the pump assemblies that use the A204H
- > **Release date:**
July 2014

AIM IO32 DEVTOOLS

A major competitive advantage for the developers of software embedded on 32-bit ARM Cortex-M core-based microcontrollers



Product description

IO32 DevTools slashes development times tenfold, creating a major competitive advantage for the developers of software embedded on 32-bit ARM Cortex-M core-based microcontrollers.

This intuitive development toolkit opens up STM32 development to a broader audience, including SMBs, where it could potentially drive:

- increased creativity
- better business competitiveness
- access to new markets

IO32 DevTools aligns with the STMicroelectronics STM32 lineup. STMicroelectronics is the global leader in 32-bit ARM Cortex-M core-based microcontrollers.

Company

AIM (Applications Industrielles des Microprocesseurs) specializes in instrumentation for microprocessors and the associated software. In addition to its manufacturing business, AIM also offers complete hardware/embedded-software systems. AIM customers can develop their own applications on these modular systems, which are available unbranded to AIM partners.

- > **Year founded:** 1977
- > **Headcount:** 13
- > **Revenue:** €1 million
- > **Website:** www.aim-plc.com

Product history

The toolkit was developed in response to a specific issue.

On the one hand, microcontrollers are offering more and more power at lower and lower costs (\$0.50 to \$7). The development of a few hundreds of KB of software, however, costs tens of man-months of labor.

These high programming costs make it difficult for SMBs—which, unlike large corporations, tend to address low-volume niche markets—to move into certain markets.

The R&D project set out to reduce programming costs via a new toolkit addressing both software and instrumentation.

The project consortium, set up with support from Minalogic, included STMicroelectronics, Grenoble University Joseph Fourier School, AIM, Delta Dore and EASI-IC. EASI-IC, as an expert partner on the project, was tasked with measuring the performance improvements obtained for two applications developed by their company (with and without the toolkit). Development was ten times faster with the toolkit.

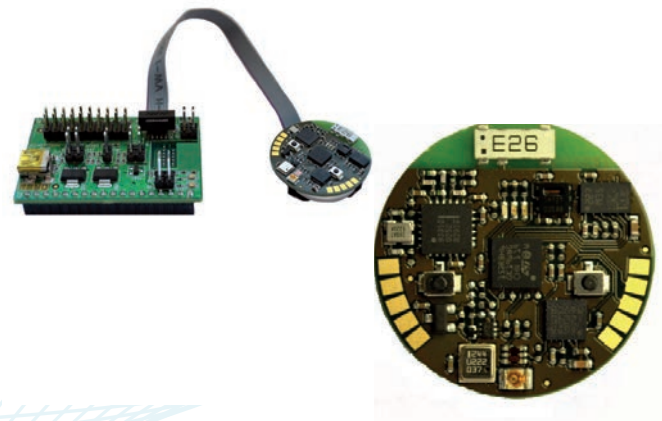
The results of the project demonstrated how bringing together partners with complementary skillsets can get results that exceed expectations.

- > **R&D project behind the product:**
IO32 p.70
(French Single Interministerial Fund 9th grant round)
- > **Budget:**
- €700K for the R&D
- €180K for industrial development
- €100K for commercialization
- > **Time to market:**
55 months
- > **Jobs created:**
4 jobs
- > **Patents:**
1 patent filed
- > **Revenue:**
- €50K (reported)
- €3 million (expected)
- > **Release date:**
June 2014

ALPWISE

BLUETOOTH LOW ENERGY PROGRAM

Communicating, self-powered, multi-sensor system module and development platform



Product description

Alpwise sells a range of hardware and software to customers seeking to integrate low-energy Bluetooth communications capabilities into their products, effectively transforming them into connected objects.

The company's TAG is both a development platform and a complete communicating, self-powered multi-sensor system module. It includes an accelerometer, a gyroscope, a magnetometer, and temperature, humidity, air pressure, and ambient light sensors and can be used to develop a broad array of applications from location and motion sensing to capturing environmental data. Data are sent via low-energy Bluetooth to a smartphone, tablet, or PC.

Alpwise supplies the entire software development environment, both for its TAG and for iOS, Android, and PC.

The company's product lineup also includes Bluetooth low-energy and dual-mode modules, development kits, and protocol stacks for 80c51, ARM CORTEX M0, M3, M4, Renesas RX100, RL78, and more.

Bluetooth low-energy was originally marketed for mobile telephony accessories, hands-free car kits, and medical systems. Today, the technology is finding new applications in the world of connected objects, where it can be used in sensors, home automation, TV, location, PC peripheral devices, smartphone accessories, sports and fitness devices, watches, and assisted-living products.

The Alpwise lineup, unique on the French market, includes technology bricks that can be used to give objects communicating capabilities for tomorrow's Internet of Things.

Product history

Very early in its history, Alpwise, a wireless-communications specialist, narrowed its focus on Bluetooth low-energy technology, participating with the support of Minalogic in various collaborative R&D projects backed by the French Single Interministerial Fund.

For example, in 2007 Alpwise contributed to Bluetooth SIG working groups tasked with developing Bluetooth 4.0 specifications under the Surgimag collaborative R&D project.

The project positioned Alpwise to develop a complete Bluetooth 4.0 protocol stack and an initial RF module using the technology, and sign a strategic partnership with EM Microelectronic

(a Swatch Group company). Alpwise showcased these developments at the Electronica trade show in 2010—and was the only exhibitor at the event to have a working Bluetooth low-energy functional demo.

The company pursued its R&D efforts through two new collaborative projects (Disdeo and Demosen from 2011 to 2014), adding new Bluetooth low-energy products to its lineup.

The projects enabled Alpwise to deepen its know-how and broaden its Bluetooth low-energy product lineup with new communication protocols for medical data, adaptation layers for iOS and Android, the TAG multi-sensor module, development kits, sensor-network management algorithms, and FOTA (firmware over-the-air) technology.

> **R&D project behind the product:**

- BLE SDK : SURGIMAG p.14 (French Single Interministerial Fund 3rd grant round)
- BLE Module: Disdeo (French Single Interministerial Fund 11th grant round)
- BLE TAG: Demosen (French Single Interministerial Fund 12th grant round)

> **Budget: €1.5 million**

> **Time to market: 4 years**

> **Jobs created: 10 jobs**

> **Revenue: €500K** in 2011 and 2012
€8 million to €10 million within five years (expected)

> **Release date: 2011**

Company

Alpwise was created to provide a turnkey connectivity solution capable of making wireless connectivity more reliable to encourage the widespread integration of wireless technology into connected objects manufactured by Alpwise's customers.

Alpwise provides traditional and low-energy Bluetooth modules, protocol stacks, and development kits, all backed by a full range of support and engineering services.

- > **Year founded:** 2004
- > **Headcount:** 15
- > **Revenue:** €850K
- > **Website:** www.alpwise.com

APIX ANALYTICS

CHROMPIX

In situ real-time multi-gas analysis



Product description

ChromPix is a portable, modular miniaturized multi-gas analysis system that performs ongoing in situ analyses in real time. The system's main technological innovation is based on full integration on silicon (leveraging microelectronics technologies), key gas-phase chromatography capabilities and, specifically, a detection module built on NEMS nanoresonators. The entire measurement chain (injection, separation, and detection) is integrated into a miniaturized analysis (analytics) module designed for plug-and-play use. The ChromPix multi-module rack system can hold up to four plug-and-play modules for up to four parallel analyses from a single sample.

The product is designed for industrial (gas quality measurements, industrial process control) and environmental applications. The ChromPix system will soon (H2 2016) be equipped with a preconcentration system that will bring detection capabilities to the parts per billion, a degree of sensitivity that is suitable for air quality testing and pollution measurement use.

Company

Grenoble, France-based Apix develops and commercializes miniature multi-gas detection and analysis devices for environmental, industrial, and safety applications requiring ongoing on-site air-quality monitoring.

The company uses chromatography in an innovative new way that enables smaller, more cost-effective testing devices than those currently available on the market.

- > **Year founded:** 2011
- > **Headcount:** 8
- > **Revenue:** €300K
- > **Website:** www.apixanalytics.com

Product history

The system was developed based on the GCAP system designed and developed under the MIGAS2 project, financed in part through the French Single Interministerial Fund (FUI) and certified by Minalogic.

Apix was founded in December 2011 and so far has been working mainly on developing an initial prototype of its gas testing system. The prototyping phase encompasses all of the system's basic building blocks (injection, separation, and detection modules and electronics).

Initial tests on the system's analytical measurement chain, conducted in 2012, were successful. However, the performance specifications for the tests were relatively low. The following development phase (which took place under the Minalogic-certified MIGAS2 project) led to substantial improvements to the prototype.

The demands of indoor air quality testing are high. The tester must, for example, be able to detect contaminants at concentrations of just tens of parts per billion. The ensuing R&D addressed these needs with enhancements like resizing the silicon-based components (the NEMS detectors and separation columns), developing MEMS-type injectors on silicon (crucial to measuring tiny concentrations), sourcing new components like preconcentrators to facilitate the measurement of low concentrations, and optimizing the system's architecture.

Because it is portable, the product could be used for other on-site environmental testing applications such as pollution monitoring, one-off audits, and identifying the sources of pollutants.

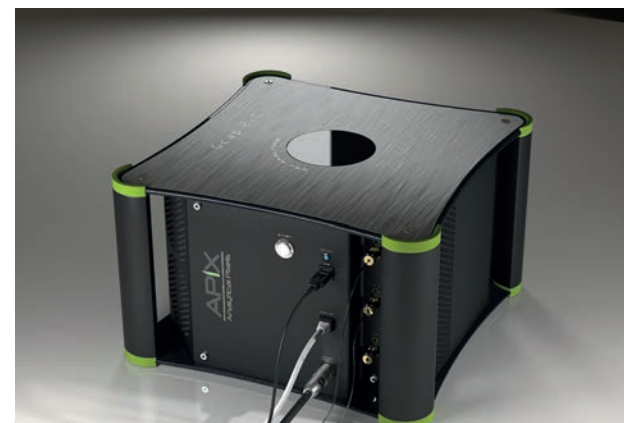
The technology developed by Apix will change how multi-gas testers are used, creating new applications for which conventional technologies are unsuitable.

- > **R&D project behind the product:**
MIGAS2
French Single Interministerial Fund 13th grant round
- > **Public sector financing from:**
Bpifrance, ERDF Rhône-Alpes, Ain General Council, Isère General Council, Haute Normandie General Council
- > **Investments:**
more than **€2 million**
- > **Jobs created:**
2 jobs during the project
2 jobs since the project ended
- > **Patents:**
2 patents filed
- > **Revenue generated:**
€10 million within three years (forecast)
- > **Market release:**
mid-2016

APIX ANALYTICS

GCAP-MIGAS

Real-time on-site multi-gas tester for air quality monitoring



Product description

GCAP-MIGAS is a comprehensive portable multi-gas testing system that can be used to complete real-time air-quality testing on site.

The product's key technological innovation lies in the miniaturization of testing capabilities on silicon chips (using techniques from the microelectronics industry). For example, the detection module is based on NEMS nanoresonators.

The product offers an alternative to current indoor air-quality testing systems, which generally either require taking air samples using absorbent cartridges, which must then be sent to a lab for testing, or using portable PID-type detectors that deliver immediate overall results, but that cannot provide a detailed analysis.

GCAP-MIGAS offers the best of both worlds, providing a detailed analysis of indoor air quality in real time, without the need to send samples to a lab.

The product will respond to France's upcoming indoor air-quality regulations (slated to go into effect in 2015), which will require public buildings like schools, daycare centers, and hospitals, to test the quality of their indoor air.

GCAP-MIGAS will address this new market, offering public and commercial building owners and operators a fast, easy testing solution.

The device can also be integrated into HVAC systems, where it can be used to trigger indoor air treatment if a certain contamination threshold is reached, for example.

Product history

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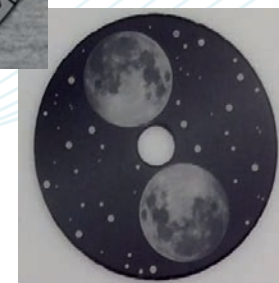
- > **Year founded:** 2011
- > **Headcount:** 8
- > **Revenue:** €300K
- > **Website:** www.apixanalytics.com

- > **R&D project behind the product:**
MIGAS2
(French Single Interministerial Fund 13th grant round)
- > **Budget:**
€2 million+
- Estimated budget for production planning phase:
€200K
- Estimated budget for commercialization phase: (including distributor agreements): **€300K**
- > **Time to market:**
3 years (the project launched in June 2012, initial product release expected mid-2015)
- > **Jobs created:**
2 jobs for this project
2 more jobs expected by mid-2015 (engineering and sales)
- > **Patents:**
2 patents filed by Apix
- > **Revenue:**
€10 million (expected)
- > **Release date:**
Mid-2015

ARNANO

NANOFORME

Micron-scale etching on thin glass disks



Product description

Arnano's Nanoforme technology makes it possible to store information for very long periods of time (around a thousand years). The concept is similar to microfilm. However, the material, sapphire, is very different.

A tiny reproduction of the document to be saved is engraved on a sapphire plate. The engraving is protected by an additional sapphire plate, for a tamper-proof, highly stable storage medium.

The solution is the fruit of numerous innovations: in image processing for the reproduction of documents on sapphire; in the molecular bonding technique to protect the engravings; and in the scanning method, which involves taking a photograph of the document and processing the resulting image.

The solution is designed for high-risk industries (nuclear power and chemicals) and conservation (museums and monuments). An additional consumer application for the technology is currently being tested under the crowdfunded Fahrenheit2451 project.

Product history

This product was developed and subsequent improvements were made under two projects (Nanoforme and Fahrenheit2451) certified by Minalogic and financed by the French Single Interministerial Fund.

The technology bricks developed for this product have also found a niche on the luxury home goods market and are being tested for use in new applications in luxury timepieces and MEMS.

Company

ARNANO develops its activities on the basis of microelectronic technologies by adapting them to graphic applications. With this technology, ARNANO develops two applications: (i) decoration, customization and authentication of luxury products including components in sapphire (watches, jewelry, mobile phones, ...), (ii) the preservation of data (final archives) on very long-term media

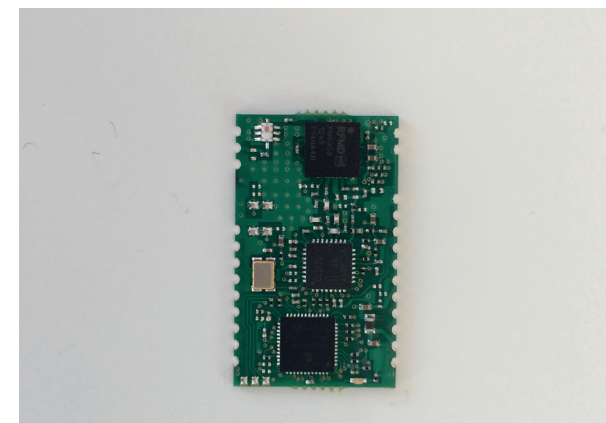
- > **Year founded:** 2009
- > **Headcount:** 4
- > **Revenue:** €650K
- > **Website:** www.arnano.fr

- > **R&D project behind the product:**
NANOFORME
(French Single Interministerial Fund 8th grant round)
- > **Budget:**
€3.5 million
- > **Time to market:**
5 years
- > **Jobs created:**
3 (indirect)
- > **Revenue:-**
€50K
- > **Release date:**
July 2014

ATIM

ATIM CLOUD WIRELESS®

The Atim Cloud Wireless® line



Product description

The Atim Cloud Wireless® M2M line of radio modems are flexible and fully configurable for local Modbus master, Modbus slave, or SIGFOX network connections.

These ultra-long-range, very energy-efficient modems are fast and easy to set up. The underlying connected-sensor technology is truly revolutionary, for an entirely new approach to network projects. Costly wiring and construction are now a thing of the past, as are hubs and radio repeaters. Simply place the radio modems and sensors at strategic locations, pick up their addresses, and setup is complete. The sensors automatically connect and are displayed on the Atim Cloud Wireless® platform.

The applications for this solution are virtually unlimited, from security and surveillance of remote or isolated sites, broken circuit detectors to prevent wire and cable theft, water leak detection, utility meter reading, smart building and smart city applications, and energy efficiency are just the beginning.

Product history

Atim worked with Minalogic on the Smart Hydro Monitoring R&D project, backed by the French Single Interministerial Fund, developing a long-range spread spectrum radio modem offering robust radio communications, even in environments with obstacles and other disturbances. Atim is currently responding to high demand for this new-generation communications system, and is working with Atos to design a PoC leveraging Atim products and Atos' web-based supervision platform.

Company

Atim has been developing secure wireless solutions for 20 years, specializing in the engineering and development of radio communications products for data transmission, from design to commercialization.

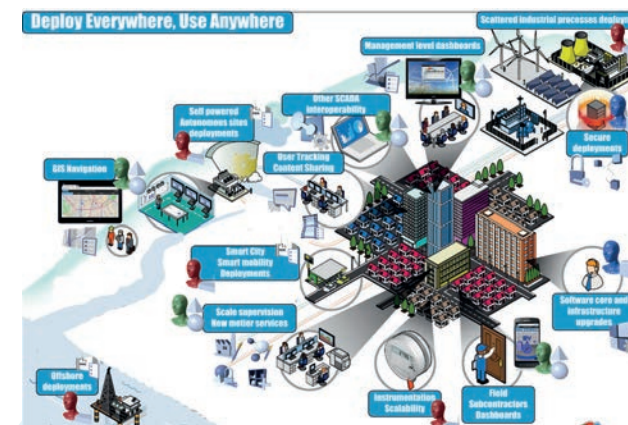
- > **Year founded:** 1996
- > **Headcount:** 10
- > **Revenue:** €920K
- > **Website:** www.atim.com

- > **R&D project behind the product:**
Smart Hydro Monitoring (French Single Interministerial Fund 14th grant round)
- > **Budget:**
Major investment in long-range technologies over the past two years
- > **Time to market:**
2 years to develop a mature product
- > **Jobs created:**
3 jobs
- > **Revenue:**
Expected sales > **€500K**
- > **Release date:**
January 2015

ATOS WORLDGRID

ATOS CLOUD INDUSTRIAL SUPERVISION

Private-cloud-based industrial supervision solution



Product description

Atos Cloud Industrial Supervision is a private-cloud-based industrial supervision solution that enables plug-and-play implementation of the hardware and software needed for industrial supervision applications. The solution's intelligent mesh networking and cloud-based architecture give end users full remote access to data and software updates; no in-house IT resources are required.

The solution is particularly appropriate for physically-dispersed processes (oil fields, wind farms, cogeneration plants, etc.) where maintenance and scaling are critical. This multi-platform solution gives users a familiar PC, tablet, and smartphone experience.

The solution's main innovation lies in the secure, remote, dynamic distribution of processing units as close to the industrial process as possible and, worth noting, on embedded hardware systems.

Atos Cloud Industrial Supervision differs from the SCADA products on the market in that it offers flexible configuration (graphics-driven programming), can be used in harsh or difficult-to-access situations (e.g. in extreme temperatures), and offers the multi-business-unit capabilities required by deregulated markets.

The solution comes with a native geographic navigation system and a collaborative workflow. It is intended for all applications using smart processes and networks, from smart cities, multi-energy smart grids, and smart buildings to water, oil, and gas. It can also be used for distributed simulation.

Product history

Atos Cloud Industrial Supervision was developed to address the needs of new supervision markets not met by existing SCADA solutions.

Increasingly, the field of energy—and, in particular, smart grids—requires supervision systems with multi-operator, multi-business-unit capabilities to cope with the aftermath of deregulation.

And, for smart grids to work, data must be processed and analyzed as close to the process as possible, on embedded systems.

Atos Cloud Industrial Supervision is a break from traditional SCADAs, which generally have centralized architectures operated by a single business unit.

As smart grids are rolled out, the integration of renewable energy sources and increasingly difficult access to fossil-based-energy will create additional remote-configuration needs.

This solution leverages the results of the iDeviceCloud R&D project, in the form of a supervision software solution that is compatible with a broad range of Linux-based hardware used in the field.

It is particularly compatible with the iDeviceBox (developed by AIM under the same R&D project). And integration with ATIM radio products and its wireless cloud (Sigfox) versions has also been tested successfully.

The resulting system, developed by stakeholders in Grenoble's innovation ecosystem, can address all aspects of distributed process supervision (for smart grids, smart cities, and smart mobility), from sensors to the information system and its mobile versions.

- > **R&D project behind the product:**
iDeviceCloud
(French Single Interministerial Fund 10th grant round)
- > **Budget:**
R&D : **€2 million**
consolidation of the commercialization budget is in progress.
- > **Time to market:**
4 years
- > **Jobs created:**
2 jobs
(early commercialization phase)
- > **Patents:**
IP issues being examined;
French software protection program (APP) feasibility study in progress
- > **Revenue:**
 - 2014: **€100K**
 - 2015 : **€500K**
(expected)
 - 2016: **€1 million**
(expected)
- > **Release date:**
September 2014

Company

Atos Worldgrid, a subsidiary of Atos, has more than three decades of experience developing real-time solutions and integrating sophisticated systems for the energy sector.

Atos Worldgrid employs 1,600 engineers in more than 15 countries. The company's supervision and command-control systems have been implemented at 70 nuclear power plants in France, the UK, Russia, and China.

- > **Year founded:** 1982
- > **Headcount:** 1600
- > **Revenue:** €8,615 million (Atos group)
- > **Website:** www://atos.net

CACTUS^{es}

Decision-assistance software for industrial utility customers

**Product description**

In France, the NOME Act, which goes into effect on January 1, 2016, will make regulated electricity rates a thing of the past. This new deregulated market concerns around 436,000 industrial sites in France that will all need specific tools and information to choose their new utility contracts.

CACTUSes decision-assistance software, developed specifically for industrial utility customers, can analyze and forecast energy consumption, determine contract power, and predict unusual usage—crucial when it comes to navigating the deregulated electricity market.

Current energy-management software solutions tend to address residential and commercial customers' needs and do not take into account the issues faced by industrial customers.

CACTUSes leverages data-mining algorithms to provide advanced features not found in other software, including consumption forecasts, which are particularly complicated in industrial settings.

CACTUSes also helps industrial utility customers bypass the energy consultants they habitually use, giving them total independence to choose the right electric utility contract and negotiate rates with utilities. No specialized in-house know-how is required.

Finally, unlike other software on the market CACTUSes addresses a very specific and clearly-identified need.

Product history

CACTUSes was developed under the OPSINE2 project, which was financed by the French Single Interministerial Fund.

Automatique & Industrie conceived of this project to address the lack of resources available to industrial utility customers seeking to implement continuous improvement processes targeting plant energy efficiency.

Minalogic certified the project, providing knowledgeable support not only with the administrative aspects of the project, but also to help Automatique & Industrie test and improve its products. The project consortium, included Automatique & Industrie (lead), ProbaYes, research lab LIRIS, and NTN-SNR Roulements (for the industrial demonstrator system).

Based on market insights and valuable information from the field provided by NTN-SNR, as well as the changing market regulations, the choice was made to develop an initial software package to help industrial utility customers select the best electricity contracts.

The product is slated for release in May 2015. Expected sales volumes are not yet known; however, feedback from initial demos has been encouraging, confirming CACTUSes' position as a comprehensive, intuitive solution.

Company

Automatique & Industrie specializes in energy management solutions designed to be reliable, long-lasting, and compatible with existing systems. The company's energy-management solutions cover the entire energy-efficiency chain, so that users can measure, compare, understand, identify sources of savings, check the results obtained, make improvements, and negotiate better utility rates.

- > **Year founded:** 1995
- > **Headcount:** 72
- > **Revenue:** €5,26 million
- > **Website:** www.aifrance.com

- > **R&D project behind the product:**
OPSINE2
(French Single Interministerial Fund 15th grant round)
- > **Budget:**
Laboratory spending:
€690K
- > **Time to market:**
2 years
- > **Jobs created:**
3 jobs
- > **Revenue:**
€1 million (expected)
- > **Release date:**
May 2015

AVALUN LABPAD

Portable in vitro diagnostic system



Product description

LabPad® is a portable in vitro diagnostic system that can be used to complete a wide variety of biological analyses. It is made up of a single reader and a broad range of consumable microcuvettes.

Avalun's LabPad® is used in much the same way as a blood sugar test kit. The type of microcuvette selected determines which test will be carried out on a capillary (finger prick) blood sample.

The product aligns closely with the growing trend towards e-healthcare, offering communications capabilities to facilitate the exchange of information between the patient, the professional doing the test, and caregivers.

Product history

LabPad is the result of a good match between an enabling technology and a market need. The point-of-care market is steadily moving toward in-home care and patient-connected solutions. The trend is fueled by the multi-measurement systems being developed by startups spun off from world-class research institutions (UCLA, MIT, EPFL). Avalun's founders are developing technologies that enable all biological measurements and that are simple to integrate into patient care protocols.

For LabPad to reach its full potential, the company must rapidly get a broad range of measurements to market. And progress is well underway, supported by strong R&D programs like the French Single Interministerial Fund-backed DDIVA project, which Avalun won with the assistance of Minalogic.

- > Project financed by the **IRT Nanoelec Easytech program**, administered by Minalogic
- > **Public sector financing from:** Auvergne-Rhône-Alpes Regional Council, Isère General Council, The Greater Grenoble Intermunicipal Authority, The City of Grenoble
- > **Developed in conjunction with** CEA DTBS
- > **Budget:** **€2 million**
- > **Time to market:** **3** years
- > **Jobs created:** **20** jobs (expected)
- > **Revenue:** **€313K** (expected)
- > **Release date:** 2016

Company

Avalun is a Leti spinoff that has earned the French government's "Young Innovative Company" (JEI) seal. The company developed a portable in vitro diagnostic system, LabPad, that leverages an exclusive license to intellectual property—a patented optical lensless imaging technology—developed by the French Alternative Energies and Atomic Energy Commission (CEA).

- > **Year founded:** December 2013
- > **Headcount:** 12
- > **Revenue:** €506 K
- > **Website:** www.avalun.com

NEOSMIA

Odor sensor specifically for people who have lost some or all of their sense of smell

Product description

Anosmia is a disorder that causes patients to lose their sense of smell. Odors are perceived through orthonasal olfaction; however, the disorder also affects the patient's sense of taste, which is perceived through the mouth (retro-olfaction). Ageusia is a disorder that affects the ability to detect sweetness, saltiness, bitterness, acidity, and umami (savory tastes). Anosmia can be due to trauma, drug treatment, a genetic predisposition, neurodegenerative causes—or the cause can remain unknown. It is estimated that around 1% to 2% of the population (15% of people over age 60 and 70% of people over age 80) suffers from the disorder. Anosmia can also be an early-warning sign of neurodegenerative diseases like Alzheimer's and Parkinson's. The market in Western countries is estimated at €500 million.

The disorder often brings with it depression-like symptoms and difficulty eating a balanced diet. The loss of a person's sense of smell also creates safety hazards; sufferers of the disorder cannot smell dangerous odors like gas and smoke, rotting food, and unpleasant or abnormal body or household odors.

In general, the disorder is considered to be untreatable. Surgery is only rarely successful. The most treatable forms are due to sinus inflammation, and the side effects of treatment can be debilitating and last for months.

Aryballe Technologies developed an odor sensor specifically for people who have lost some or all of their sense of smell. A prototyping project led to the development of a dedicated SPRI chip, a database, and a product prototype.

The R&D conducted under the NEOSMIA project led to further advances. A second prototyping project was completed and ten identical prototypes were manufactured and used to test the device's operation in real-world conditions. Patients suffering from anosmia also tested the prototypes. The prototype is currently being scaled-up for manufacturing and the product's commercial release is expected by early 2017.



Product history

Aryballe Technologies was founded in March 2014 by a group of entrepreneurs and scientists. The company's mission is to combine nanotechnology, biotechnology, IT, and cognitive science to develop breakthrough innovations. Surface Plasmon Resonance imaging (SPRI) for sensory testing, a technique initially patented by the French Alternative Energies and Atomic Energy Commission (CEA) and France's National Center for Scientific Research (CNRS) responds to this need. In the spring of 2014, the technique was successfully used for the first time ever to detect and distinguish between different odors. At the time, the technique had been developed as a laboratory-grade instrument that was cumbersome (dozens of centimeters and 20 kg) and expensive (more than €10K). Therefore, the company's early-stage R&D involved proof-of-concept testing to determine whether or not the sensor could be used universally and work to miniaturize the system leveraging low-cost components.

Leti's DTBS lab (which focuses on microtechnology for biology and healthcare) is renowned for its expertise developing innovative systems. Aryballe Technologies drew up specifications and seven months of development work was completed to come up with a small, affordable instrument capable of delivering the same results as the lab-grade instrument used for the proof-of-concept testing. The company turned to CREAB, an INAC lab (CEA-CNRS-Grenoble-Alpes University) for the biochemical functionalization of the optical sensors. Aryballe Technologies coordinated the project and conducted some of the R&D in conjunction with Leti's DTBS and CREAB.

These joint R&D projects took place from the fall of 2014 and the spring of 2015. The results positioned Aryballe Technologies to contract out the production of 20 prototypes and sign partnership agreements with healthcare-industry stakeholders. Since then, the company has built up a network of industrial partners through a consortium of seven France-based members under an initiative financed in part by the French Single Interministerial Fund. Aryballe Technologies recently raised €3 million from investors. The company is scaling up the technology for manufacturing and plans to manufacture and sell nearly 10,000 odor detectors, including for people suffering from anosmia, in 2017.

> Project financed by the **IRT Nanoelec Easytech program**, administered by Minalogic

> **Public sector financing from:**
Auvergne-Rhône-Alpes Regional Council,
Isère General Council,
The Greater Grenoble Intermunicipal Authority,
The City of Grenoble

> **Developed in conjunction with CEA DTBS**

> **Budget:**
-R&D: **€300K**
-Industrial scale-up: **€500K**
-Go-to-market: **€1 million**

> **Time to market:**
2 years

> **Jobs created:**
6 jobs

> **Revenue:**
€300K

> **Release date:**
Q2 2017

Company

Aryballe Technologies develops, manufactures, and commercializes odor detectors for industrial and consumer applications. The company's products are intended mainly for odor pollution monitoring, quality control for fragrances and flavorings for the cosmetics and food industries, and medical applications.

- > **Year founded:** 2014
- > **Headcount:** 9
- > **Revenue:** €221 K
- > **Website:** www.aryballe-technologies.com

AZIMUT MONITORING GREENBEE

Continuous noise, weather, and air pollution monitoring



Product description

Greenbee® is Azimut Monitoring's multi-sensor measurement station. It can measure noise, weather, ozone, nitrogen dioxide, hydrogen sulfide, and other parameters; is self-powered (by its own solar panels); and offers wireless communications capabilities (via GPRS).

The Greenbee® measurement station packs in a host of innovative tools that offer excellent interoperability and upgradeability. The system is easy to implement. It can be used to provide continuous environmental data and configured to trigger an alarm if a given threshold is reached. Because it is portable, collection points can be moved as needed.

Azimut Monitoring is rolling out a business model driven by data analysis and consulting services. The company is positioned to help organizations across the public and private sectors integrate environmental issues into their strategies through feasibility studies, equipment installation, data management, indicators and reports, dedicated web portals to access data, and alerts via SMS, email, and RSS.

Company

Azimut Monitoring develops innovative technologies and services in the environmental monitoring field. The company's environmental data collection solutions encompass indoor air quality, noise, pollution, odor, and energy.

The company sells a comprehensive lineup of tools, protocols, and personalized support to meet a wide range of environmental data analysis and communication needs.

Azimut Monitoring has earned the French government's Innovative Young Company label.

- > **Year founded:** 2006
- > **Headcount:** 12
- > **Revenue:** €1.1 million
- > **Website:** www.azimut-monitoring.com

Product history

Azimut Monitoring has traditionally focused on noise pollution monitoring (with its Ladybird® measurement station). Today, with the Greenbee® measurement station, the company is extending its self-powered, communicating measurement station concept to data other than noise.

The use of heterogeneous sensors in the same system raises a number of technological challenges, most notably in terms of energy management. In addition to being self-powered and communicating, Azimut Monitoring products must also be easy to integrate into today's emerging urban sensor networks.

Azimut Monitoring joined the Senscity project (certified by Minalogic) to address the sensor-network issues inherent to tomorrow's smart cities. The project consortium included stakeholders with wide-ranging know-how. Together, they were able to bring the multi-sensor measurement station to a relatively advanced stage of maturity, both in terms of technology and in terms of an associated service lineup to ensure fast, easy commercialization of the future product.

Greenbee® was released commercially upon completion of the Senscity R&D project in 2011. Today, the product accounts for nearly half of Azimut Monitoring's revenue. The company even hired new employees from 2010–2012 on sales of the product (four positions within the company can be attributed to Greenbee®).

- > **R&D project behind the product:**
Senscity
(French Single Interministerial Fund 7th grant round)
- > **Budget:**
€200K
- > **Time to market:**
2 years
- > **Jobs created:**
4 jobs
- > **Revenue:**
€650K
- > **Release date:**
2011

BESPOON

HOLODECK BY BESPOON & KOLOR

Immersive display technology



Product description

Holodeck by BeSpoon & Kolor offers a science-fiction-worthy teleportation-like experience accessible to a broad range of consumers.

Users simply set up around a half-dozen beacons right in their living room (or any other place); the beacons locate the user to within centimeters.

The user then puts on a pair of stereoscopic teleportation glasses equipped with the SpoonPhone, BeSpoon's smartphone with location capabilities.

All it takes is a few seconds to transform any space into a Holodeck. The user is instantly teleported to and can move around within a faraway (previously-digitized) place.

This impressive technology combines two major innovations:

- the precision location capabilities developed by BeSpoon under the Minalogic-certified Lokeos project (co-certified with SCS).
- The immersive display experience developed by Kolor, just a few kilometers down the road from BeSpoon.

The system has garnered interest from business users in a number of fields. However, because it is affordable and easy to use, it also offers the advantage of being accessible to a broad range of consumers.

Ultimately, BeSpoon and Kolor would like to see every home with its own Holodeck!

Product history

Holodeck is a classic case of the good things that can happen when clusters like Minalogic help their members network.

Which is how BeSpoon and Kolor came to work together, combining their precision location and immersive display technologies.

The two companies knew each other well; some of their engineers had even worked together previously. However, they had to travel thousands of kilometers to the Consumer Electronics Show in Las Vegas to hatch a new idea for an interactive immersive experience at the crossroads of the two companies' respective technologies.

And the more they talked about it, the better the idea seemed:

- Kolor had the know-how to assemble spheres to digitize a physical space and move around within it.
- BeSpoon had a technology capable of pinpointing a person's movements within a given space.

Combining the two technologies resulted in a major advance, one that would allow people to move around within digitized spaces simply by putting on a pair of special glasses.

Anyone's living room can be transformed into a Holodeck, giving "the average Joe" access to a world of fascinating places, no matter how far away they may be.

Company

BeSpoon worked with CEA-Leti to develop an integrated circuit that can measure distances accurate to within centimeters, even through obstacles like walls and people.

The cost-effective new chip, which is both accurate and reliable, is making waves in location technology.

- > **Year founded:** 2010
- > **Headcount:** 25
- > **Website :** www.bespoon.com

- > **R&D project behind the product:**
Lokeos
(French Single Interministerial Fund 13th grant round)
Co-certified by cluster SCS
- > **Budget:**
€6 million for the location technology;
€10K for the Holodeck
- > **Time to market:**
6 months
- > **Jobs created:**
9 jobs requiring a graduate degree or higher
- > **Patents:**
7 patents filed to date
- > **Release date:**
Fall 2014

REDIN

Identification system that manages access to household waste receptacles to facilitate the implementation of incentive programs



Company

BH Technologies has been working with municipalities for more than 20 years and is a major stakeholder in the Smart City market, delivering innovative solutions to manage public lighting and waste collection at voluntary drop-off points. BH Environnement offers two separate, yet complementary systems: The SYREN probe, which remotely measures waste receptacle fill levels, and the Redin identification system to manage individual access to the receptacles.

BH Technologies' solutions can be used on all types of waste receptacles and are revolutionizing waste collection at voluntary drop-off points. The autonomous communicating sensors are connected to supervision software to form a comprehensive solution for managing waste disposal and collection. The solution generates immediate savings. First, it eliminates container overflow by letting waste-management authorities know when a receptacle is almost full. This information enables more efficient collection and encourages households to keep using the receptacles. Municipalities can also manage their incentive programs and generate performance indicators.

BH Technologies offers connected open-source applications to support multi-stakeholder management of municipal services.

- > **Year founded:** 1998
- > **Headcount:** 39
- > **Revenue:** €9 million
- > **Website:** www.bh-technologies.com

Product description

Redin is an identification system that manages access to household waste receptacles to facilitate the implementation of incentive programs. To dispose of household waste, users must open the receptacle using their household's access card. Every time a household disposes of waste, it is recorded so that waste management authorities can bill the household for the number of uses. The less a household throws away, the lower the waste-disposal bill. Effective sorting of recyclables is also rewarded.

The product integrates IoT network capabilities into waste-reduction incentives in an innovative new way.

The Redin terminal is powered by a long-lasting (more than 10 years) lithium battery. It is IP68 and IP69K rated for resistance to moisture and dust and can withstand power washing. The product is robust and easy to use.

Redin is intended for municipal waste-management authorities seeking solutions for the implementation of waste-reduction incentives that respond to the "polluter pays" principle outlined in the French government's environmental agenda.

Product history

The product will meet the needs of municipalities as they roll out policies to more effectively manage voluntary waste drop-off points to align with the national environmental agenda. The product was developed under a multi-partner R&D program with Orange Labs and other companies, including BH Technologies. The purpose of the project was to determine a standard communications protocol to ensure object-to-object communications. The results of the project positioned BH Technologies to leverage a LPWAN-type radio network to transmit the data gathered by the terminal.

Redin will round out BH Technologies' existing environmental products and services with two new products. The product aligns with municipalities' waste-reduction incentive strategies and will help municipalities control costs and encourage and improve waste sorting, ultimately reducing the total volume of household waste. This will reduce the need for landfills and incinerators. The access-card and incentive system will effectively encourage citizens to more effectively sort their own household waste.

A probe (SYREN) was also developed to measure the fill level of the voluntary waste drop-off receptacles to help avoid overflow, make waste-collection schedules more efficient, and, ultimately, further encourage households to use the bins.

- > **R&D project behind the product:**
Senscity
(French Single Interministerial Fund 7th grant round)
- > **Budget:**
The project required 8,000 hours of R&D (the equivalent of a half-time position for one year) for the industrial scale-up phase. Three test sites were set up at customers' premises to prepare the product for market release.
- > **Time to market:**
6 years
- > **Jobs created:**
2 jobs
- > **Revenue:**
€1 million
- > **Release date:**
January 2015

POWER DATA TRANSFER

Product description

The goal was to come up with a high-speed data transfer solution to rapidly replace the current mobile-device connectors that will soon be obsolete.

The first-generation product is a connected Qi charger with an iOS and Android application via Bluetooth. The second-generation product is a connected Qi charger that integrates a new technology, high-speed data transfer, thanks to a new STMicroelectronics chip.

Product history

Digital media and data backup methods are changing, creating a need for products capable of transferring data between the smartphones and tablets people use every day. Cloud-based solutions cannot provide this service: these solutions cannot handle large files and access depends on a good internet connection.

Bidul&Co is filling this gap with multi-functional data storage systems capable of transferring data between computers and smartphones or tablets. The company's products are sold under Apple's MFi and Microsoft's Designed for Surface programs.

Company

Bidul&Co is a Lyon, France-based startup and is a member of FrenchTech andMinalogic. The company has built a strong network in the region's innovation ecosystem, with partners that include STMicroelectronics, Leti, and academic institutions ESISAR and INSA Lyon. Bidul&Co designs, develops, and commercializes innovative connected accessories for smartphones and tablets; the company's products are sold under the Bidul brand name.

- > **Year founded:** 2011
- > **Headcount:** 3
- > **Revenue:** €502 K
- > **Website:** www.bidulandco.com

- > Project financed by the **IRT Nanoelec Easytech program**, administered by Minalogic
- > **Public sector financing from:** Auvergne-Rhône-Alpes Regional Council
- > **Developed in conjunction with** Grenoble INP-Esisar
- > **Budget:** **€500 K**
- > **Time to market:**
Phase 1 : Q2 2017
Phase 2 : Q4 2018
- > **Jobs created:** **4** jobs
- > **Revenue generated:-**
€100K in 2017
€200K in 2018
€800K in 2019
€1.2 million in 2020
- > **Release date:** 2016

CORIAL

ICP-RIE 200 MM

Etching machine



Product description

Corial developed a new-generation 200 mm ICP-RIE etching machine.

The machine will give the company's current and future customers access to a broader range of materials etching processes, including deep etching (> 100 µm) of hard materials.

Deep silicon etching (cryogenic or Bosch) has become a crucial step in the production of MEMS (micro-electro-mechanical systems), integrated optics, and system-level packaging.

The primary challenge is to deeply etch materials just microns thick while maintaining a vertical etch profile, good etching uniformity, and a high aspect ratio. The ability to obtain these kinds of structures on hard materials like glass, silicon carbide, sapphire, and lithium niobate could open the door to new opportunities in MEMS, packaging, and power semiconductor devices.

Corial improved its etching machine by adding more powerful ICP and RF sources, a removable liner, a more efficient pump set, and a more effective substrate cooling system.

The upgrades made to the ICP-RIE machine, combined with in-house R&D know-how, resulted in the development of rapid deep etching processes for hard materials that respond to market needs.

Product history

Deep reactive ion etching (DRIE) was a revolution that spurred exponential growth for silicon-based MEMS.

These technologies are now pervasive. However, DRIE is difficult to use effectively on materials other than silicon and today many industries make components on non-silicon substrates.

The purpose of the HMDE project was to develop solutions for the deep etching of «hard» materials (glass, ceramic, crystal) for new components for the watchmaking and telecommunications industries.

The project provided Corial with a unique opportunity to:

- Form a strategic partnership with Leti
- Develop deep etching technologies leveraging access to Leti's technology portfolio (substrates, masks, characterization equipment) and obtain a tangible, factual performance assessment of Corial's machines
- Validate the technologies developed through testing with end users
- Gain new technical knowledge (processes)
- Develop new products (machines)

Company

Corial specializes in plasma-enhanced etching and deposition. The company researches, designs, and builds plasma-enhanced etching and deposition equipment for research and manufacturing (semiconductors, LEDs, and related industries).

- > **Year founded:** 2004
- > **Headcount:** 20
- > **Revenue:** €4 million
- > **Website:** www.corial.net

- > **R&D project behind the product:**
HMDE
(French Single Interministerial Fund 19th grant round)
- > **Budget:**
R&D: **€800K**
Industrial scale-up: **€400K**
Go-to-market: **€200K**
- > **Time to market:**
3 years
- > **Jobs created:**
6 jobs
- > **Revenue:**
2015: **€600K**
2016: **€1.5 million**
2017: **€3 million**
2018: **€3.6 million**
2019: **€4.5 million**
- > **Release date:**
Q2 2017

DRACULA TECHNOLOGIES

DRACULA POWER ULTRALIGHT

Dracula Power Ultralight panels



Product description

Dracula Power Ultralight photovoltaic panels by RaidLight provide portable, off-grid power for outdoor activities.

These third-generation PV panels plug in to a USB port to top up a USB powerbank that can then be used to charge a mobile phone, GPS, or any other USB-compatible device.

Weighing in at just 35 grams, the product meets the extreme weight requirements of adventure racing and backpacking.

Product history

Dracula Power Ultralight panels evolved from our flexible PV and EL management circuit boards.

The goal was to design a new electronic board combining Dracula Power's two technologies, photovoltaics and electroluminescence. But first, the board's solar energy storage capacity and overall yield had to be improved.

Dracula Technologies joined forces with Grenoble Institute of Technology-Esisar students to develop new solutions optimized for these applications. This joint R&D project resulted in three new boards for Dracula Technologies. The students developed five modules and two daughterboards. They also achieved yields in excess of 95%.

Company

Dracula Technologies (organic PV and EL) harnesses light to produce energy for consumer mobile devices. Dracula Power and Lighting solutions can give a product enhanced capabilities like integrated lighting and power sources without compromising the product's main function. The company's flexible printed solar cells, for example, can be used to charge mobile devices like phones, GPSs, and flashlights on the go.

- > **Year founded:** 2012
- > **Headcount:** 6
- > **Revenue:** €200K
- > **Website:** www.dracula-technologies.com

- > Project financed by the **IRT Nanoelec Easytech program**, administered by Minalogic
- > Public sector financing from: Auvergne-Rhône-Alpes Regional Council
- > **Developed in conjunction with** Grenoble INP Esisar
- > **Budget:** **€70K**
- > **Time to market:** **12** months
- > **Jobs created:** **10** jobs
- > **Revenue:** 2015: **€450K** (expected)
- > **Release date:** March 2014

EFS & SCHNEIDER ELECTRIC

LED BOX

LED lighting power and control unit



Product description

LedBox is a new lighting system offering centralized power and control modules to operate solid-state (LED and OLED) and traditional lighting at room-level. The unit is intended for use with a complete lighting system (lighting, sensors, and actuators) with the goal of improving both energy efficiency and occupant convenience and comfort.

One LedBox is installed in each room, where it converts a single 230V AC input into nine very-low-voltage DC outputs that directly feed the room's light fixtures.

The unit adapts to the needs of the light fixtures in terms of polarity, power supply (voltage, current), and energy level, and can be configured for different lighting scenarios (dimmer, colors).

LedBox can also communicate with a supervision system (several LedBox units can be connected to the same supervision system). The overall system can be configured either centrally by the supervision system, or locally via a suitable human-machine interface (by an installer or user).

LedBox is designed to ensure optimal energy efficiency and room lighting at all times. It addresses all markets potentially interested in the occupant comfort and energy efficiency offered by LED lighting.

Pilot projects are currently in progress at hotels, restaurants, and other commercial buildings.

Product history

LedBox was developed under the DELight project (backed by the French Single Interministerial Fund). Schneider Electric, which had previously completed proof-of-concept testing on the LedBox, served as the project lead for the 12-partner consortium.

LED lighting offers vast potential for widespread adoption in the short term. LED lighting is currently the only solution that can offer end users excellent energy efficiency and comfort.

LED technology is expected to reach maturity within the next ten years and will gradually replace traditional incandescent and fluorescent bulbs.

Regulations prohibiting the use of energy-hungry light bulbs will be a key growth driver on this market.

However, one roadblock to the widespread adoption of solid-state lighting systems (which are, by nature, non-standard) is the fact that their control systems must be configured by a professional.

LedBox was designed to overcome this hurdle by offering rich human-machine interfaces suitable for both installers and end users. Easy to install and pleasant to use, the LedBox is both a self-contained product and an enabler that innovative solid-state lighting and lighting systems providers can leverage to drive growth.

Company

EFS has been designing and manufacturing innovative electronic, mechanical, optical, and software products and solutions for 30 years. The company earned its ISO 9001 certification in 2008, and prides itself on maintaining the in-house human and technical resources necessary to rapidly develop and manufacture innovative products across all of its lines of business.

- > **Year founded:** 1980
- > **Headcount:** 75+10 (China)
- > **Revenue:** €7 million
- > **Website:** www.efs.fr

- > **R&D project behind the product:**
DELIGHT
(French Single Interministerial Fund 11th grant round)
- > **Budget:**
€1.5 million
- > **Time to market:**
4 years
- > **Jobs created:**
2 jobs
- > **Revenue:**
€2 million by the fifth year (expected)
- > **Release date:**
2015

ENDOCONTROL JAIMY

Bras robotique co-manipulé associé à un système de fluorescence pour l'assistance aux gestes opératoires en chirurgie laparoscopique

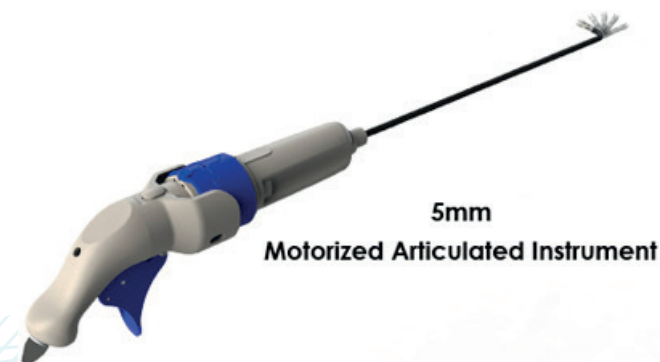
Product description

With laparoscopic surgery, incisions are just millimeters long. This is good news for patients, but creates an additional challenge for surgeons, who can no longer directly see the surgical site. Fluorescence imaging, which consists of injecting markers that are concentrated in the area of interest and that emit infrared light, could give surgeons more detailed information about what they are seeing. However, fluorescence imaging is currently not compatible with laparoscopic surgery.

Laparoscopic surgery presents the added challenge of giving surgeons extremely tight spaces to work within. Endocontrol developed an endoscopic fluorescence imaging system combined with a surgical cobot to make laparoscopic surgery safer and more precise. The first step was to develop an endoscopic imaging system capable of displaying the areas of interest in color and fluorescence. This entailed miniaturizing the fluorescence imaging system and coming up with an endoscope compatible with the two types of imaging. The surgical cobot leveraged an innovative shared control mechanism. The surgeon picks up an instrument, which is also held by a robotic arm. The surgeon uses the traditional technique, and the robot serves as a guide, enhancing the surgeon's stability and precision. Endocontrol worked on the robotics component of the project.

The laparoscopic surgery systems developed will address: digestive, bariatric, and urological surgery, which all include complicated coelioscopy, which has much to gain from robotic assistance; as well as gynecological, cardiac, pulmonary, and vascular surgery. The laparoscopic surgery market was estimated at €14.8 billion in 2008 and was expected to grow 7.8% per year to reach €23 billion by 2014, according to the 2009 BCC Research Report, «The market for Minimally Invasive Medical Devices.»

There are an estimated 100,000 laparoscopic surgeons worldwide (not including India and China) according to the MedTech Insight and Frost & Sullivan reports on endoscopic surgery (2006). The number of centers potentially interested in this solution could therefore be between 30,000 and 40,000.



Product history

The FluoRoMIS project looked at an endoscopic fluorescence imaging system (including a 3D version) and a surgical cobot. The end goal was to combine the two systems to guide the surgeon's hand, making laparoscopic surgery safer. The concept was to extract the information required to control the robot from the fluorescence images.

The first step was the endoscopic fluorescence imaging system. This type of imaging is used in open surgery. To use it in laparoscopic surgery required new optical systems compatible with the difficult conditions of laparoscopic surgery (miniaturization, lighting, image quality).

Next came the cobot, with the goal of developing a robotic arm capable of enhancing the surgeon's technique without interfering. Finally, image-based control rules were developed. The first two steps were completed in parallel, and resulted in the development of two separate, fully operational systems suitable for different markets.

The complete system combining the two is designed to respond to the fundamental problem in laparoscopic surgery: seeing the areas of interest and using the surgical instruments with precision.

This project harnesses the strengths of the MedTech ecosystems in Grenoble and Paris, with academic and institutional partners like UPMC, UJF, and the CEA, as well as a number of SMEs. The project addresses microtechnologies (video sensors, fluorescence imaging, miniaturized robotics) and embedded software (3D display, video and fluorescence image fusion, and a master/slave configuration for the robotics and operating room systems), two of Minalogic's core activities, as well as innovative medical systems in oncology, leveraging the Medicen cluster's expertise in imaging.

The project played a crucial role in technology convergence, coupling the surgical robotics developed for over a decade at UJF, UPMC, and Endocontrol with CEA-Leti/FluoOptics fluorescence imaging technologies.

Company

ENDOCONTROL specializes in robotic assistance for laparoscopic surgery. The company works with and for surgeons to develop "cobots" (collaborative robots) for laparoscopic procedures.

ENDOCONTROL develops and distributes a range of products aiming to aid the surgeon in minimally invasive surgery: VIKY EP, a motorized endoscope positioner for laparoscopy, VIKY UP, a motorized uterus positioner, and JAIMY, the first articulated robotized instrument for 5-mm incisions.

- > **Year founded:** 2006
- > **Headcount:** 18
- > **Website:** www.endocontrol-medical.com

- > **R&D project behind the product:**
FLuoRoMIS
(French Single Interministerial Fund 13th grant round)
- > **Budget:**
€3.2million
- > **Time to market:**
36 months
- > **Jobs created :** **18** jobs
- > **Patents:**
1 patent filed
- > **Release date:**
December 2014
(accord de distribution en France signé à cette date)

ENDOCONTROL

VIKY

Motorized endoscope positioner



Product description

Viky gives surgeons direct, assistance-free control of endoscope (Viky EP) and uterine manipulator (Viky UP) positioning. A multilingual voice-control system with wireless microphone lets surgeons simply tell the system the desired position to deliver the best possible image of the surgical site. Viky is small, lightweight, and fast and easy to learn to use, a revolution in minimally-invasive surgery.

Viky EP is a motorized endoscope positioner for laparoscopic surgery. It provides excellent image stability and lets the surgeon control the image. It also eliminates camera shake, reducing eye fatigue, a key factor for longer procedures. Viky EP can be used for a variety of laparoscopic procedures (urological, gynecological, thoracic, pediatric, and general surgery).

Viky UP is a motorized uterine manipulator holder for gynecological surgery that lets the surgeon control the position of uterine tissue during surgery, exposing tissue to be removed and keeping healthy tissue away from the surgical site. Viky UP makes a number of traditional and robotically-assisted laparoscopic gynecological procedures (hysterectomy, myomectomy, promontofixation, and endometriosis treatment) easier.

The robotically-assisted surgery market is the leading professional-grade robotics market and it continues to grow. Surgeons are particularly open to new innovations, and, based on their successful use of pioneering robotics solutions, surgeons are particularly likely to adopt alternative robotics concepts. Endocontrol developed a new collaborative robotic concept for laparoscopic surgery for more flexible, affordable, and modular systems that adapt well to the wide range of anatomical features and pathologies surgeons deal with every day. This new concept has the potential to make robotically-assisted surgery systems more precise and ergonomic.

Product history

The Viky EP motorized endoscope positioner was the first robot developed by Endocontrol in 2007. It lets surgeons control the endoscope camera directly and without assistance. Viky's revolutionary architecture, developed by and for practitioners, responds to the ergonomics requirements of laparoscopic surgery. Because it is small and lightweight, Viky EP improves surgeons' posture and is compatible with traditional instruments and techniques. It can also be used for a wide range of procedures for the benefit of many patients. In 2010 a new version of the Viky system was developed for uterine positioning: the Viky UP robotized uterine manipulator holder for gynecological surgery.

Viky EP (Endoscope Positioner) provides a stable image and lets surgeons control the image, eliminating camera shake and the associated eye fatigue, especially during longer procedures.

Viky UP (Uterus Positioner) gives surgeons excellent control positioning uterine tissue during surgery so that they can effectively expose the tissue to be removed and keep healthy tissue away from the surgical site.

Since Viky was released, 150 systems have been installed and 10,000 surgeries have been completed.

Company

ENDOCONTROL specializes in robotic assistance for laparoscopic surgery. The company works with and for surgeons to develop "cobots" (collaborative robots) for laparoscopic procedures.

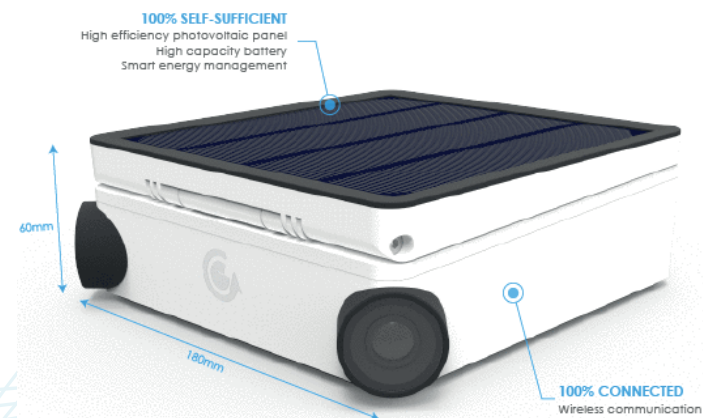
ENDOCONTROL develops and distributes a range of products aiming to aid the surgeon in minimally invasive surgery: VIKY EP, a motorized endoscope positioner for laparoscopy, VIKY UP, a motorized uterus positioner, and JAIMY, the first articulated robotized instrument for 5-mm incisions.

- > **Year founded:** 2006
- > **Headcount:** 18
- > **Website:** www.endocontrol-medical.com

- > **R&D projects behind the product:**
Fluoromis (French Single Interministerial Fund 13th grant round)
- > **Time to market:**
2 years (2005–2007)
Industrial scale-up of Viky by Endocontrol.
- > **Jobs created:**
12 jobs
- > **Patents:**
Endocontrol has filed **2** patent families for Viky's robotic architecture patent families
- > **Release date:**
2007. Viky obtains the CE label and is released on the European market

ENLAPS
TIKEE

Indoor geolocation system



Product description

Enlaps developed an innovative solution for creating and sharing time lapse videos. The product, Tikee, is suitable for professionals and consumers.

Time lapse videos are produced by capturing individual frames at regular intervals. When the sequence is played back at a higher speed, phenomena that are normally too slow to be observed with the naked eye are revealed (construction of a new building, events, weather, etc.).

Enlaps was established to:

- Put time lapse video within the reach of all users by making the entire process (image-capture, editing, and sharing) simple, so that anyone who wants to observe a changing scene over time can.
- Support digital communication using time lapse video, a format particularly well-suited to online use. Time lapse videos are short, simple, and have a strong emotional impact.

The solution is made up of:

- A self-powered, communicating camera: The camera can be placed outdoors, is solar powered, and offers advanced connectivity to eliminate any memory capacity issues.
- A dedicated web app developed specifically for time lapse videos: The easy-to-use web app lets users configure, view, and edit their videos. No special knowledge is required. Videos can then be shared on social media or embedded in other video footage, websites, or other multimedia content.

Product history

Producing high-quality time lapse videos requires photography skills, costly equipment, complicated software, and a lot of time. The results are impressive, but the process is involved and expensive. Enlaps' founder took an interest in the topic, and, after taking a close look at the existing solutions on the market, started Enlaps to develop an affordable comprehensive solution offering automated configuration and editing capabilities.

Enlaps received the support of the Easytech program administered by Minalogic. This support included recruiting four students supervised by ESISAR, an engineering school, to develop the embedded software that gives the product its self-powering capabilities through the smart management of the integrated solar panel and battery.

- > Project financed by the **IRT Nanoelec Easytech program**, administered by Minalogic
- > **Public sector financing from:** Isère General Council, Grenoble Alpes Métropole (intermunicipal authority), Auvergne-Rhône-Alpes Regional Council
- > **Developed in conjunction with** Grenoble Institute of Technology-Esisar
- > **Budget:** **€1 million**
- > **Time to market:** **1.5** year
- > **Jobs created:** **5** jobs
- > **Revenue:** **€250K** in pre-orders
- > **Patents:** **1** patent filed
- > **Release date:** Q1 2017

Company

Give your communications greater emotional impact with time lapse video. Tikee is a comprehensive system that includes a self-powered, communicating camera and a web app. It is a user-friendly solution that lets anyone create breathtaking time lapse sequences.

- > **Year founded:** 2015
- > **Headcount:** 2
- > **Website:** www.enlaps.io

ENERBEE
ENERBEE

Indoor air quality control product



Product description

EnerBee's new indoor air quality control product was developed to support healthy indoor environments and everyday wellness for building occupants.

The product is self-powered, easy to install, and fully integrated (with air-quality sensors and EnerBee's energy-harvesting system). The product can be integrated into HVAC systems where it delivers smart capabilities and helps keep energy consumption down.

EnerBee, for healthy living in a world where air quality, energy efficiency, and comfort are within reach for all.

Product history

The impacts of indoor air quality on public health and the economy are becoming a major concern. A total of 4.3 million premature deaths each year are attributed to poor indoor air quality. In France, the cost to the economy is estimated at €19 billion per year.

HVAC systems and extractor fans play a crucial role in ensuring indoor air quality. EnerBee developed its latest product to help bring good indoor air quality to all.

The product addresses a large market. In France, some 12 million air extractor fans are already installed and more than 1 million new extractor fans are sold each year. EnerBee's new product has the capacity to give these systems smart capabilities and enhanced performance.

Company

EnerBee, established in 2014 in Grenoble, France, developed a microgenerator unlike anything else available worldwide. EnerBee's goal is to become the global leader in self-powering systems for connected objects. The company's microgenerator harvests energy from movement, no matter how slow or irregular.

The company was founded to develop and commercialize technology born from joint research over five years by Grenoble Institute of Technology's G2Elab, Leti, CNRS, and Grenoble-Alpes University's Joseph Fourier School. EnerBee's energy-harvesting technology is protected by around ten patents and represents a breakthrough with regard to traditional technologies.

- > **Year founded:** 2014
- > **Headcount:** 14
- > **Revenue:** €50K
- > **Website:** www.enerbee.fr

- > Project financed by the **IRT Nanoelec Easytech program**, administered by Minalogic
- > **Public financers :**
The Grésivaudan Valley Intermunicipal Authority, Isère General Council, Auvergne-Rhône-Alpes Regional Council
- > Developed in conjunction with Grenoble INP-Phelma
- > **Budget:**
Total investment to date of nearly **€6 million**
- > **Jobs created:**
15
- > **Patents:**
6 patents filed

EVEON

INTUITY® JECT

Automated drug injection system



Product description

The Intuity® Ject drug injection system is completely automated, a major innovation. The system is intended mainly for the biodrug market, which requires precision dose accuracy capacity due to the high cost of the drugs.

Intuity® Ject truly stands out from other solutions on the market in that it enables fully automated subcutaneous, intramuscular and intradermal injections of tiny amounts of a drug with a high degree of precision. No other product on the market can currently make these claims.

Eveon's portfolio of micropump technologies, which includes a MEMS-based pump, gives the company a significant advantage. The MEMS pump makes it possible to inject just a few microliters with minimal drug losses. And, for the more expensive drugs on the market, a few microliters can cost in the tens of euros.

Intuity® Ject was developed for the following treatments:

- oncology (cancer),
- neurodegenerative diseases (Parkinson's),
- inflammatory and autoimmune diseases (rheumatoid arthritis and multiple sclerosis),
- respiratory diseases (cystic fibrosis).

Product history

The concept behind Intuity® Ject was inspired by the mosquito. Mosquitoes sting at the "right" depth, using five sensors and two pumps to inject their own anticoagulant and extract a "dose" of blood. The idea was to try to reproduce the mosquito's particularly effective injection technique in an automated drug injection system.

Eveon headed the FluMin3 R&D project (with partners Grenoble Institute of Technology lab IMEP-LAHC, CEA-Leti, and Cedrat Technologies, and the support of Minalogic) to develop a prototype of the first-ever MEMS-based totally-automated injection system.

The project's primary objectives were to develop:

- A MEMS with a powerful micropump (the only of its kind currently to offer flow rates of 10ml/min) and sensors to measure injection parameters in real time, all on the same chip.
- Wafer-level integration of the MEMS compliant with biomedical requirements (biocompatibility, sterilization, and manufacturable on an industrial scale).
- A miniaturized, low-power actuator.
- Methods for the mechatronic integration and assembly of subcomponents and components compatible with the final product's size requirements and complexity.

Eveon plans to commercialize the product in several years. However, the R&D project positioned the company as a leader in technical solutions for automated systems on the international markets and, specifically, enabled Eveon to establish a solid reputation with European and US-based partners.

Company

Eveon designs and develops innovative automated drug preparation and delivery systems. The company's strong capacity for innovation has led to partnerships with pharmaceutical companies addressing markets like cystic fibrosis, inflammatory diseases, oncology, and urology.

The company is ISO 13485 certified.

- > **Year founded:** 2009
- > **Headcount:** 39
- > **Revenue:** €3 million
- > **Site internet :** www.eveon.eu

- > **R&D project behind the product:**
FluMin3
(French Single Interministerial Fund 9th grant round)
- > **Budget:**
Development and commercialization are planned under a future joint development contract with a pharmaceutical company (more information forthcoming)
- > **Time to market:**
3 years (avec une technologie de micropompe non-MEMS)
- > **Jobs created:**
6 direct jobs and
4 long-lasting jobs directs
- > **Patents:**
18 patents files

GORGY TIMING SCPTIME

End-to-end time production, distribution, broadcasting, and acquisition system



Product description

SCPTIME is an end-to-end time production, distribution, broadcasting, and acquisition system. The system can be implemented on either an open network, or, for businesses that must keep their systems isolated, a closed network.

SCPTIME was developed to produce and broadcast via IT networks an accurate, certified, traceable, and highly-secure universal time anywhere in the world.

The SCPTIME Box gives users a legal, certified, tracked, and secure UTC. Two of the product's strengths are that it is linked to legal French time and data is traceable. The SCPTIME Box delivers precise SCPTIME to the customer. All synchronization data is tracked and logged.

SCPTIME delivers accurate, secure legal time to secure servers to prevent jamming and cyberattacks. In today's digital economy, and with the advent of connected objects, these capabilities have become strategically important.

The product is suitable for organizations of all sizes seeking synchronization, time-stamping, and cybersecurity solutions.

Company

Gorgy Timing is a France-based family-owned mid-sized business founded in 1974 by Maurice Gorgy. The company designs, manufactures, and sells state-of-the-art time distribution and synchronization solutions to customers worldwide.

- > **Year founded:** 1974
- > **Headcount:** 65
- > **Revenue:** €6 million
- > **Website:** www.gorgy-timing.fr

Product history

In 2014 Gorgy Timing took the lead on the Minalogic-certified SCPTIME project. This innovative, multi-partner R&D project earned France's PSPC seal for its capacity to shape an emerging industry. A total of €12 million was invested in R&D over the course of the 42-month project, which was approved by the Steering Committee for France's economic stimulus package, financed by Bpifrance, and signed on June 2, 2014 by France's Prime Minister.

Gorgy Timing is an innovative mid-sized business headquartered in Isère, France. For more than 40 years, the company has been innovating time and, in particular, time synchronization, solutions. Minalogic's support was a key factor in securing the necessary partners for the SCPTIME project.

This international multi-partner project involved a consortium of partners with broad, deep knowledge of time and frequency technologies:

- Business: Gorgy Timing, Eolas, Tronics, Syrlinks, Muquans, and Tyleos.
- Academic research: the Paris and Besançon Observatories, the Institut Femto-ST of Franche-Comté University, France's National Metrology and Testing Lab.
- Users/integrators: Schneider Electric for integration into industrial and smart energy distribution systems; France's national rail operator, SNCF, for integration into large infrastructures; and Business & Decision for integration into data centers.

SCPTIME responds to cybersecurity, efficiency, and legal time-stamping needs for the transportation, energy, and manufacturing industries. However, the technology is also of interest to banking transactions, emergency call centers, and video surveillance.

- > **R&D project behind the product:**
SCPTIME
PSPC
- > **Budget:**
€12 million
in R&D for the project
- > **Time to market:**
3 years
- > **Jobs created:**
Around **10** over two years
- > **Release date:**
H1 2017
- > **Patents:**
1 patent filed

GROUPE BRUNET

E-NA

Mobile, self-powered building

Company

Brunet pioneered a revolutionary approach to environmentally-friendly development. The company keeps an up-to-the-minute watch on the latest innovations and their operational implementation. Brunet's partnership with IRT Nanoelec to develop self-powering mobile equipment for buildings supports this approach. Brunet carries out its own R&D at its in-house innovation lab in Morocco, looking at new innovations and their applications, mainly in the area of conserving natural resources and making public water utilities more efficient. The concept of sustainable living spaces, at the core of Brunet's approach to environmentally-friendly development, is also a key pillar of the company's identity. The sustainable living space is the incarnation of our intuitive knowledge that all environments, human, natural, and technological, must coexist in flexible environments.

- > **Year founded:** 1964
- > **Headcount:** 300 environmentally-friendly development experts in France and 150 in Morocco
- > **Consolidated revenue:** €42 million
- > **Website:** www.groupe-brunet.net

Product description

This project set out to develop a concept for a mobile building capable of providing its own energy and water. The idea was to start from the building's intended use (commercial, residential, tourism, healthcare, etc.) to come up with sustainable living spaces with modular, mobile equipment that can be adapted to different environments and uses.

The equipment would not need to be hooked up to traditional utilities, and would thus provide occupants with complete freedom to configure the space they need and go off-grid at the same time.

Product history

Brunet spearheaded the LiveArium mobile, self-powered building development project run at IdeasLab.

The project sped innovation while generating synergies across the company for greater efficiency. The project was a precursor to the E-na project, which Groupe Brunet is leading at IRT Nanoelec.

- > Project financed by the **IRT Nanoelec Easytech program**, administered by Minalogic
- > **Public sector financing from:** Auvergne-Rhône-Alpes Regional Council
- > Developed in conjunction with IRT Nanoelec
- > **Budget:** Laboratory spending: **€66K**
- > **Release date:** 2016

HAP2U

Touch screens texture



Product description

HAP2U was developed for integration into touch interfaces for devices like smartphones, tablets, touchpads, and communicating objects, with the goal of giving users the «third dimension»: touch.

The solution gives touch screens texture for richer content. Texture enhances web browsers (links), ecommerce (clothing you can «feel»), gaming, home automation, and assisted living solutions for the visually-impaired, bringing the human-machine interface into a new era.

Unlike competing solutions, HAP2U is fully synchronized and instantaneous, with no lag between the touch and visual feedback. The experience truly feels natural. The use of an innovative thin-layer technology resulted in optimized system packaging and a five-fold reduction in energy consumption. HAP2U can be used anywhere there is a touch interface:

- Mobile devices: more intuitive communication through enhanced browsing
- Industrial machines: secure interaction between machine and operator
 - Automotive: touch-based GPS and on-board system control (air conditioning, etc.) for safer driving
 - Interactive kiosks and ticketing: touch codes to replace numerical codes, enhanced browsing

HAP2U solutions will address manufacturers seeking ways to make their products more competitive as well as users looking for more «people friendly» technology.

Company

With HAP2U, technology makes the virtual world more tangible, and, therefore, more accessible to users. HAP2U's four founders bring a complementary range of experiences positioning the company to achieve global leadership on the HMI market.

- > **Year founded:** 2015
- > **Headcount:** 6
- > **Website:** www.hap2u.net

Product history

The project originally started as a joint initiative of STMicroelectronics, the CEA, and USTL (Lille Science and Technology University) to develop applications for STMicroelectronics touch microcontrollers. Positive market response (from customers like Microsoft, Samsung, Skoda, and Renault) encouraged STMicroelectronics to pursue development, this time under the TouchIT project backed by the French Single Interministerial Fund. TouchIT aimed to:

- Improve energy performance
- Develop models of the system's behavior to prepare the technology for industrial scale-up
- Improve the driver electronics for an ultra-compact form factor
- Develop applications for the technology

A project consortium covering all of these issues was created:

- STMicroelectronics: project lead, electronic component manufacturer
- EASII IC: integrated circuit design
- CEA-LETI: low-power actuator fabrication
- USTL: haptic feedback solution
- TIMA (UJF): mechanical modelling and characterization
- INRIA: algorithm development
- AlphaUI: backside keyboard integration
- ORANGE LABS: embedded application testing

HAP2U is targeting the touch interface market (a sizeable goal given the more than two billion smartphones sold in 2014). The company's go-to-market plan includes several generations of the technology for gradual penetration of growth markets (industrial, development) and, ultimately, the mobile phone market.

- > **R&D project behind the product:**
TOUCHIT
(French Single Interministerial Fund 13th grant round)
- > **Budget:**
€5 million
- > **Time to market:**
4 years
- > **Jobs created:**
6 jobs
- > **Revenue:**
€30 million in 2019
- > **Patents:**
5 patents filed
- > **Release date:**
At the end of 2016
(developer kit)

RF800Z

Indoor geolocation system

Product description

HFI's RF800 indoor geolocation system leverages professional-grade radio communication networks to precision-locate staff inside buildings.

The system is compatible with the latest digital mobile radio network (DMR and pDMR) standards and can be used with the latest professional-grade walkie-talkies.

The latest version of the RF800Z uses a UHF mesh network to locate personnel wearing a compact receiver manufactured by HFI. The system is totally self-powered, independent from the facility's communication networks, and easy to implement, test, and maintain. In addition, the frequencies used ensure effective indoor coverage with minimal infrastructure requirements.

The system responds to increased demand for location systems for industrial facilities, office buildings, and parking facilities and can enhance isolated worker protection, maintenance, and operations.

The initial standard version of the solution has already been implemented at several airports, prisons, shopping malls, and factories.

Company

HFI (Haute Fréquence Ingénierie) specializes in radio communications engineering. Located in Meylan, just outside of Grenoble, the company designs, manufactures, and commercializes products for:

- professional-grade radio communications network installation
- isolated worker protection
- real-time location
- RF remote control and alarm systems.

- > **Year founded:** 1994
- > **Headcount:** 7
- > **Revenue:** €1.1 million
- > **Website:** www.hfi.fr



Product history

HFI initially developed an indoor geolocation system that combined a simple fixed UHF beacon and receiver setup with a DMR or pDMR network to send location data to an application server.

To use the system, personnel had to carry walkie-talkies equipped with HFI chips to receive the signals emitted by the beacons. This ultimately evolved into a system where the UHF beacons could communicate with each other via a mesh network, with location capabilities still based on UHF beacon-receiver communication. However the data is transmitted to the server via the UHF mesh network, which is completely separate from the location system.

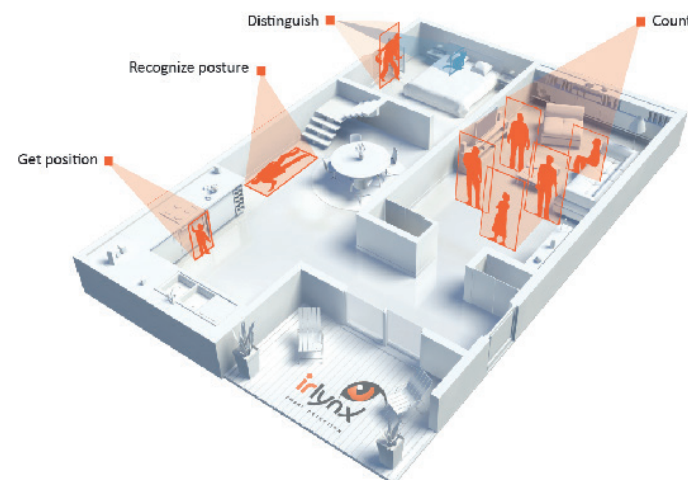
This improvement, developed in conjunction with Grenoble Institute of Technology-Esisar students with the support of the Easytech program, will allow the location system to be used outside of professional-grade radio environments.

The mesh network's main features were developed in conjunction with the students, who participated actively in the needs analysis, market intelligence, functional and technical specifications, and hardware and software development phases of the project.

- > Project financed by the **IRT Naoelec Easytech program**, administered by Minalogic
- > **Public sector financing from:** Isère General Council, Grenoble Alpes Métropole (intermunicipal authority), Auvergne-Rhône-Alpes Regional Council
- > **Developed in conjunction with** Grenoble Institute of Technology-Esisar
- > **Budget:** The project was carried out under a R&D contract with Esisar. Esisar spending: **€30K**
HFI total R&D spending: **€100K**
- > **Time to market:** **2** years
- > **Jobs created:** **4** jobs
- > **Revenue:** **€1.5 million** (expected)
- > **Release date:** Version RFZ: Q3 2015

IRLYNX

IRLYNX SENSOR



Product description

Irlynx sensors detect human presence and count people in real time, delivering reliable information and requiring no special equipment for users. The sensors can also provide additional value-added data like position, direction, speed, and posture (standing, sitting, lying down).

The data generated by the sensors can be used to manage smart building systems (lighting, HVAC, shutters and blinds, automatic doors) to generate energy savings while ensuring occupant comfort and convenience. The data is also of use for assisted living personal safety applications. Finally, the sensors can map traffic, generating data that can be leveraged to make more efficient use of space. All of these applications target the BtoB and consumer markets.

Irlynx sensors pick up the heat emitted by the human body to detect and locate people. The company's unique, patented infrared technology is compatible with low-cost mass production to make all homes more comfortable, economical, and environmentally-friendly.

Product history

Irlynx was founded by Sebastien Fabre in 2012. Mr. Fabre acquired solid experience with infrared technology during his employment at Vince Innovation. He founded Irlynx to develop a new, nonintrusive technology to detect and characterize human activity innovative enough to be unique on the market. He joined forces with tech pioneers Lionel Fritsch and Lionel Chaverot to invent new solutions to replace the basic motion detectors on the market and bring their customers more added value. The company developed a new generation of matrix-based thermal IR detector modules for smart building applications. The all-in-one, low-cost, low-power modules protect users' privacy.

In 2014, Irlynx joined the Easytech program, backed by IRT Nanoelec and administered by Minalogic, to receive support for the development of the company's innovative IR detector. Irlynx is currently a member of Minalogic and is taking full advantage of the cluster's ongoing support.

Company

Irlynx designs and sells low-cost matrix-based thermal IR detectors for OEMs serving the smart building, smart city, assisted living and personal safety, security, and smart objects markets.

- > **Year founded:** 2012
- > **Headcount:** 15
- > **Revenue:** €300K
- > **Website:** www.irlynx.com/

- > Project financed by the **IRT Nanoelec Easytech program**, administered by Minalogic
- > **Time to market:** 4 years
- > **Jobs created:** 15 jobs
- > **Patents:** 3 patents filed

ISORG

IMAGE SENSOR ON PLASTIC



Product description

Isorg manufactures the world's first-ever image sensor (1 million pixels) on plastic.

The company's sensor leverages printed organic electronics and targets the healthcare, security, manufacturing, and consumer electronics markets. Capabilities include a scanner for X-ray imaging, biometric sensor, barcode reader, diagnostics, and document scanning.

Product benefits are: cost, flexibility, thin profile, mechanical strength, light weight, and high performance (sensitivity, and operation in visible and NIR modes).

Product history

The sensor was developed under the Printronics project, backed by the French Single Interministerial Fund.

Isorg is a spinoff of the CEA created as a result of the same project.

The company is also involved in other Minalogic-certified projects: Optitat (industrial control for pharmaceuticals with Sanofi-Aventis) and Roxtar (X-ray medical imaging with Trixell).

The company is developing new electronics-on-plastic solutions for optical sensors.

Company

ISORG develops and manufactures optical-electronic systems leveraging organic electronics (organic photodiodes and large-surface image sensors). The company develops new technology and prepares it for industrial-scale manufacturing; designs, validates, and characterizes sensors using optoelectronic measurements; and builds functional demonstrators, assemblies, and connectors.

- > **Year founded:** 2010
- > **Headcount:** 27
- > **Website:** www.isorg.fr

- > **R&D project behind the product:**
Printronics
French Single Interministerial Fund 5th grant round
- > **Budget:**
PIC-TIC (CEA Grenoble) pilot line. Industrial manufacturing facility under development for 2017
- > **Time to market:**
2 years
- > **Jobs created:**
27 jobs
- > **Patents:**
Around **30** patents filed

ISORG
OMT

A multi-touch screen demonstrator with optical sensors leveraging printed electronics

Product description

The demonstrator is the first and crucial step in the development of organic cells integrated into the LCD panel.

The demonstrator will have a screen size similar to an all-in-one PC

(24 to 27 inches) equipped with a crown of optical sensors

to triangulate the position of touch points. The project encompasses the development of a read board, an embedded system to control the measurement sequencing, and algorithms to determine the coordinates of the touch points.

Product history

The main project partner, ESISAR (Grenoble Institute of Technology), is providing human resources and know-how to support transfer of the system for manufacturing.

ISORG has identified the display market as the leading potential market for this technology. The advantages of ISORG's technology are that it creates the possibility of a new type of contactless interface and, later, will give screens scanning capabilities.

ISORG's goal is to ready the technology for industrial-scale manufacturing and launch production for niche markets (industrial and medical applications, for example) where volumes will be compatible with the company's manufacturing capacity. For high-volume consumer markets, ISORG plans to license the technology to leading global manufacturers.

Company

ISORG develops and manufactures optical-electronic systems leveraging organic electronics (organic photodiodes and large-surface image sensors). The company develops new technology and prepares it for industrial-scale manufacturing; designs, validates, and characterizes sensors using optoelectronic measurements; and builds functional demonstrators, assemblies, and connectors.

- > **Year founded:** 2010
- > **Headcount:** 27
- > **Website:** www.isorg.fr

- > Project financed by the **IRT Nanoelec Easytech program**, administered by Minalogic
- > **Public sector financing from:**
 Isère General Council, Grenoble Alpes Métropole (intermunicipal authority), Auvergne-Rhône-Alpes Regional Council, The City of Grenoble
- > **Developed in conjunction with** Grenoble INP-Esisar
- > **Jobs created:**
1 job:
- > **Revenue generated:**
 Forecast additional revenue: **€200K** to **€300K**
- > **Release date:**
 2016

JASON

AN INK-JET PRINTING CONTROLLER MODULE

Product description

Development of a new-generation machine with a new printer head offering modular flexibility (in terms of printer head technology and changes due to new or evolving customer or market needs).

Product history

Product background and history:

- Soon-to-be-obsolete consumable
- Ageing product line
- Changing customer needs
 - More information to print
 - Printing on plastic
 - 2D data matrix barcodes
- Opportunity created by robotization

Implementation:

- Equipment selection
- Feasibility of high-speed real-time communication networks
- Review of common printing formats
- Development of embedded software modules:
 - HMI
 - Three-axis motorization
 - Printing module
 - Web interface
 - RFID interface
- Linux development knowledge transfer

Project results:

- Lower costs
- High-end product positioning.

Company

Jason brings years of experience providing solutions for printing required information (batch numbers, use-by dates, manufacturing dates, manufacturing site) on packaging. The company works mainly with the food, and, specifically, the poultry industry.

- > **Year founded:** 1993
- > **Headcount:** 11
- > **Revenue:** €1.5 million (forecast)
- > **Website:** www.jason-printing.com

- > Project financed by the **IRT Nanoelec Easytech program**, administered by Minalogic
- > **Public sector financing from:**
Auvergne-Rhône-Alpes Regional Council
- > **Developed in conjunction with** Grenoble INP ESISAR
- > **Jobs created:**
1-2 jobs (target)
- > **Revenue generated:**
€572K in 2015
€367K in 2016 (at end-June)
- > **Release date:**
2015

KALRAY

MPPA

Massively Parallel Processor Array

Product description

Kalray developed the MPPA® (Massively Parallel Processor Array), a manycore processor with 288 cores (more than any other processor on the market). The processor's unique parallel architecture makes it ideal for industries that need real-time, high-performance, low-power computing for network, storage, and offloading applications. The processor's real-time capabilities bring data centers low-latency transfer and storage.

Kalray works with the aeronautics and automotive industries to develop embedded solutions and plans to integrate its MPPA® processors into driverless cars.

Product history

Kalray is one of France's only startups in the microprocessor business. The company is based in Montbonnot, near Grenoble, and is a member of clusters Minalogic and Systematic.

Company

Kalray, a CEA spinoff, was founded in 2008. The company currently employs 60 people to develop the MPPA processor and associated software. The processors are manufactured Developed in conjunction with TSMC using 28 nm CMOS processes.

- > **Year founded:** 2008
- > **Headcount:** >60
- > **Website:** www.kalrayinc.com

- > **R&D project behind the product:**
CHAPI
(French Single Interministerial Fund 8th grant round)
- > **Patents:**
>20 patents filed

MU-TEST

IMPROVED TESTING AND CHARACTERIZATION ARCHITECTURE FOR THE SEMI-CONDUCTOR INDUSTRY

Product description

Target markets: engineering platforms that test components before launching volume manufacturing; and small-volume test platforms (100 K units/month).

Product history

The purpose of the project was to bring CPU to instrument data transfer rates from 50 Mbps to 6 Gbps, for performance similar to competing solutions for a 20 megapixel imager. The hardware architecture was validated during an initial R&D project run with engineering school Esisar in 2015. This goal of this new project is to finalize the software. Sales resulting from this project are estimated at €500 K the first year and €600 K the second year.

Company

Mu-Test designs and supplies testing and characterization systems for the semiconductor industry.

- > **Year founded:** 2010
- > **Headcount:** 15
- > **Revenue:** €1322K
- > **Website:** www.mu-test.com

- > Project financed by the **IRT Nanoelec Easytech program**, administered by Minalogic
- > **Developed in conjunction with** Grenoble INP Esisar
- > **Revenue:**
€500K
 (expected 2017)
€600K
 (expected 2018)
- > **Release date:**
 November 2016

NOVADAY

NOVALAMP

High-power LED systems for efficient, reliable systems

Product description

Novalamp is an efficient, robust lighting system suitable for use in industrial environments.

It can be installed at height and over large surface areas and offers fast ROI.

The R&D project focused on developing cost-effective, easily-transferrable technology bricks using materials with good thermal exchange compatible with high-power LED systems for efficient, reliable systems with two times the usual ROI.

Product history

Today's lighting systems offer efficiency of 110lm/W.

Total system cost is directly influenced by the number of LEDs and the cooling system. Despite substantial market potential, these systems have failed to penetrate the French market due to low ROI. Energy costs are rising and building operators are being forced to cut operating costs.

Novaday is leveraging a technological breakthrough capable of slashing energy consumption to take advantage of this unique market opportunity.

Company

Novaday offers innovative energy, lighting, and LED solutions and services designed to improve business' energy performance. From energy, environmental, and financial audits of current lighting equipment to lighting technology development and integration, Novaday offers end-to-end solutions.

- > **Year founded:** 2010
- > **Headcount:** 45
- > **Revenue:** €3 million
- > **Website:** www.novaday.com

- > Project financed by the **IRT Nanoelec Easytech program**, administered by Minalogic
- > **Public sector financing from:**
Isère General Council, Auvergne-Rhône-Alpes Regional Council
- > En collaboration avec :
Le CEA
- > **Budget:**
€200K to date
Estimated total cost: **€400K**
- > **Time to market:**
4 years, including 2 years for proof-of-concept testing
- > **Jobs created:**
3 jobs:
2 engineers directly involved in the project (1 at launch and 1 at completion), **1** project manager/administrator
- > **Revenue:**
Launch: **€1.27 million**
Launch+1y: **€3.8 million**
Launch+2y : **€7.6 million**
- > **Patents:**
1 patent filed
- > **Release date:**
2017

QUALIPAC

E-MOTION#1

Effets lumineux pour l'industrie cosmétique de luxe

Product description

E-motion adds light to cosmetics and other luxury goods packaging, delivering the capacity to sculpt light like any other noble material. The dynamic lighting effects are custom designed to interact with the glass' design, texture, and decorative features.

Product history

This project responds to the need of the cosmetics and luxury goods industries' constant quest for new features to differentiate their products from their competitors'.

The project provided Qualipac with an opportunity to work with Minalogic and Leti to develop new know-how (in electronics) not previously available in-house.

As a result of this project, Qualipac will strengthen its image as an innovative brand with the capacity to meet its customers' (cosmetics brands') need for innovative solutions.

Company

Qualipac is a subsidiary of Pochet, and specializes in metal and plastic transformation.

- > **Year founded:** 1984
- > **Revenue:** €248 million
- > **Website:** <http://www.groupe-pochet.fr>

- > Project financed by the **IRT Nanoelec Easytech program**, administered by Minalogic
- > **Public sector financing from:**
Auvergne-Rhône-Alpes Regional Council
- > **Developed in conjunction with**
Grenoble INP Esisar
- > **Budget:**
R&D services **€160K**
R&D payroll **€172K**
Industrial scale-up **€40K**
Go-to-market **€50K**
- > **Revenue:**
No sales yet

R2S ROBOTICS

REAL-TIME POSITION MEASUREMENT SENSORS

Product description

In order to address the mining equipment reconditioning market, R2S Robotics needed a sensor module to determine the position of the drill arm in space. The module will be used to measure pitch, roll, and yaw. For mining applications, precise information about the position of the drill arm can be used to increase efficiency.

The module will be implemented on a 50 mm x 50 mm acquisition board supplied by R2S. The board must be vibration resistant to provide acceptable precision.

Product history

ESISAR (Grenoble Institute of Technology) developed a sensor system to measure the drill arm's pitch, roll, and yaw. It works in static mode, like an inclinometer, with accuracy to within less than one degree. The sensor module also works in dynamic mode, which means that R2S will later be able to develop a master/slave communication protocol between the module and the drill arm.

Company

R2S Robotics develops drilling solutions for the mining industry. The company's solutions can help reduce underground drilling costs. Customers also benefit from operational support and assistance and reporting services to help them manage their drilling equipment more cost-effectively and efficiently.

- > **Year founded:** 2012
- > **Headcount:** 1
- > **Revenue:** €200K
- > **Website:** www.r2srobotics.com

- > Project financed by the **IRT Nanoelec Easytech program**, administered by Minalogic
- > **Public sector financing from:**
Auvergne-Rhône-Alpes Regional Council
- > **Developed in conjunction with** Grenoble INP Esisar
- > **Budget:**
Laboratory spending: **€28K**

CLEAN ROOM CONTROL PANEL

Product description

The product developed is a secure clean room vestibule access control panel. The principle is to separate the door and vestibule functions, with each door controlled individually so that door operation aligns with the specifications.

Interlocking will also be managed separately and master-slave relationships between doors will be fully configurable regardless of the number of doors or the layout of the vestibule. In the event of changes to the building or clean room layout, reconfiguring the access control system will not require any additional programming.

The current solution consists of the following equipment installed on the door frames:

- 1 limit switch
- 1 suction strip to lock or open the door
- 1 buzzer
- 1 optional key-operated switch
- 1 optional key-card reader

Each component is wired to the main cabinet, which contains the PLCs that manage the network with the software application developed.

The maximum distance between any given door and the PLC is estimated at 400 meters.

For larger facilities, the wiring costs would be high and network speeds would be negatively affected.

The main cabinet can also be connected to a supervision system, either locally or remotely.

Product history

There are many automatic clean room vestibule door manufacturers, each with its own door interlock system.

All manufacturers offer economical one- or two-door solutions. However, for clean rooms and or labs with more than two doors, or with doors from different manufacturers, access management is a challenge.

Implementation times are unpredictable and it is often falls upon the customer to adapt to the capabilities of the different systems, when it should be the other way around: the customer should be able to install a system that operates according to specifications.

This project would simplify access control while providing enhanced security and the ability to adapt to unique configurations.

The product is expected to be priced at €200 ex. tax and annual sales volumes are estimated at 2,000 to 5,000 units.

Company

RAC Electronic designs and manufactures custom industrial-grade circuit boards. The company can produce small- to medium-sized batches and handles all stages of the design and manufacturing processes in-house from specifications through to production and assistance obtaining accreditations, working closely with customers on each project. RAC Electronic's integrated approach adds value for its customers.

- > **Year founded:** 1980
- > **Headcount:** 16
- > **Revenue:** €1343K
- > **Website:** www.rac-electronic.fr

- > Project financed by the **IRT Nanoelec Easytech program**, administered by Minalogic
- > **Public sector financing from:**
Auvergne-Rhône-Alpes Regional Council,
Isère General Council,
The Greater Grenoble Intermunicipal Authority
- > **Budget:**
€80K
- > **Release date:**
2017

RESOLUTION SPECTRA SYSTEMS

PROCELLICS™

Raman spectroscopy system that can be used as a PAT (Process Analytical Technology) tool for the biopharmaceutical industry



Product description

ProCellics™ is the first-ever Raman spectroscopy system that can be used as a PAT (Process Analytical Technology) tool for the biopharmaceutical industry. ProCellics™ was developed exclusively for the in-line process control of critical nutrients and metabolites to ensure that cell cultures develop optimally.

Raman spectroscopy has recently been confirmed by major pharmaceutical companies as a very effective bioprocess control tool. Resolution Spectra Systems now offers a GMP testing system that biotech companies can easily implement as an industrial-grade sensor to improve bioprocess development and in-line process control.

The product delivers a number of major benefits to users:

- A better understanding of bioprocesses
- Improved yields and a lower reject batch rate
- More effective final-product quality control
- Regulatory compliance

Product history

ProCellics™ was developed as a result of the ANAgRAM project (2013-2016, 9 partners €4.9 million invested) led by Resolution Spectra Systems. The purpose of the ANAgRAM project was to develop high-performance, ultra-integrated Raman spectroscopy solutions to deliver non-destructive testing capabilities for industrial process control, microbiological analysis, in situ environmental testing, and anti-counterfeiting systems.

The project partners: Resolution Spectra Systems, Pyxalis, Teem Photonics, ATT, Leti, IPAG, IMEP-LAHC, LEPMI, and LTM.

Company

Resolution Spectra Systems designs and manufactures innovative optical sensors and instruments for laser characterization, structural health monitoring, and, more recently, PAT (Process Analytical Technology) for the biopharmaceutical industry. The company's innovative products bring a unique combination of features: they are compact, deliver high precision, are fast, and offer robust calibration.

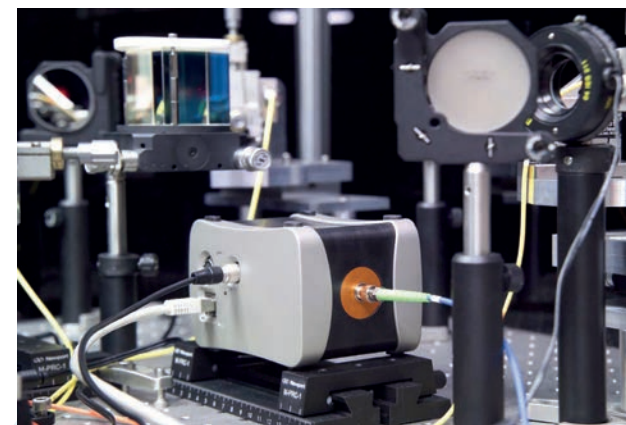
- > **Year founded:** 2011
- > **Headcount:** 14
- > **Website:** www.resolutionspectra.com

- > **R&D project behind the product:**
ANAgRAM
(French Single Interministerial Fund 15th grant round)
- > **Budget:**
€6 million
- > **Time to market:**
3 years
- > **Jobs created:**
4 jobs
- > **Revenue:**
€15 million (by 2020)
- > **Release date:**
December 2016
- > **Patents:**
2 patents filed

RESOLUTION SPECTRA SYSTEMS

ZOOM & MICRO SPECTRA

Compact high resolution optical spectrometers designed for laser characterization markets



Product description

The ZOOM Spectra and Micro Spectra are compact high resolution optical spectrometers designed for laser characterization markets.

They are used to characterize lasers (ECDL, VECSEL, DFB, ND-Yag, etc.) for both manufacturers who wish to integrate them into their products and end users.

These spectrometers are based on SWIFTS, a disruptive technology built around the combination of microelectronics, integrated optics, nanotechnology, and software engineering.

As a result, the products combine high resolutions and precision measurements with a compact, robust design.

To avoid any risk of accidental alteration to the spectrometer settings and capacities, all mobile parts were removed from the design.

Thanks to the products' calibration process, users no longer need to recalibrate their products after factory calibration.

ZOOM Spectra and MICRO Spectra products are currently sold throughout Europe (Germany, France, etc.), Asia (China, Japan), and the United States.

Over the past two years, the ZOOM Spectra product has earned several innovation and quality awards at trade shows in France, the United States, and Europe.

Product history

These products were developed as a result of the SWIFTS 400-1000 R&D project backed by the French Single Interministerial Fund (2008–2011; 7 partners; €4.5 million) and led to the creation of the company Resolution Spectra Systems.

This project gave three companies (Teem Photonics, Floralis, and e2v) and four academic research laboratories (IPAG, IMEP-LAHC, LTM, and UTT) the opportunity to transform a Grenoble academic invention into a marketable product.

Since its creation, Resolution Spectra Systems has continued to transfer the developments born of the SWIFTS 400-1000 project to industry and has begun marketing these new products on the laser characterization market.

Another Minalogic project was launched in 2013 to develop new products based on SWIFTS technology.

The ANAgRAM project, led by Resolution Spectra Systems, is developing high performance and integrated Raman analyzer solutions that meet demands for nondestructive testing (NDT) in industrial processes, microbiology analyses, on-site environmental testing, and anti-counterfeiting programs.

Partners: Resolution Spectra Systems, Pyxalis, Teem Photonics, ATT, CEA-Leti, IPAG, IMEP-LAHC, LEPMI, and LTM..

Company

Resolution Spectra Systems offers groundbreaking optical spectrometers that stand out for their compact form factor, unequalled performance, and ease-of-use. Users get real breakthroughs for a broad range of applications. Created in 2011, Resolution Spectra Systems is located in Grenoble and is a member of Minalogic. The company also won a national entrepreneurship competition.

- > **Year founded:** 2011
- > **Headcount:** 8
- > **Website:** www.resolutionspectra.com

- > **R&D projects behind the product:**
 SWIFTS 400-1000 p.100 (French Single Interministerial Fund 6th grant round)
 ANAgRAM (French Single Interministerial Fund 15th grant round)
- > **Time to market:**
 4 years
- > **Jobs created:**
 8 jobs
- > **Patents:**
 2 global patent families
- > **Release date:**
 ZOOM Spectra: June 2012
 MICRO Spectra: October 2013

SCHNEIDER ELECTRIC

TEMPERATURE, HUMIDITY, AND CO2 SENSOR



Product description

The wireless sensor prototypes developed under the Homes project served as the starting point for the development of a ZigBee-based very-low-power wireless sensor platform to meet the needs of a ZigBee sensor line for building and asset monitoring and control.

The first sensor, currently being prepared for industrial-scale manufacturing, is a ZigBee temperature, humidity, and CO2 sensor (commercial release Q1 2016).

The sensor's very low power consumption (less than 200 nA in standby mode) makes it unique, as does its CO2 sensor, which leverages a breakthrough technology providing the performance and battery life the market demands. It is the only CO2 sensor on the market guaranteed to work for ten years on the same battery. The building systems market will be the first addressed, with applications like HVAC control, comfort monitoring, and indoor air quality monitoring.

The second sensor, also being prepared for industrial-scale manufacturing, is a temperature monitoring sensor for medium-voltage electrical distribution equipment. The sensor's compact footprint and low power consumption make it compatible with self-powering via the magnetic field generated by the AC current in electrical cables and busbars.

The sensor is also robust, with projected lifespans of 20 years in harsh environments (temperatures up to 125°C). The sensor will address the heat monitoring market for medium-voltage switchgear (ensuring uptime for industrial sites and other building systems). Commercial release is slated for H1 2016.

Product history

The wireless-sensor development work carried out under the Homes project confirmed the feasibility of very-low-power wireless sensors compatible with battery- or self-powered solutions for lifespans (10 years+) compatible with the target applications.

Company

Global energy management specialist Schneider Electric is present in more than 100 countries and offers integrated solutions for a number of market segments. The company is a leading provider of solutions for energy utilities and infrastructures, manufacturing and machines, residential and non-residential buildings, and data centers and networks.

- > **Headcount:** 170 000 in more than 100 countries
- > **Revenue:** €25 billion (2014)
- > **Website:** www.schneider-electric.com

> R&D project behind the product:

HOMES p.28
(French Agency for Industrial Innovation Strategic Industrial Innovation Program)

> Time to market:

8 years since the launch of the Homes project and Schneider Electric's earliest work on the subject

4 years since development work on the very-low-power ZigBee sensor platform

> Release date:

1st semester 2016

SOITEC
ESI

A substrate for cost-competitive, high-performance RF circuits for 4G/LTE-Advanced smartphones



© iStock

Product description

Soitec's eSI wafers are used for the fabrication of high-performance, competitively-priced radiofrequency circuits for applications that include new-generation smartphones. The substrate delivers faster, more reliable data transmission to meet the needs of 3G, 4G, and LTE Advanced networks.

Soitec's RFeSI-SOI wafers incorporate an innovative material (a trap-rich layer) between the high-resistivity handle wafer and the buried oxide (BOX), which limits the parasite surface conduction of standard HR-SOI and significantly improves the RF performance of the finished ICs manufactured on these wafers, enhancing RF isolation, lowering insertion loss, boosting thermal conductivity, and improving signal integrity. The substrate, which allows more flexible design rules, can also help reduce the number of steps in the manufacturing process, lowering production costs and enabling smaller chip sizes for the same function. The product targets RF circuit designers and manufacturers (front-end modules with power amplifiers, antenna switches, and transmitter-receivers) serving consumer electronics and, especially, smartphone and tablet manufacturers.

Company

Soitec is one of the world's leading manufacturers of innovative semiconductor materials for the electronics industry. The company boasts a portfolio of more than 3,000 patents and has implemented an ambitious innovation strategy to bring its customers high-performance, energy-efficient, and cost-competitive products. Soitec has two manufacturing plants, R&D centers, and sales offices in Europe, the United States, and Asia.

- > **Year founded:** 1992
- > **Headcount:** 900
- > **Revenue:** €233 million
- > **Website:** www.soitec.com

Product history

A patent was obtained for the Trap-Rich technology in 2005 as a result of RF substrate development work carried out with the Catholic University of Leuven, Belgium. The technology was developed further Developed in conjunction with Leti under the Nanosmart program from 2006 to 2011.

Prototypes were developed in 2009 in conjunction with Skyworks and RFMD. Industrial-scale manufacturing for the mobile telephone antenna switch market was launched in 2012.

The substrate became a true commercial success two years later, in 2014, rounding out Soitec's product lines to cover 100% of the 20-billion-unit RF IC market.

- > **R&D project behind the product:**
Nanosmart
(French Agency for Industrial Innovation Strategic Industrial Innovation Program)
- > **Budget:**
More than **€50 million**
(Investment at Soitec's Bernin plant during the project)
- > **Time to market:**
7 years
- > **Jobs created:**
400 jobs
- > **Revenue generated:**
Not reported
- > **Patents:**
150 patents filed
- > **Release date:**
2012

SOITEC

ADVANCED SUBSTRATE FOR HB LEDs

An advanced, high-performance GaN semiconductor substrate for high-brightness LEDs



Product description

This advanced, high-performance GaN semiconductor substrate for high-brightness LEDs leverages an innovative technology for transferring thin layers of very high quality GaN onto substrates compatible with the LED market's quality and cost requirements.

The product's key differentiator is a lighting density per sq. mm that opens the door to new designs and applications.

The product will target the LED and high-performance/high end lighting markets (general indoor and outdoor lighting, automotive lighting, consumer electronics, and video projectors, for example).

High-brightness LED manufacturers will be interested in the product.

Soitec also plans to develop a lighting lineup that takes advantage of this substrate's enormous potential.

Product history

2005: Start of R&D work on growing and transferring the GaN film (funded by Soitec).

2006–2011: Nanosmart program Developed in conjunction with CEA-Leti to develop advanced substrates for GaN-based lighting.

2012: Project secures government funding for additional R&D.

2013: Licensing agreement signed with Sumitomo Electric.

2013: Development of Soitec Lighting lineup.

Company

Soitec is one of the world's leading manufacturers of innovative semiconductor materials for the electronics industry. The company boasts a portfolio of more than 3,000 patents and has implemented an ambitious innovation strategy to bring its customers high-performance, energy-efficient, and cost-competitive products. Soitec has two manufacturing plants, R&D centers, and sales offices in Europe, the United States, and Asia.

- > **Year founded:** 1992
- > **Headcount:** 1 291
- > **Revenue:** €247 million
- > **Website:** www.soitec.com

- > **R&D project behind the product:**
Nanosmart
(French Agency for Industrial Innovation Strategic Industrial Innovation Program)
- > **Budget:**
€30 million+
(since the Nanosmart launch)
- > **Time to market:**
8 years
- > **Jobs created:**
Around **50** jobs
- > **Patents:**
150 patents filed
- > **Release date:**
2013

SOITEC

FD-SOI SUBSTRATE

An innovative silicon wafer combining energy efficiency and high performance at minimal cost



© fotolia

Product description

Soitec's FD-SOI substrate will enable the most advanced transistors in the microelectronics industry. FD-SOI, ideal for mobile applications, delivers high performance, ultra-low power consumption, and reliability—all at a competitive cost.

Given FD-SOI's low power consumption and high reliability, Soitec is currently marketing the product mainly to the IoT and automotive industries. The product is also particularly well-suited to the high-performance, low-power processors used in low-end smartphones and tablets.

What makes FD-SOI wafers so innovative is that the top and BOX layers are extremely thin and uniform. Soitec guarantees the final SOI layer's uniformity to within just a few atomic layers.

The product targets processor designers and manufacturers for consumer electronics applications.

Product history

Soitec's R&D programs have mainly focused on ultra-thin products since 2005 and have been facilitated and financed in part by French government funds to support R&D through the Nanosmart project (2006–2011) and Exact (2012–2015), a financing instrument of the French government's economic stimulus package.

Soitec partnered with Leti and major industrial partners like IBM and STMicroelectronics to bring its FD-SOI product line to maturity. FD-SOI is gaining traction with manufacturers: Samsung chose 28 nm FD-SOI in 2014; and Global Foundries began running 22 nm and 12 nm FD-SOI in 2015 and 2016, respectively.

The first consumer product built on FD-SOI technology was released on the Chinese market in 2016: the Amazfit smart sports watch manufactured by Huami (a partner of Xiaomi). The watch is equipped with a GPS chip etched on FD-SOI for record-breaking energy efficiency. The chip's technology enables an unrivalled battery life of 35 hours with the GPS activated—twice the maximum battery life of 16 hours promised by similar products.

Company

Soitec is one of the world's leading manufacturers of innovative semiconductor materials for the electronics industry. The company boasts a portfolio of more than 3,000 patents and has implemented an ambitious innovation strategy to bring its customers high-performance, energy-efficient, and cost-competitive products. Soitec has two manufacturing plants, R&D centers, and sales offices in Europe, the United States, and Asia.

- > **Year founded:** 1992
- > **Headcount:** 900
- > **Revenue:** €233 million
- > **Website:** www.soitec.com

- > **R&D project behind the product:**
Nanosmart (French Agency for Industrial Innovation Strategic Industrial Innovation Program)
- > **Budget:**
More than **€50 million**
- > **Time to market:**
7 years
- > **Jobs created:**
400 jobs
- > **Patents:**
150 patents filed
- > **Release date:**
2012

TERRADONA CLIINK

Cliiink smart recycling container solution



Product description

The goal is to develop a proof-of-concept prototype that uses low-cost technologies and minimal energy. It will take the form of a self-contained unit that can then be integrated into recycling containers, where it would detect and identify waste, count the number of items, and estimate the size of the items.

The project objectives are a complete prototype for glass and proof-of-concept for paper.

Product history

Terradona, Leti, and four engineering firms worked together to develop a truly unique material characterization system capable of transforming our recycling bins into smart robots.

This innovative material recognition system immediately identifies items placed inside a recycling container. Put an end to paper in the glass recycling bin once and for all!

The result is enhanced sorting of all recyclables through positive behavioral reinforcement each time someone places the right waste in the right bin.

The solution is designed to be practical and space-saving. It does not require the purchase of new bins and can be used with your existing bins. A universal sensor identifies, counts, and estimates the volume of recyclables for optimal waste management.

Company

Terradona specializes in solutions for sustainable development and circular economies, designing and implementing innovative waste-management systems for local governments, businesses, and private individuals. The company is focusing on smart sorting solutions for waste recycling to help transform waste into resources and encourage all stakeholders to get involved. Terradona's future is one where smart cities reward citizens for doing their part.

- > **Year founded:** 2013
- > **Headcount:** 5
- > **Website:** www.terradona.com
www.cliiink.com

- > Project financed by the **IRT Nanoelec Easytech program**, administered by Minalogic
- > Developed in conjunction with CEA
- > **Budget:**
 - R&D: **€600K**
 - Industrial transfer: **€250K**
 - Commercialization: **€750K**
- > **Time to market:** **2,5** years
- > **Jobs created:** **5** jobs
- > **Revenue:** 2016: **€1.8 million** (expected)
- > **Patents:** **3** patents filed
- > **Release date:** April 2016

TPL SYSTEMES

THE BIRDY-TETRA PAGER

Dual-mode TETRA/GPRS pager

Product description

The Birdy-Tetra pager is a system that sends alerts to on-call emergency response and maintenance workers.

It is the only dual-mode TETRA/GPRS pager in the world.

The target markets are:

- Emergency services (fire, police, and emergency medical)

- Industry

The pagers would be used by on-call personnel.

Product history

With the support of Minalogic, TPL Systemes was able to work with Leti on making improvements to and integrating the miniaturized antennas. Without Leti, TPL Systemes would not have been able to complete this project.

Company

TPL Systemes designs radio communications and alert systems for emergency services (fire, police, and emergency medical).

- > **Year founded:** 1989
- > **Headcount:** 49
- > **Revenue:** €18 million
- > **Website:** www.tplsystemes.com

- > Project financed by the **IRT Nanoelec Easytech program**, administered by Minalogic
- > Developed in conjunction with CEA DSIS
- > **Revenue generated:** **€253 K**
- > **Release date:** February 2013

Products

COMPANY NAME · PRODUCT NAME

ADEUNIS RF · SELF-POWERING SENSOR	10	EVEON · INTUITY® JECT	56
ADIXEN VACUUM PRODUCTS · A204H	12	GORGY TIMING · SCPTIME	58
AIM · IO32 DEVTOOLS	14	GROUPE BRUNET · E-NA	60
ALPWISE · BLUETOOTH LOW ENERGY PROGRAM	16	HAP2U · HAP2U	62
APIX ANALYTICS · CHROMPIX	18	HFI HAUTE FRÉQUENCE INGÉNIERIE · RF 800Z	64
APIX ANALYTICS · GCAP-MIGAS	20	IRLYNX · IRLYNX SENSOR	66
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GRENOBLE OFFICE

MAISON MINATEC · 3, PARVIS LOUIS NÉEL · 38054 GRENOBLE CEDEX 9 · FRANCE

T : +33 4 38 78 19 47 · F : +33 4 38 78 53 94 · CONTACT@MINALOGIC.COM

SAINT-ETIENNE OFFICE

BÂTIMENT DES HAUTES TECHNOLOGIES · 20 RUE BENOÎT LAURAS · 42000 SAINT-ETIENNE · FRANCE

T : +33 4 28 07 01 75 · CONTACT@MINALOGIC.COM

LYON OFFICE

27 RUE JOANNÈS CARRET CS 80 700 · 69256 LYON CEDEX 09 · FRANCE

TEL: +33 4 78 15 00 86 · CONTACT@MINALOGIC.COM

WWW.MINALOGIC.COM



GLOBAL INNOVATION CLUSTER FOR DIGITAL TECHNOLOGIES

GRENOBLE OFFICE

Maison Minatec · 3, Parvis Louis Néel · 38054 Grenoble Cedex 9 · France
T : +33 4 38 78 19 47

SAINT-ETIENNE OFFICE

Bâtiment des Hautes technologies · 20 rue Benoît Lauras · 42000 Saint-Etienne · France
T : +33 4 28 07 01 75

LYON OFFICE

27 rue Joannès Carret CS 80 700 69256 Lyon Cedex 09 · France
T : +33 4 78 15 00 86

CONTACT@MINALOGIC.COM · WWW.MINALOGIC.COM



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