

# LFOUNDRY ANNUAL REVIEW FOR THE YEAR 2017







# 01 INTRO



# BIG CHANGES, GREAT CHALLENGES, A SHORT TIME.

**THIS IS THE SPIRIT DRIVING US TOWARD OUR NEXT SUCCESS.**

For LFoundry, 2017 has been a special year, of crucial importance from a number of points of view. On the one hand, the reorganisation of the company resulting from the acquisition on the part of SMIC presented a challenge that compelled us to reconsider our industrial identity; on the other, it allowed us to fully understand our vocation for image sensors and their applications.

The year began with the clear, challenging objective of equipping the Avezzano plant with further, alternative production capacity compared to its traditional focus on image sensors, made necessary by the growing demand from China and Asian markets.

This demand, however, then saw a sudden turnaround, and, at the same time, a strong increase in the request for image sensors on the part of our largest, long-standing customer. Therefore, we spent the second part of 2017 involved in another important company reorganisation process, undertaken in order to guarantee this long-established customer sufficient supplies to meet their growing demand for image sensors.

This process of continuous improvement allowed us to achieve an impressive result at the end of the year: SMIC assigned the Avezzano plant the "A1 Outstanding Contribution Fab" award for the significant improvement in its main operating indicators (Use, Cycle Time, Price Ranges, Costs and Line Yield) since we have been included in SMIC metrics.

Today, LFoundry is an increasingly strong candidate to become a SMIC centre of excellence for CMOS Image Sensors, and to take on the role of strategic partner of the world leaders in the application of image sensors in the automotive field.

This position has earned us an excellent reputation in the world of optoelectronics, making LFoundry an increasingly sought-after, interesting option for all players in this sector. Specifically, in the automotive sector, we have sailed through the DEKRA audit, aimed at verifying the compliance of the LFoundry quality management system with the new, increasingly specific, stringent ISO9001:2015 and IATF 16949 quality standards.

In a rapidly evolving scenario, in which it is necessary for companies to demonstrate their resilience, 2018 promises to be a year that presents a wealth of challenges, objectives and prospects.

We already know that the demand on the part of LFoundry's long-established customer will be higher than the production capacity of the Avezzano plant alone, so it will be essential to choose the direction we are to grow in: expanding the current capacity or looking for a new production facility. A further prospect and undertaking for 2018 will be the strengthening of LFoundry's reputation in the application of sensors, and this has been the focus of Research and Development efforts in recent years; market niches, such as the diagnosis of paediatric neoplasms or the study of dark matter, which for us are a matter of pride, visibility and reputation.

The main focus, however, will remain on the automotive and industrial sector: the car of the future and self-driving cars will be increasingly interconnected with the environment they will be moving in, and the technologies that will allow cars to see, diagnose and avoid danger will have an increasingly essential role to play.

Thanks to an organisation, mentality and working methodology of recognised quality, in 2018, LFoundry will be seeking to boost its reputation as one of the top players in its field, and to do so by strengthening its roots in the Abruzzo region.

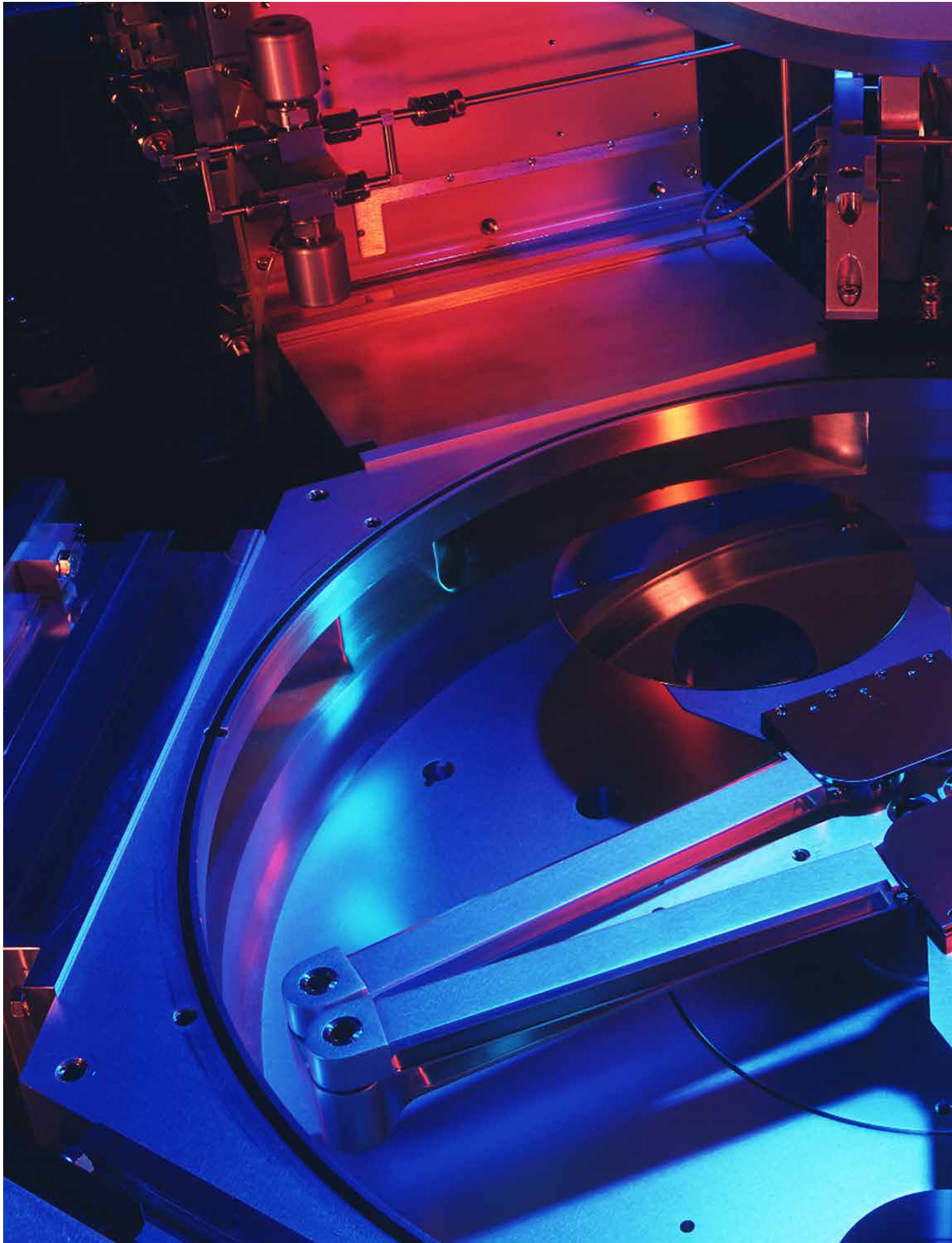
In Abruzzo, the post-earthquake reconstruction process has not focused only on repairing the area, but on relaunching it, with a view to boosting innovation and making it more attractive to talent from all over the world.

In this scenario, LFoundry seeks to be the symbol of a new development effort that the whole of Italy is called upon to take on board: skilfully balancing the quality of life in a uniquely beautiful setting with the outstanding professional skills of a technological company of international importance.

*Sergio Galbiati (Vice-Chairman)  
and Guenther Ernst (Chief Executive Officer)*

**“ TODAY, LFOUNDRY IS AN INCREASINGLY STRONG CANDIDATE TO BECOME A SMIC CENTRE OF EXCELLENCE FOR CMOS IMAGE SENSORS. ”**

**“ IT WILL BE ESSENTIAL TO CHOOSE THE DIRECTION WE ARE TO GROW IN: EXPANDING THE CURRENT CAPACITY OR LOOKING FOR A NEW PRODUCTION FACILITY. ”**







# 02 OVERVIEW

# THIS IS US

**IT IS NOT ALWAYS EASY TO EXPLAIN THE TRUE MEANING OF WHAT WE DO. IT IS INSEPARABLE FROM THE HUMAN BEING, INTERTWINED WITH THE FUTURE, INEXTRICABLY LINKED TO THE HIGHEST EXPRESSION OF MAN'S EVOLUTION.**

## OUR COMPANY

From the heart of ancient Europe, LFoundry, a SMIC majority-owned company, provides innovative solutions reaching around the world, breathing life into our customers' visions. Fully committed to finding the best solutions to satisfy every specific need, LFoundry creates innovation to bring our partners' projects to life. When it comes to transforming innovation into reality, this is what makes LFoundry a world-class player. Our leading and highly specialized foundry has an advanced 200mm manufacturing fab and proprietary technologies at 150 and 110 nm nodes, with MPW and MLM services available. We provide special capabilities and know-how for CMOS Image Sensors through CIS optimised processes down to 90nm, as well as Back Side Illumination technology. We also provide excellent technology support for Optoelectronics such as SiPM, SPAD, X-Ray, as well as for DBI Bonding (3D-Stacking) and Smart Power and a vast range of applications for the automotive, industrial, medical, security, science and space imaging industries.

## OUR PLACE

In Avezzano (AQ - Italy), LFoundry is enabling innovation worldwide. We have a continuous commitment to guaranteeing a secure environment in which our customers can realise their ideas to the highest standard, relying on LFoundry as an indispensable partner to unleash their full potential.

## OUR WORDS

These are the words we choose to name our spirit and introduce LFoundry to the world. This is what we are, where we go, what we do and how we do it. Put simply, this is us.

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# MISSION

**WE CREATE INNOVATIVE SOLUTIONS TO BRING OUR CUSTOMERS' VISION TO LIFE, SHAPING STRONG PARTNERSHIPS IN A HIGHLY SECURE ENVIRONMENT**

# VALUES

## INITIATIVE

LFoundry promotes a spirit of initiative to find high-performance solutions. Driven by creativity to create value for and with its customers, making the right decisions at the right time. Being part of SMIC a multinational company, we will foster innovation continuously and actively carry out product technology R&D, increasing productivity and optimizing work procedures.

## FAIRNESS

LFoundry takes the initiative to understand customer's needs (both internal and external) to create tailor-made solutions, establishing highly collaborative relationships and a long term win-win partnership, founded on its dignity and integrity as a partner. We will be honest, defend important principles, commit to our words, and be responsible towards how our behavior influences the company and society.

## QUALITY & SECURITY

We will conform to quality standards and carry out each task with a mindset on total employee participation, putting quality first and continual improvements. We also have a continuous commitment to guaranteeing a secure environment in which customers can realize their ideas to the highest standard, trusting in LFoundry as a valued partner to unleash their full potential.

## RESILIENCE THROUGH EXECUTION

Rooted in LFoundry's history, these factors express the concept of resilience underlining the ability to interpret the context, go across significant change and come out victorious. This value lays a strong foundation for the company to overcome the technological and circumstantial challenges of the future. Through resilience the company can adapt itself at the context, elaborating standardized processes and creating strict disciplines. We will meet our goals through rigorous planning, efficient execution, detailed follow-up, and timely problem resolution, keeping in mind the environmental changes.

## INTERDEPENDENCE

Conveys the ideas of interdependence and cooperation, specifically in the foundry-customer interrelationship, in individual work teams and between each member of Foundry's workforce. Company goals will be achieved by cooperation between disciplines, all taking the proper ownership and accountability while understanding each other's role and challenges for success. This value underlines the importance of the single parts of a larger system comprised of the foundry, its customers and its employees, simultaneously evoking their connection to the working process with a view to reaching a common goals.





**03**

**FOCUS  
2017/2018**



**SO MANY FACTS, SO MUCH INFLUENCE**  
LFOUNDRY IS MADE UP OF EVENTS, PEOPLE, PROJECTS AND NEWS. HERE IT ALL IS.

# 2018

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5

**FEBRUARY**

Inspired by the principles of responsibility, sustainability and humanism, the Hubruzzo Foundation (Responsible Industry Foundation) was born on February 5, 2018. The founding members of the Hubruzzo Foundation are LFoundry (Sergio Galbiati), Valagro (Ottorino La Rocca), Proger (Umberto Sgambati), Almacis (Enrico Marramiero), Honda Europe (Marcello Vinciguerra), Tecnomatic (Giuseppe Ranalli) e Zecca Energia (Gennaro Zecca). Sergio Galbiati, LFoundry vice Chairman, has been appointed as President of the Foundation.

# 2017

## 17

NOVEMBER

SMIC and Invensas announced the establishment of Invensas' Direct Bond Interconnect (DBI®) technology at LFoundry's Avezzano facility. This capability enables SMIC to support the growing demand for high performance, hybrid stacked backside illuminated (BSI) image sensors, as well as other semiconductor devices, in a wide range of end applications including smartphones and automobiles.

## 7

NOVEMBER

LFoundry participated in the project "AUTO 4.0 - Understanding and Achieving Automotive Training Outcomes 4.0" organized by the Automotive Innovative Pole of Abruzzo Region: a network of independent and innovative operators in the automotive system.

## 26-29

SEPTEMBER

LFoundry joined NanoInnovation 2017 - at the Faculty of Civil and Industrial Engineering, Sapienza University of Rome). NanoInnovation aims to represent the reference national event for the wide and multidisciplinary community involved in the development of nanotechnologies and in their integration with other enabling technologies (KETs) in all application fields.

# 2017

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**31**  
MAY

Was held in LAquila the workshop meeting of LIFE BITMAPS. The LIFE BITMAPS project will establish a pilot plant that will demonstrate a new and never-before attempted process for the treatment of effluents from electronics and semiconductor manufacturing.

**10**  
MAY

LFoundry developed the application of Tip Enhanced Raman Spectroscopy to real semiconductor industry devices. The application has been developed in collaboration with CNIS- Roma La Sapienza University.



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# 15-16

## MARCH

LFoundry participated in the 2017 Image Sensors Conference (15-16 March, London). Image Sensors attracts a wide range of companies from across the digital imaging supply chain.





# 04 COMMITMENT TO OUR TERRITORY



# LFOUNDRY'S CODE OF ETHICS

**ETHICAL PRINCIPLES ARE CRUCIAL DRIVERS ON OUR PATH TOWARD A SUSTAINABLE FUTURE.**

The Code of Ethics represents an unavoidable management tool for ethical conduct in business affairs, together with the rules and agreements in force in the countries where LFoundry is operating, both directly and indirectly, or through its subsidiaries and / or affiliates. The Code is also an effective element of corporate strategy and organization and is an integral part of the Organisational, Management and Control Model pursuant to Legislative Decree no. 231/01 (hereinafter the "Model").

The ethical principles inspiring LFoundry, and from which its models of conduct derive, in order to effectively and fairly compete in the market, improve the satisfaction of its customers, increase the value and develop people's skills and the professional growth are following:

- compliance with the laws
- ethics, fairness, professionalism
- impartiality
- people's honesty
- transparency and completeness of the information

All people at LFoundry, without any distinction and exception, undertake therefore to observe and enforce these principles, as part of their duties and responsibilities. This commitment requires that the persons, with whom the company is in relationship for whatever reason, act towards it according to the rules and methods based on the same values. In particular, the belief of acting to the benefit of the company shall not justify in any way behaviors that conflict with these principles.

In this scenario, LFoundry is responsible for:

- promoting propagation of the Code among the recipients so that they can contribute to improve its principles and contents
- taking into account recipients possible suggestions and observations, in order to confirm or integrate the Code
- controlling the compliance with the Code by providing

- suitable information, prevention and control tools and procedures, and ensuring the transparency of operations and behaviors, implementing corrective actions, if necessary

The verification of compliance with the Code is performed by the Supervisory Body pursuant to Legislative Decree. 231/01 of the Company (hereinafter "OdV"). Bringing such principles and conduct to life is the essential element for the responsible growth of our company, whose aim is to be one of the best examples of business ethics at international level.

LFoundry's Code of Ethics and Model of Organization, Management and Control were approved by the Board of Directors of LFoundry S.r.l. on April 29, 2014; the 2nd version of both the Code of Ethics and the Model of Organization, Management and Control were approved by the BoD of LFoundry S.r.l. on June 16, 2016.

**BRINGING THE CODE OF ETHICS PRINCIPLES AND CONDUCT TO LIFE IS THE ESSENTIAL ELEMENT FOR THE RESPONSIBLE GROWTH OF OUR COMPANY, WHOSE AIM IS TO BE ONE OF THE BEST EXAMPLES OF BUSINESS ETHICS AT INTERNATIONAL LEVEL.**

# EUROPEAN PROJECTS

**THE SEMICONDUCTOR BUSINESS HAS BEEN IDENTIFIED BY THE EUROPEAN COMMISSION AS ONE OF THE KEY ENABLING TECHNOLOGIES FOR EUROPEAN INDUSTRIAL DEVELOPMENT. LFOUNDRY CONTRIBUTES BY DEVELOPING RESEARCH PROJECTS OF EUROPEAN INTEREST THROUGH ITS PARTICIPATION IN SCHEMES LAUNCHED BY THE COMMISSION TO ADDRESS THE IDENTIFIED AREAS OF DEVELOPMENT.**

## ONGOING PROJECTS

### **PRODUCTIVE4.0 - AMBITIOUS PROJECT WITH A UNIQUE MAIN OBJECTIVE**

The main objective of Productive4.0 is to achieve improvement of digitizing the European industry by electronics and ICT.

Ultimately, the project aims at suitability for everyday application across all industrial sectors – up to TRL8. It addresses various industrial domains with one single approach of digitalization.

What makes the project unique is the holistic system approach of consistently focusing on the three main pillars: digital automation, supply chain networks and product lifecycle management, all of which interact and influence each other. This is part of the new concept of introducing seamless automation and network solutions as well as enhancing the transparency of data, their consistence and overall efficiency. Currently, such a complex project can only be realized in ECSEL.

### **LIFE-BITMAPS - pilot Technology for Aerobic Biodegradation of Spent Tmah photoresist Solution In Semiconductor Industries**

The LIFE BITMAPS project will establish a pilot plant to demonstrate a new and never-before attempted process for the treatment of effluents from electronics and semiconductor manufacturing. The project will contribute to the implementation of the EU Water Framework Directive 2000/60/EC by introducing more efficient treatment technologies to help reduce Tetramethylammonium hydroxide (TMAH) pollution at source. By recycling wastewater, it will also demonstrate the practical application of the circular economy priority of water reuse and savings in industrial processes.

### **SUPERTWIN - All Solid-State Super-Twinning photon Microscope**

The goal of this project is to develop the technology foundation for advanced optical microscope imaging at a resolution beyond the Rayleigh limit, utilizing super-twinning

photon states (N-partite entangled states) with de Broglie wavelength at a fraction of the wavelength of a photon in a classical state.

### **NanoStreeM - NANOmaterials: Strategies for Safety Assessments in Advanced Integrated Circuits Manufacturing**

The purpose of this project is to promote best practices (for example, by following up standards) and identify gaps in methodologies and potential directions for further investigation to support risk assessment in order to protect human health. The project also aims to initiate communication with stakeholders to support informed decision making and the governance of risks related to the handling of nanomaterials and medical surveillance of the workforce in the semiconductor fabrication process.

## CLOSED PROJECTS

### **INTEGRATE - Integrated Solutions for Agile Manufacturing in High-mix Semiconductor Fabs**

INTEGRATE will consider the development of integrated process control and equipment control optimization tools, together with advanced lot flow control techniques that interact with lower and upper decisions levels but also consider various elements of the fab.

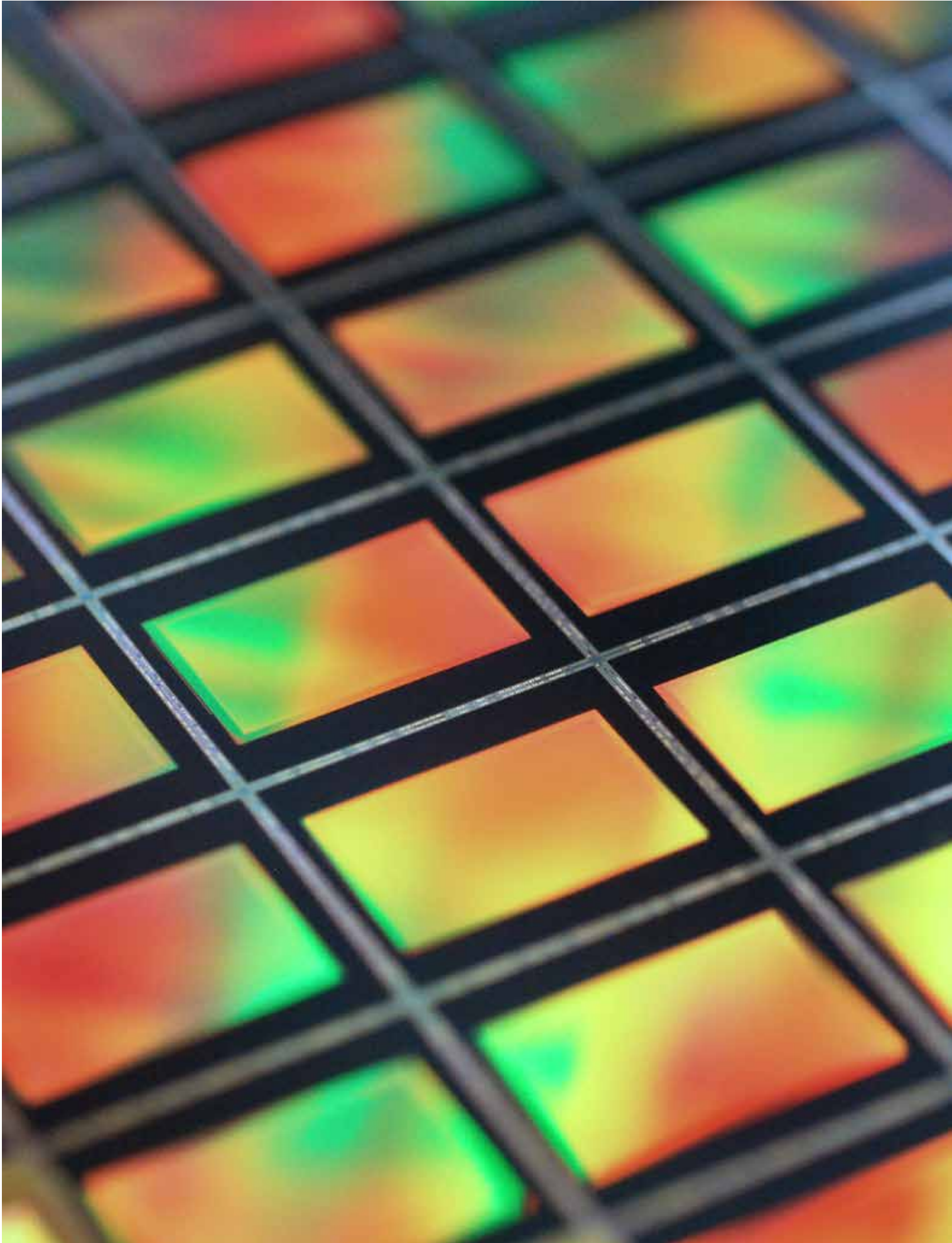
### **SILVER - Semiconductor Industry Leading towards Viable Energy Recovery**

The objective of the SILVER project is the design, development and assessment of innovative and comprehensive approaches to reduce the environmental impact of existing semiconductor manufacturing. The project will focus on the development of innovative solutions for the reduction of water and energy consumption.

### **LASSIE-FP7 - Large Area Solid State Intelligent Efficient Luminaires**

The main objective of the LASSIE-FP7 project is to implement large-area and low-cost intelligent SSL modules with high efficiency and high lighting quality, while assessing environmental impact throughout their life cyc.







# 05

## FINANCIAL DATA

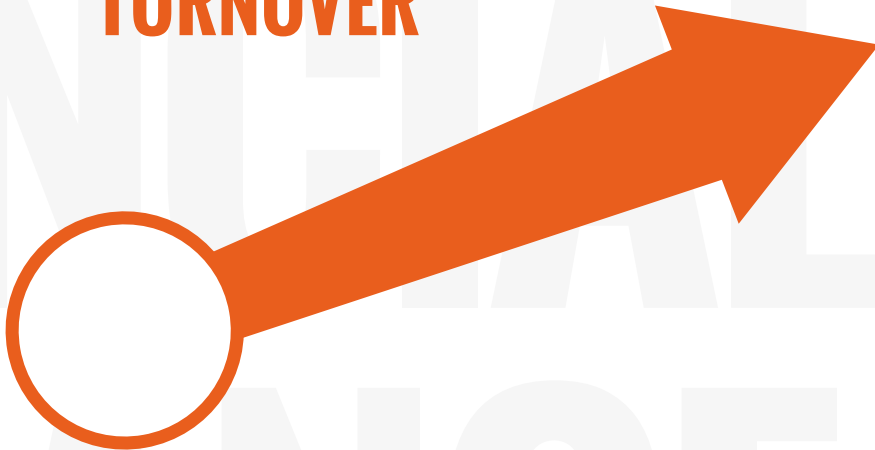
# 2017

**THE PROJECTED PERFORMANCE AS FORECAST IN THE CORPORATE BUSINESS PLAN WAS GREATLY SATISFIED IN WHAT HAS BEEN A YEAR OF TURNOVER GROWTH FOR LFOUNDRY.**

**TURNOVER**

**ACTUAL DATA**

**+5,7%**



**GUIDELINE**

IDRY  
FINANCIAL  
MANAGEMENT  
YEAR 2015







# 06 PEOPLE

# HR & CORPORATE AFFAIRS: ACCOMPLISHMENTS AND FUTURE CHALLENGES

## 2017 ACCOMPLISHMENTS

The world evolves day by day. What it is true today, can be obsolescent tomorrow. The practice that we use today, can be not anymore updated tomorrow. That's the reason why we use a continuous learning approach at LFoundry that, on 2017, has involved two key aspects of the organization, leadership and technical competencies.

All our leaders could enjoy a program held by external advisors aimed to give new ideas on the matter concerning how to make more efficient the relations among individuals, with a focus on the working environment. The continuous learning on this subject will help us to keep the engagement of LF employees to a fairly high level: indeed a research carried out with the IULM University of Milan has shown that the engagement of LF employees is very good. Based on the output, it looks like that one of the key elements pushing high the engagement is the quality of relationships between peers and supervisors. Moreover thanks to Industrial Relations effort we also have an agreement of a profit sharing contract based on goals achievement.

In parallel we have formalized the 2018 training plan, aimed to keep the technical competencies of our organization at the leading edge.

The Industrial Relations have had a boost, thanks to the bargaining and agreement of a profit sharing contract based on goals achievement. The agreement has a validity of three years with an annual review of outcome and goals.

Another important fact is about an amendment on the so-called "arduous works", as defined by the Italian law. This amendment, achieved thanks to the proactive work of the Unions and approved by the Italian Parliament, allows

also the shift workers of LFoundry to anticipate the retirement, upon the satisfaction of some conditions about the length of time worked on shift and the number of nights actually worked annually.

We have directly involved more than 700 people on several activities aimed to identify improvement area on important topics for the company like the leadership practice, the development plans, the motivation and communication and many more. The outcomes are the fundamentals for some of the activities already addressed on 2017. Some more will be addressed on 2018.

Since the changes on the corporate governance we had on 2016, we have reviewed our employer value proposition and we have also investigated about the individual value proposition, by auditing both LF employees and students at the end of their studies at the University. Scientific models have been used to analyze the data, thanks to collaborations with relevant Universities.

We continue our big effort in funding R&D and training programs by leveraging on European, National and Regional programs. On 2017 we had a couple of projects of research-development-innovation approved, one by the ECSEL JU (joint undertaking) and the other one from Regione Abruzzo. Both are collaborative projects, meaning that we are part of a consortium.

Also we are part of the core team to establish a so-called European Important Project of Common Interest focused on Microelectronics. Companies and RTOs of 4 members states, namely France, Germany, Italy and UK, are part of the team. A big effort has been conducted on hiring activities, covering 52 internal and external hiring. Moreover in 2017 LFoundry

welcomed around 100 students coming from Avezzano, L'Aquila and Sulmona for periods of learning in a work situation, within a ministerial program called "school-work alternation". We are pleased to continue to work with the educational world, as the youngsters, with their enthusiasm and desire to learn, represent the best guarantee for our future.

## 2018 CHALLENGES

HR department can provide a pivotal contribution in order to face future challenges, setting proper policies concerning several topics directly linked to the overall people management. Identifying talents and managing their careers, formalizing and strengthening the pivotal technical and managerial skills, recognizing the overall company's achievement and contribution of the best performers will be part of the activity of HR on 2018, jointly with the rest of the organization.

The participation to public tenders aimed to provide incentives to Research-Development-Innovation (RDI) activities is a way to support the strategy of the company while optimizing the cost of RDI in technology.

On 2018 we plan to participate to H2020 and ECSEL calls in Europe and to some tenders expected from the relevant Italian Ministries, namely the Ministry of the Economic Development and the Ministry of the Research.

To improve further the people's engagement and to be more and more effective in attracting new talents, we plan to communicate our Employee Value Proposition (EVP). Working at LFoundry means contributing to innovation in the world and to technological and social growth in Europe,

at the same time being aware that environmental sustainability and responsibility towards the territory are two important aspects of our daily live. We'll support this communication effort also with a corporate video that will be ready soon.

One of the most important end-user markets for our technology solutions is the automotive segment.

Car companies are developing more and more Advanced Driver Assistance Systems (ADAS) to improve driving comfort and to build safer cars and roads in order to drastically reduce the number of road accidents.

To implement ADAS, cars need to have many different optical sensors. In order to create employees awareness and increase sense of responsibility about the impact of our work on the final users, an event about ADAS systems will be organized. The event "We drive the future" aims to represent a meeting point of our stakeholders to explore the new frontiers of the ADAS world and to illustrate potential developments.

Finally, new corporate values were defined. In order to make the values transparent and explicit inside the organization, a new assessment model of organizational behaviors will be implemented. The model is based on adherence to the values of the company by all LFoundry employees. The objective is to put the values at the center of every business decision, transforming the strategy into daily action also aligned with the company's code of ethics. We call this kind of evaluation: citizenship appraisal.







# 07

## EHSS

ENVIRONMENT, HEALTH, SAFETY & SECURITY



# CORPORATE SOCIAL RESPONSIBILITY

**BEING A LEADING COMPANY MEANS BEING AN EXAMPLE TO THE WORLD WE LEAD.**

## HEALTH AND SAFETY

The Occupational Health and Safety (OHS) Management System, established at LFoundry according to standard OHSAS 18001:2007 is periodically audited and recertified by a Third Party. The company's performance in these disciplines demonstrates the effectiveness of the preventive and protective measures we adopt to safeguard and protect employees, visitors and contractors from occupational risks as well as those risks associated to any emergencies.

## SECURITY

According to the contents of its security policy, the Security Management System in LFoundry is intended to "safeguard people, information, goods and business continuity, guaranteeing an environment that infuses trust to investors, suppliers and customers." LFoundry is deeply committed to the protection of the Confidentiality, Integrity and Availability of Information, Goods, Processes, Materials and Products. Its aim is to reach this goal through the suitable use of technologies, methods, and trained personnel.

In order to reach and keep this goal LFoundry is involved in a Site Security Certification process, in accordance with the standard ISO 15408.

This certification path is under the control of the Italian Body for Security Certification (OCSI: Organismo di Certificazione della Sicurezza Informatica: under the MISE (Italian Ministry for Economic Development).

The plan for LFoundry is to reach an EAL5+ level certification. When success is achieved, we will be the first Italian company to be awarded this certification level.

## ENVIRONMENT

The Environmental Management System established at LFoundry according to standard DIN ISO 14001:2015 is periodically audited and recertified by a Third Party; this demonstrates the effectiveness of the systems and methods we adopt as well as the continuous commitment to the environment as proof of our consistent compliance with regulations and the achievement of significant results in reducing the use of natural resources, energy consumption, raw materials and chemicals, waste disposal and employee transportation. LFoundry's commitment to environmental

sustainability is further demonstrated by the implementation of the IECQ QC 080000 Hazardous Substance Process Management (HSPM) system, aiming to minimize or eliminate hazardous substances from the products supplied to our customers.

According to standard DIN ISO 14001:2015 and European and National environmental policies, LFoundry strives for environmental improvement and the sustainable use of waste and secondary raw materials, in order to prevent the depletion of natural resources.

This is the case of sulfuric acid solution (H<sub>2</sub>SO<sub>4</sub> 70%wt), a raw material widely used in the manufacture of semiconductors, for the cleaning process, recovered from industrial water and sent for recycling, and put on the market as secondary raw material. The total quantity of recovered acid at this stage is about 80 tons/year.

## ENERGY

Energy Management plays a key role in supporting our plans to maximize profitability, strengthen our competitive position and provide customers with the highest quality products through the implementation of Best Key Methods (BKM). This has allowed LFoundry to become a benchmark company in terms of the rational use of energy, increasing the efficiency of energy production and utilization and the process management of the main sources of energy through a solid management of conventional and innovative activities and projects, while maintaining the conformity with laws and codes. The energy screening performed by LFoundry in compliance with the guide UNI CEI 16247, strives to:

- maximize its energy performance, reducing operating expenses and increasing shareholder value by actively and responsibly managing energy consumption;
- demonstrate commitment to our community and leadership in our industry, by reducing the environmental impacts associated to energy use
- identify strategic projects to achieve our energy management mission. A strategic project of a new cogeneration plant will allow us to reduce the gas consumption of 25% and will improve the environmental impact based on a reduction of more than 20% in terms of NO<sub>x</sub> and CO<sub>2</sub> annual quantity.

- supply the Gas plant utilities by our cogeneration will be totally implemented. Cost Savings ~,500,000 €/year

Based on the Kyoto protocol, the National Electricity and Gas Authority has developed a mechanism to incentivize energy efficiency activities to achieve the energy saving targets based on the European agreement (2020). The following energy saving projects have been funded in 2017:

- Fab efficiency
  - Phase 1: 1.018 k€
  - Phase 2: 1.018 k€
- Energy tax reduction due to the qualification of Energy Intensive Manufacturing Plant ~,820 k€

## WASTE MANAGEMENT

Waste is one of the focal areas of the LFoundry environmental policy. Semiconductor manufacture generates a large amount of hazardous and non-hazardous waste that contributes to environmental pollution, as well as resulting in costs for correct disposal. In order to effectively address the above issues, LFoundry coordinates a Consortium including other companies and the University of l'Aquila, focused on the LIFE BITMAPS project funded by the European Community. The main objective of LIFE BITMAPS is to demonstrate a viable industrial solution for the aerobic biodegradation of TMAH (Tetra- Metyl Ammonium Hydroxide) which is a hazardous substance used in the Photolithography process. The project began in July 2016 and will be completed by December 2018. Total Budget of the LIFE BITMAPS project: € 1,676,923.00; EU contribution: € 1,003,753.00

## WATER MANAGEMENT

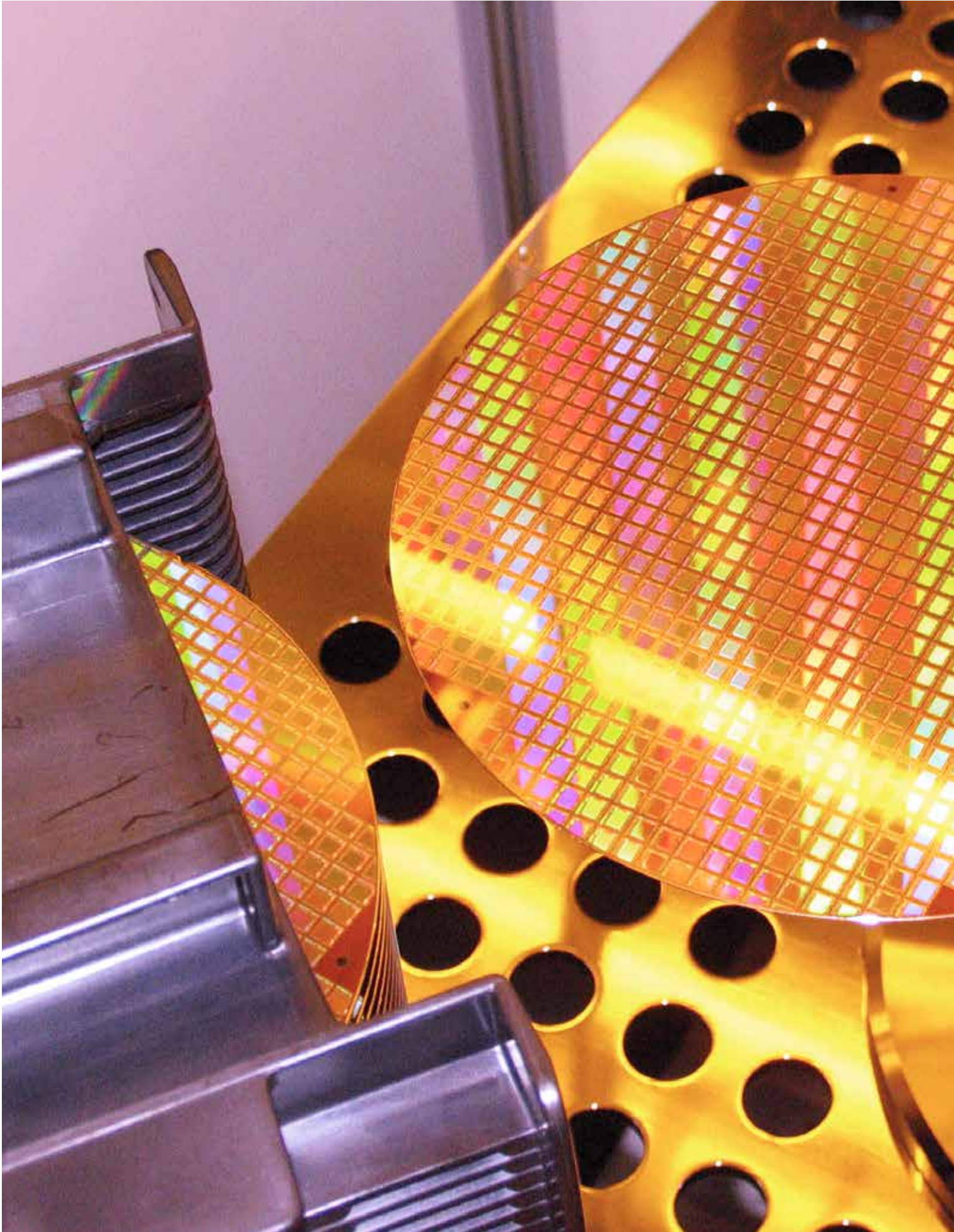
Water is a key resource for semiconductor production. A large amount of ultrapure water is needed to run a production Fab, and same quantity is released as waste water at the end of the production cycle. LFoundry is actively investigating a solution to improve water usage efficiency, to reduce input needs at the facility, as well as aiming to release less polluted output water for the benefit of the environment. In order to effectively address the reduction of water consumption, the LIFE BITMAPS project funded by the European Community has included as additional objective:

recycling of the main waste water stream at the Avezzano Wafer Fab.

## MAJOR ACCIDENTS

The company complies to a dedicated Policy for the prevention of Major Accidents as defined by the "Seveso" Directive 2012/18/EU which applies to the Plant in Avezzano. This Policy is fulfilled by implementing the Environmental and Health & Safety Management Systems and guaranteeing a continuous improvement program to conduct operations as well as maintain and design our systems and plants. The vulnerability of the plants and structures to earthquakes and landslides identified as possible scenarios for Major Incidents at the Avezzano site were evaluated during 2016. It was assessed that landslides cannot be the root cause for a Major Incident, while an improvement plan according to current technical standards was approved to eliminate the possible effects due to earthquakes.









# 08 QUALITY

# QUALITY CULTURE

## MOVING FORWARD

## QUALITY CULTURE

LFoundry has made own the Quality Management principles of ISO 9000 and of IATF 16949 for automotive market to foster quality culture across all over the organization.

Customer focus, leadership, engagement of people, process approach, improvement, evidence-based decision making, relation management are considered the pillars to continuously improve our Quality management systems.

The restless focus on continuous improvement of our processes and our customer's product, the compliance to multiple quality standards, have contributed to strengthen the awareness of the organization to put customer at the first place and better understand its needs, striving to anticipate future ones.

Quality culture inside LFoundry makes the contribute of each single team member valuable for the customer, that is deemed key to the organization's future.

## PRODUCTS FOR SAFETY APPLICATION

The future is becoming closer and electronic devices are enabling the evolution of solutions to increase our safety and our comfort up to replacement of human decision making process in situation of risk.

Autonomous drive may be considered the most evident example, but it only the peak of the iceberg: several applications are currently available in our cars to prevent safety incidents.

We partner with our customer to ensure a safe future thanks to high quality and reliable electronic device. for safety application.

Zero defect has never been more real and urgent in the industry.

Starting from safe launch of new product we keep on striving more and more to reduce any potential failure and any defect in our production line.

We are strengthening our processes to challenge our quality performance and further advance our new requirements: all our best practice keeps on evolving to ensure:

- the most effective management systems,
- safe launch of technology and products
- fully automated production environment to prevent process deviation and detect product anomalies
- steadfast application of the best methodologies and quality tools

## THE CONTRIBUTION OF OUR TEAM

The constant tension toward the excellence is possible only thanks to our team members.

Their ability to understand at any level the needs of our customer and to develop the competencies required to develop new solutions to fulfill them is key for our success.

Organizational knowledge, competence, awareness and communication are considered as key factors for the people engagement and make them work as a team towards common objectives.

## THE QUALITY YOU NEED

Our expertise and technology is bringing us in leadership position for customized process solutions.

We provide processes for high quality application with proven and consolidated expertise in CMOS image sensor manufacturing and newly developed solutions for the OPTO+ marked.

## LFOUNDRY QUALITY MANAGEMENT SYSTEM

- WE HAVE BEEN CERTIFIED ISO 9001 SINCE 1994. WE HAVE SUCCESSFULLY HOSTED CERTIFICATION AUDIT IN JANUARY 2018 TO MIGRATE TO NEW REVISED STANDARD (ISO 9001:2015)
- WE HAVE BEEN CERTIFIED ISO TS 16949 SINCE 2009 AS FOUNDATION OF OUR EXCELLENCE IN AUTOMOTIVE MARKET. WE HAVE SUCCESSFULLY HOSTED CERTIFICATION AUDIT IN JANUARY 2018 TO MIGRATE TO IATF 16949 STANDARD

- WE HAVE BEEN CERTIFIED ISO TL9000 FOR THE TELECOMMUNICATION INDUSTRY IN 2017. WE HAVE SUCCESSFULLY HOSTED CERTIFICATION AUDIT IN FEBRUARY 2018 TO MIGRATE TO NEW REVISED STANDARD (V.6.1/5.5)

## SAFE LAUNCH OF TECHNOLOGY AND PRODUCTS

- PROPRIETARY TECHNOLOGY PROCESS QUALIFICATION STRATEGY ACCORDING TO JEDEC JP-001 AND AEC-Q-100-REVG (AUTOMOTIVE ELECTRONICS COUNCIL)
- STAGE AND GATE NEW PRODUCT INTRODUCTION ACCORDING TO APQP METHODOLOGY

## FULLY AUTOMATED PRODUCTION ENVIRONMENT TO PREVENT PROCESS DEVIATION AND DETECT PRODUCT ANOMALIES

- ELECTRONIC CONTROL PLAN (PAPERLESS) AUTOMATED PROCESS CONTROL ARCHITECTURE
- REAL TIME SPC SYSTEM FOR CONTROLLING CRITICAL INLINE PARAMETERS
- FDC (FAULT DETECTION AND CLASSIFICATION) TOOLS TO DETECT PROCESS VARIATIONS
- APC (ADVANCED PROCESS CONTROL AND AUTOMATIC ADJUSTMENTS) TO REDUCE PROCESS VARIATIONS
- OCAP TREATMENT AND DOCUMENTATION, INCLUDING NON-CONFORMING PRODUCT SEGREGATION
- QUALITY CHECKS FOR PRODUCTION EQUIPMENT AUTOMATICALLY CONTROLLED BY STRUCTURED QC MODELS
- SAFE PROCESS RECIPE MANAGEMENT

- FULLY AUTOMATED POKA YOKE TOOLS TO PREVENT MISPROCESSES AND MIS-OPERATION
- ELECTRONIC IDENTIFICATION AND TRACEABILITY OF THE MANUFACTURED PRODUCT
- INFRASTRUCTURE SECURITY

## ADVANCED ANALYTICS FOR EARLY DETECTION AND FAILURE ANALYSIS

- STRUCTURED MONITORING AND ANALYSIS OF THE MANUFACTURING PROCESSES AND OF THE PRODUCT PERFORMANCE
- DATA MINING
- STRUCTURED YIELD MANAGEMENT
- FAILURE ANALYSIS, PRODUCT AND ANALYTICS LABS

## STEADFAST APPLICATION OF THE BEST METHODOLOGIES AND QUALITY TOOLS

- RISK ANALYSIS AND RISK MANAGEMENT PLANNING
- ADVANCED PRODUCT QUALITY PLANNING (APQP)
- PRODUCTION PART APPROVAL PROCESS (PPAP)
- LIFE CYCLE MODEL
- CULTURE OF PREVENTION AND OF IMPROVEMENT
- LEARNING FROM PROBLEMS VALUING FEEDBACK FROM OUR CUSTOMERS AS A CRITICAL INPUT FOR OUR LEARNING CYCLE
- BUSINESS CONTINUITY
- STRUCTURED MONITORING AND ANALYSIS OF THE QMS PROCESSES KEY PROCESS INDICATORS





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