

# LFOUNDRY ANNUAL REVIEW FOR THE YEAR 2015





# 01 INTRO





# BIG CHANGES, GREAT CHALLENGES, A SHORT TIME.

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

The three years that have passed since we set off on this journey together are, by any normal measure, a relatively short period of time but, as we all know, the innovation arena is not one that advances according to any normal measure. Anyone seeking proof of how rapidly and profoundly change has swept through the semiconductor industry need look no further than LFoundry's history since its formation in May 2013. From the onset, we have faced considerable odds and uncertainties, but always with a clear vision of where we wanted to be and steadfast determination to get there. Although the future holds many challenges, we can now take a moment to look back down the path we have walked and take pride in having finally passed the half-way mark. The road ahead is opening up, and with each step our destination comes a little more sharply into focus.

Specifically, the past twelve months have seen the consolidation of our relevance in the imaging business and a competitive position that continues to retain its significant critical mass. And another milestone on the road to becoming a truly successful foundry was reached in 2015: we proved we can fully and reliably implement new technology platforms for our customers to build their applications, thus cementing our position as a key partner to exceptional mid-size players like Aptina Imaging Corporation – recently acquired by industry giant ON Semiconductor. Admittedly, it has taken longer than we expected, but now this key asset is fixed in place we are moving fast to complement it with subsequent platforms and extended features to our IP range. The flip side is that we are seeing just how long it takes to convert this into commercial leverage, but fortunately ON Semiconductor's newly acquired business scale and status as a world-renown player of absolute excellence has allowed LFoundry the breathing space it needs to mature.

All this in a year in which LFoundry's core values have been increasingly reflected in every aspect of our developing activities. We owe a great deal of the resilience that has brought us this far down the road to the initiative and fairness which guides our practices in all facets of the business, coupled with the fact that we recognise both the interdependency of

the players we work with and how our connected roles create mutually beneficial value within the secure and conducive business environment that LFoundry provides.

Without doubt, LFoundry has come a long way in the past twelve months, but the year ahead will be our true test case: profitability in 2016 will prove our success. Our immediate goal is to achieve real diversification in our sales channel, and not – as currently stands – only through our technology portfolio. At the same time, we need to grow in order to optimise our scale, but we must do so with a disciplined management of costs. To make sure this happens, we have to draw on our own resources while we establish the optimal level of manufacturing capacity, investing in R&D at a more sustainable rate while in the short term speeding up the commercial deployment of our 2015 R&D effort. On top of all that, I envision an acceleration in our exploration for partnerships to push forward inorganic growth.

While dealing with the challenges ahead, we will continue to be a key partner to ON Semiconductor, a world leader in the imaging business where expected growth continues to be among the strongest in the whole semiconductor industry. Moving forward, our ambition is to be a serious player in many of the key trends of the so-called More Than Moore arena. We are currently seeing accelerated consolidation in the industry due to the sheer scale of the resources required to cultivate innovation and maintain production capacity. The size threshold necessary to stay in the game is increasing at a rate for which organic growth is insufficient for almost all but the top three or four players. We will have to be creative in order to continue to be relevant and ensure prosperous longevity to our expanded team.

But then again, our track record shows that creativity in the face of challenge is what LFoundry does best.

So all in all, we look forward to another exciting and rewarding year.

*Sergio Galbiati, Chairman & CFO*

**“ ALTHOUGH THE FUTURE HOLDS MANY CHALLENGES, WE CAN NOW TAKE A MOMENT TO LOOK BACK DOWN THE PATH WE HAVE WALKED AND TAKE PRIDE IN HAVING FINALLY PASSED THE HALF-WAY MARK. THE ROAD AHEAD IS OPENING UP, AND WITH EACH STEP OUR DESTINATION COMES A LITTLE MORE SHARPLY INTO FOCUS. ”**

**“ WITHOUT DOUBT, LFOUNDRY HAS COME A LONG WAY IN THE PAST TWELVE MONTHS, BUT THE YEAR AHEAD WILL BE OUR TRUE TEST CASE: PROFITABILITY IN 2016 WILL PROVE OUR SUCCESS. ”**

# 2015: 365 DAYS TO EXPAND OUR WORLD

**NEW PRODUCTS, NEW COUNTRIES, NEW PARTNERSHIPS: WE ARE READY TO GROW.**

As we speak, LFoundry is currently completing the first phase of its transformation from a captive fabrication Integrated Device Manufacturer into a leading foundry that succeeds in being both highly specialised and inherently diverse. Crucially, 2016 marks a new era of development as our strategic roadmap has now been validated and approved and our technology portfolio offering is being released to market. LFoundry's core principles are ensuring that each and every customer receives maximum value through reliable, fast and flexible manufacturing and development services. Consequently, our key customers are escalating production, and sales activities are being ramped up.

LFoundry's presence in image sensor, analog-mixed-signal, microcontroller, and power and sensor markets continues to spread internationally. Having successfully broken into Japan and the US in the last few years, we are now beginning to extend our activities into Asia - particularly in IoT, imaging, touch display and MCU markets.

These developments follow on from what has been a formative year for LFoundry. In 2015, we successfully launched new products for the single largest existing customer in the image sensor market. In terms of diversification, the first products to feature our differentiating 110nm eFlash technology for secure applications were rolled out, putting our very own image sensor technology at centre stage. Compared to the previous year, both FAB loading and revenue increased by as much as 15%.

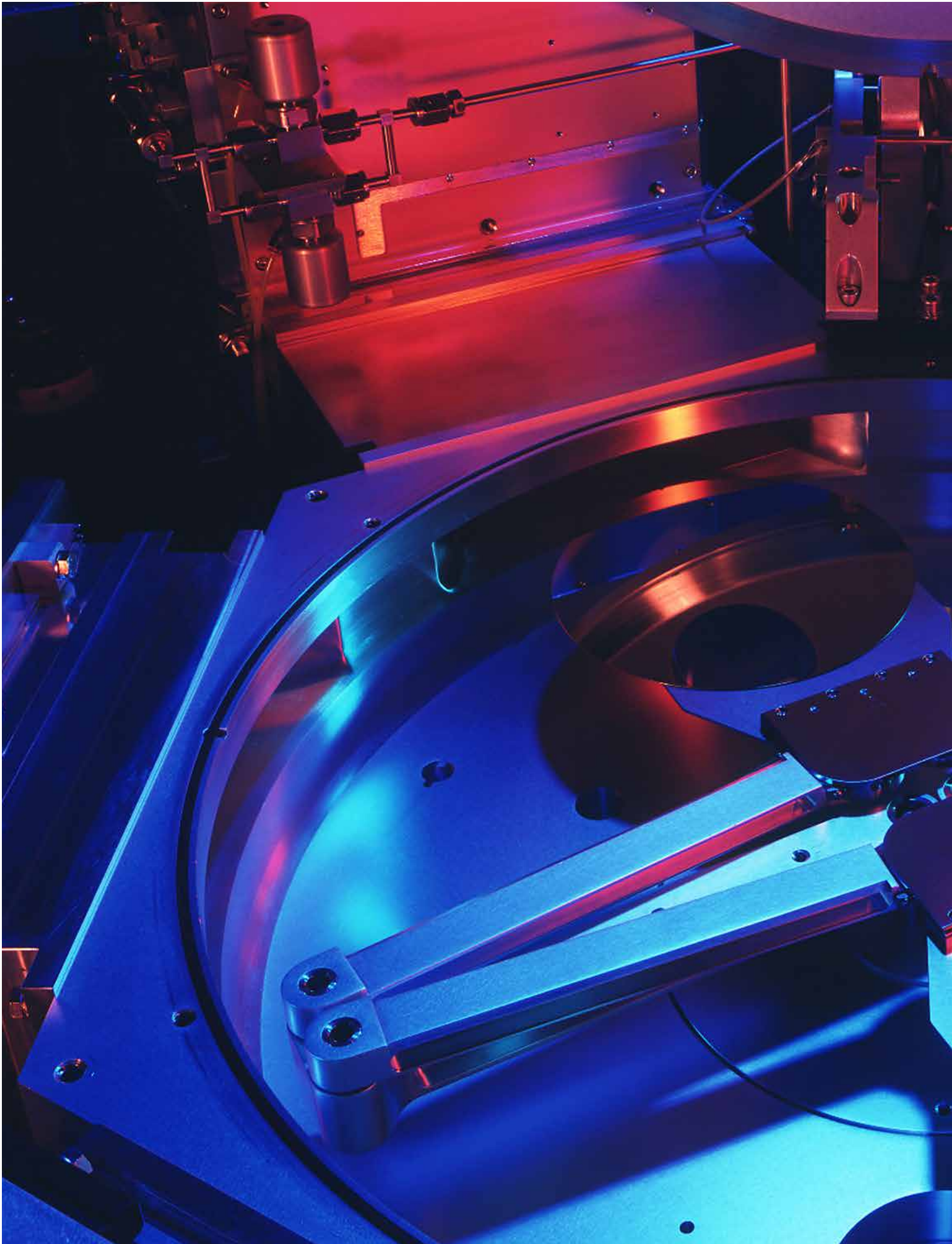
A pivotal year, 2016 will see the release of technology solutions that form the very heart of LFoundry's roadmap, enabling us to gain momentum in the foundry market while continuing to develop new and differentiated features for our recently set-up technology platforms. Among our main goals for this year is to expand capacity through strategic partnerships, allowing us to extend our customer base and fully deploy our developed tech platforms to the addressable market at a far superior volume to our current capacity offering. Furthermore, an extensive cost reduction program will be initiated in order to meet our targets for GM and net profit.

The future will also see further investment in Avezzano, allowing LFoundry to run a more diversified product mix. In addition, dedicated capital expenditure investments will allow us to maximise our output. While tech development will naturally remain a high priority, additional investment will update our cogeneration plant in line with Italian and European environmental regulations. Access to external fabrication plants is a critical factor for LFoundry's growth strategy and will enable us to acquire bigger customers. To this end, a significant investment is on the cards within the next year.

It looks like the year ahead will once again be filled with exciting prospects and memorable achievements for LFoundry.

*Günther Ernst, CEO & CMO*

**“ IN 2015,  
WE SUCCESSFULLY  
LAUNCHED NEW  
PRODUCTS FOR THE  
SINGLE LARGEST  
EXISTING CUSTOMER  
IN THE IMAGE SENSOR  
MARKET. COMPARED TO  
THE PREVIOUS YEAR,  
BOTH FAB LOADING AND  
REVENUE INCREASED BY  
AS MUCH AS 15%. ”**





# 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 provides innovative solutions that reach all around the world, breathing life into our customers' visions. Fully committed to finding the best solutions to satisfy every specific necessity, 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 specialised foundry has an advanced 200 mm 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 90 nm, as well as Back Side Illumination technology, Secure Microcontrollers, Smart Power, and CMOS-MEMS Integration.

## 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.

---

# MISSION

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

# VALUES

## RESILIENCE

Resilience expresses the ability to go up against significant change and come out victorious. Rooted in LFoundry's history, this value lays a strong foundation for the company to overcome the technological and circumstantial challenges of the future.

## 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.

## FAIRNESS

LFoundry works alongside its customers to create tailor-made solutions, establishing highly collaborative relationships founded on its dignity and integrity as a technology partner.

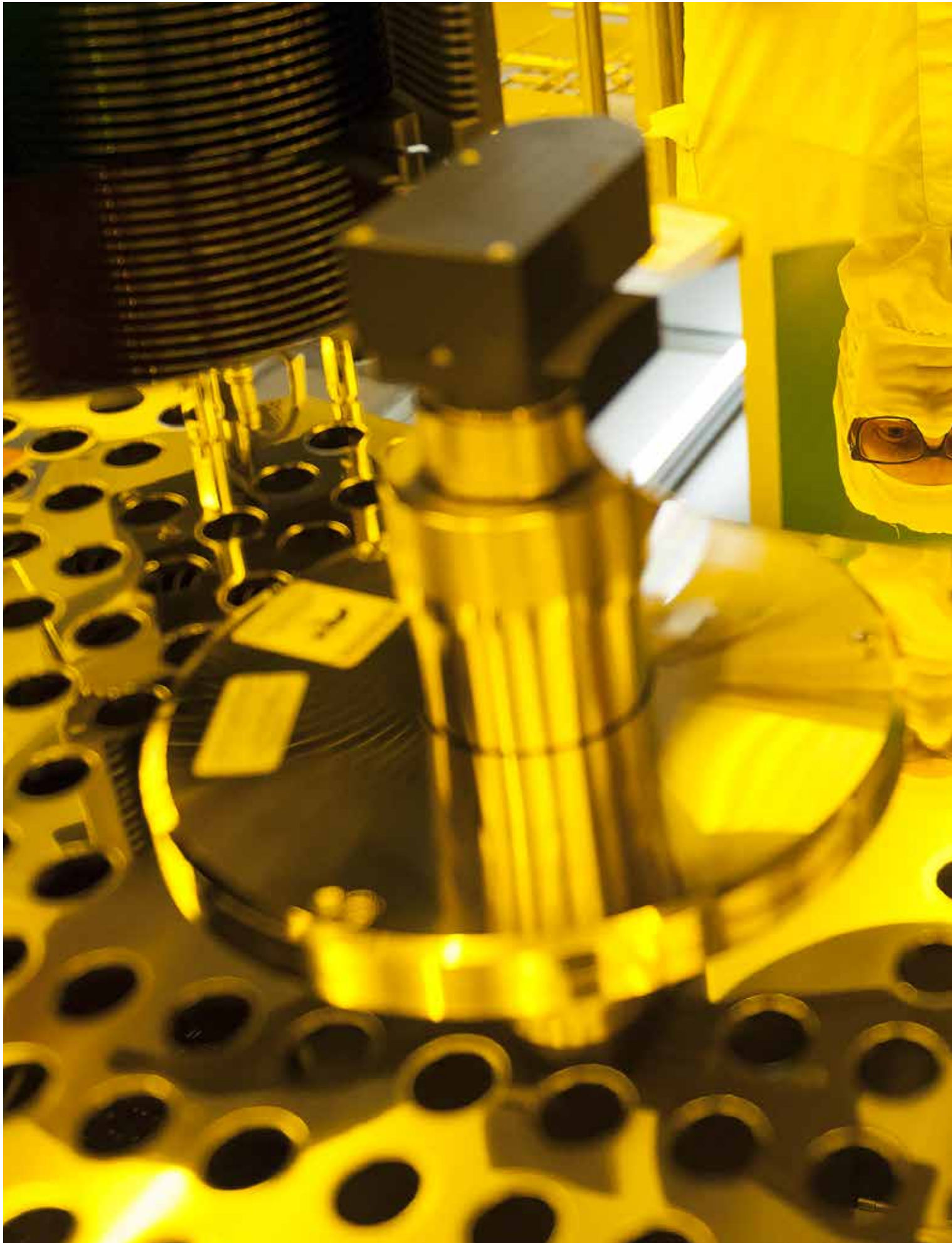
## SECURITY

A continuous commitment to guaranteeing a secure environment in which customers can realise their ideas to the highest standard, trusting in LFoundry as a valued partner to unleash their full potential. Embodies the concept of protection, both in terms of the products themselves and the intellectual property rights associated with them.

## INTERDEPENDENCE

Conveys the ideas of interdependence and cooperation, specifically in the foundry-customer interrelationship, in individual work teams and between each member of LFoundry's workforce. 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 goal.









# 03

## FOCUS 2015/2016

## SO MANY FACTS, SO MUCH INFLUENCE

LFOUNDRY IS MADE UP OF EVENTS, PEOPLE, PROJECTS AND NEWS. HERE IT ALL IS.

# 2016

## 19

APRIL

### **LFoundry Announces Availability of Interoperable Process Design Kit (iPDK)**

Landshut & Munich, Germany:

LFoundry announces the availability of an OpenAccess (OA) based interoperable process design kit (iPDK) for high performance analog and RF design using Keysight Technologies' Advanced Design System (ADS) EDA software. The iPDK was validated jointly with Keysight to ensure compliance with ADS 2016 and to provide customers access to the full unabridged set of ADS dedicated RF design flow tools in a Linux or Windows environment.

## 14

APRIL

### **LFoundry and Caeleste: a new step towards European independence for future space imaging applications**

The European Space Agency has awarded and funded a contract to a European industrial consortium, led by *Caeleste*, to develop a new CMOS image sensor entirely designed, manufactured and tested within Europe. *Caeleste* contributes to the project with over 250 man-years of experience in the custom design and realisation of CMOS image sensors for various application domains, including space and astronomy applications.

**LFoundry**, with its wafer fab facility at Avezzano, is responsible for the manufacturing of the image sensor. LFoundry is able to manufacture sensors that respond to very stringent specifications such as cryogenic environments (at temperatures as low as -180 degrees).

**Airbus Defence and Space** provides fifteen years' experience in CMOS image sensors development for space applications and will carry out a characterisation campaign in parallel with *Caeleste*.

29

MARCH

***Cadence User Conference 2016***

LFoundry participated in the 2016 CDN Live (*Cadence User Conference 2016*) from 2nd to 4th May in Munich. Each year, CDN Live EMEA brings together a record number of *Cadence*® technology users, developers, and industry experts to network, share best practices on critical design and verification issues, and discover new techniques for designing advanced silicon, SoCs, and systems.

27

JANUARY

***Project INPS In House: success at LFoundry***

And so concludes the *My pension - INPS In House* project at LFoundry and Micron, Avezzano. The initiative included a series of meetings and consultations hosted by Avezzano's INPS staff for LFoundry's employees. The project was a great success with over 350 consultations carried out, more than 1,500 people (including Micron and LFoundry employees) participating in plenary meetings and 375 personal PIN numbers issued to access INPS services in the months of December 2015 and January 2016.

12

JANUARY

***LFoundry participates in the 2016 Image Sensors Conference***

Held in London, the 2016 Image Sensors Conference attracts a wide range of companies from across the digital imaging supply chain. From end users in all the main applications to camera system suppliers, sensor design houses and technology developers, optics suppliers and wafer foundries. The 2016 ISC is the most important conference in Europe in the image sensor industry. Therefore LFoundry's presence was of key importance as the company wants to remain in the vanguard for 200mm technology for image sensors, staying up to the minute with the latest trends and feeding them back into their technology development roadmaps.

# 2015

09

DECEMBER

**Project *INPS In House*: LFoundry's up next**

Through the *INPS In House* operation, the institute makes LFoundry policyholders aware of the amount of contributions being paid and their related pension benefits. Meetings, consultations and an operational phase setting up two INPS stations in the company.

24

NOVEMBER

**Professor Albert Theuwissen visits LFoundry's headquarters**

Professor Albert Theuwissen, one of the world's leading experts on Image Sensors, visited LFoundry headquarter to give a lecture on new CMOS Image Sensor (CIS) technology trends. Professors and researchers from many Italian Universities, as well as LFoundry's engineers and R&D team participated in the meeting.

09

OCTOBER

**LFoundry and FAU initiate new collaborative partnership**

LFoundry has become the key collaborative partner to FAU (*Friedrich-Alexander-Universität*) on the *AIMS project*, aimed at developing self-sufficient, intelligent miniature sensors for independent living. This research project is managed by the *E|Home Center*, whose mission is to develop innovative solutions in the fields of home energy management, comfort and safety. AIMS research is carried out in interdisciplinary collaboration with various research institutions, private companies and other relevant organizations.



07

OCTOBER

**LFoundry: the *Open-Lab* project takes flight**

Taking place at the Polo ICT-Abruzzo laboratory (also known as *Open-Lab*) located in LFoundry, these are high level training courses on the advanced analytical instrumentation installed in the lab and purchased through *POR ERDF Abruzzo 2007/2013* funds (*I.1.2: support for setting up innovation clusters*). This new equipment, combined with the existent facilities at LFoundry, makes the Open-Lab workshops centres of absolute excellence in the technical landscape of national and international science.

11

SEPTEMBER

**First Edition of *Nano-Italy***

LFoundry joins *Nano-Italy*. The event links up researchers and technologists from research institutions and industrial laboratories, enabling them to share and exchange innovative ideas and multidisciplinary knowledge across the broad nanotechnology field, fostering the integration of ideas and know-how among different application sectors.

15

JULY

***CETYS Universidad of Mexico* visits LFoundry's headquarters**

This visit was part of the *Mobility Window* initiative in collaboration with the *CETYS University of Mexico* and the University of Aquila.

LFoundry believes the cooperation between industry and universities provides a competitive advantage to the company and nurtures growth in the wider ecosystem.

# 2015

## 25

JUNE

***Microscopy Techniques and Electronic Diffraction Characterisation of Semiconductor Devices***

LFoundry is a partner at the *Microscopy Techniques and Electronic Diffraction Characterisation of Semiconductor Devices* workshop.

The two-day event was aimed at technologists, researchers and students eager to gain an introduction to microscopy techniques and diffraction electron transmission for applications in electronics industries.

## 24

MARCH

***LFoundry participates in the 2015 Image Sensors Conference***

Held in London, the Image Sensors Conference attracts a wide range of companies from across the digital imaging supply chain.

Rainer Kaesmaier, Business Development VP, Alfonso D'Anna, Technology Development & PLM VP, and Giovanni De Amicis, Principal PI Eng-DMTS each attended the conference.

Image Sensors is a must-attend conference bringing together leading suppliers and developers of image sensors and related digital imaging technology from the full range of end-use applications in both consumer and industrial markets with CMOS image sensor manufacturers.

## 17

MARCH

***LFoundry receives a grant for €1,302,000***

Signed in Pescara (Italy), the first ever Development Contract between the Region of Abruzzo and a private company will invest in strategic initiatives for the development of the Abruzzo region.

LFoundry received a grant of €1,302,000 for the CSL-LFMIT project, related to the introduction of new technologies.

Development Contracts are an initiative of *Invitalia*, the national agency for investment promotion and enterprise development.

# 27

**FEBRUARY**

**LFoundry plans to participate in the 2015 Global Semiconductor and Electronic Forum**

February 2015: Held in Shanghai, the 2015 *Global Semiconductor and Electronic Forum (GSEF)* is a unique event bringing together the end-to-end value chain of electronics development and production. Guenther Ernst, LFoundry CEO, was present at the conference speaking about "Innovation and Cost Efficiency as Key Factors in the IoT Era". Günther underlined how to support growing market demand for IoT Foundry Solutions.

# 19

**FEBRUARY**

**LFoundry Announces New Vice President of R&D**

LFoundry announce that Roberto Bez has joined the company as the new Vice President of R&D. Roberto was awarded a Laurea degree in Physics from the University of Milan.

# 28

**JANUARY**

**LFoundry hosts a summit organised by the Region of Abruzzo aimed at boosting the region's industrial development**

The Region of Abruzzo organised a summit aimed at providing information about EU and national funding opportunities as part of a measure to boost innovation. The opportunities available have been presented by representatives of the authorities concerned, including Community Programs. Of particular note, the General Manager of ECSEL talked about public-private partnerships and their regulations.







# 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 Code of Ethics was approved by the Board of Directors of LFoundry S.r.l. on April 29, 2014.

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



## ONGOING PROJECTS

### **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 cycle.

### **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, utilising 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 to identifying 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.

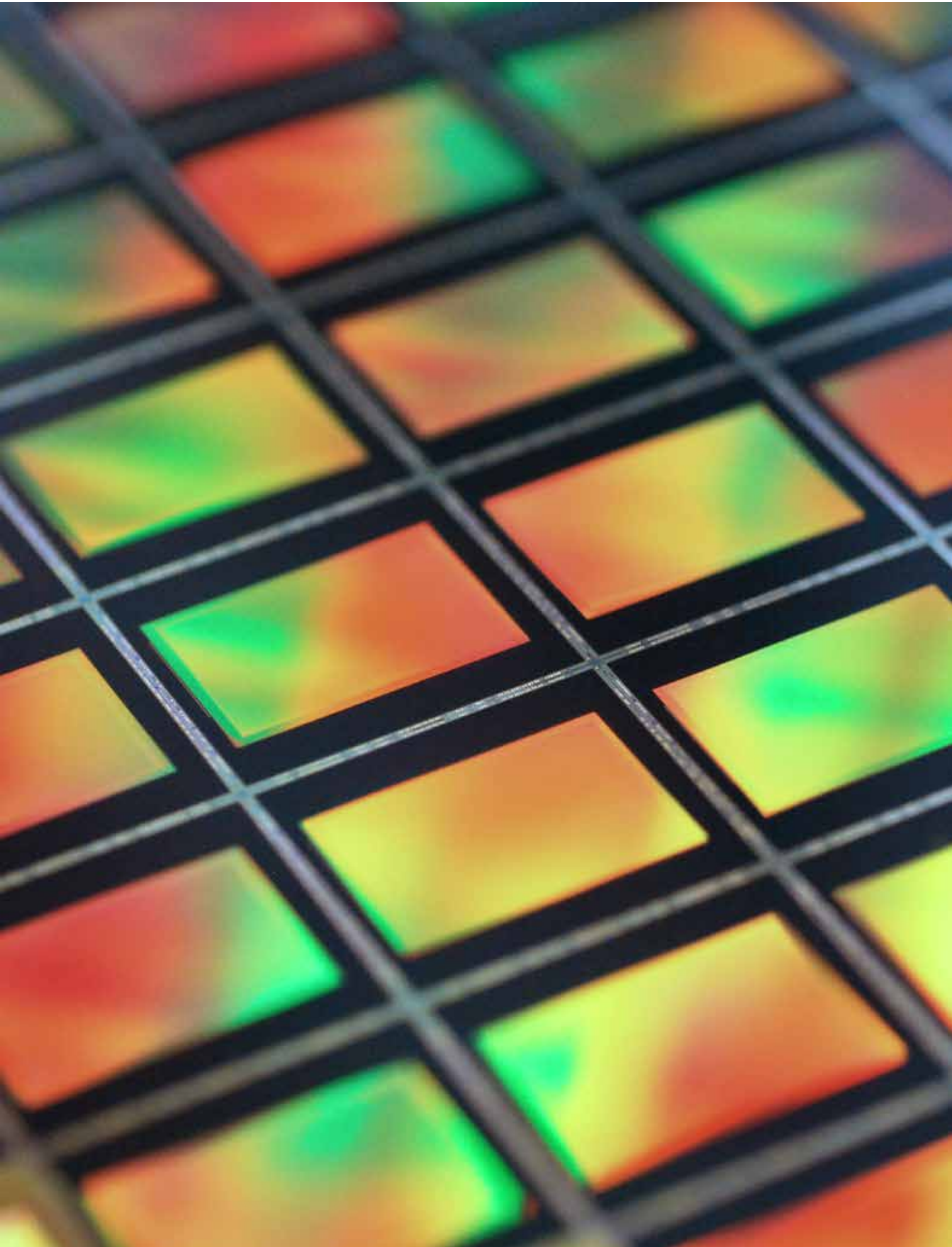
## CLOSED PROJECTS

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

INTEGRATE will consider the development of integrated process control and equipment control optimisation 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 SILVER project's objective 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.



# 05 FINANCIAL DATA



**ONCE IN A WHILE, A YEAR COMES ALONG THAT SURPASSES THE EXPECTATIONS OF EVEN THE MOST OPTIMISTIC FORECASTERS. FOR LFOUNDRY, 2015 WAS JUST SUCH A YEAR.**

**PROJECTED PERFORMANCE AS FORECAST IN THE CORPORATE BUSINESS PLAN WAS GREATLY EXCEEDED IN WHAT HAS BEEN LFOUNDRY'S STRONGEST YEAR TO DATE.**

## TURNOVER

ACTUAL DATA

**+14%**

**+7%**

GUIDANCE FY15

## NET PROFIT

**THIRD  
CONSECUTIVE  
PROFITABLE YEAR**







# THE HUMAN FACTOR IN SHAPING TECHNOLOGY

## THE OUTLOOK FROM LFOUNDRY'S HR DIRECTOR, DR. FABRIZIO FAMÀ.

### WHAT VALUE BEST DESCRIBES THE HUMAN FACTOR IN LFOUNDRY'S ACTIVITIES?

A few months after the start-up of the new company, LFoundry's management team sat down to identify a new vision and a new mission for the reawakened company, defining how these destinations would be reached through a detailed strategy map. Numerous steps were identified, involving the most important aspects of the company's operations, such as its technology portfolio and business development activities.

Two tasks were focused on regarding the human factor at LFoundry, one of which was identified as a clear priority:

*"To guarantee the best possible organisation and workforce to execute the strategy map in an effective and efficient fashion".*

Leading on from this decision and taking advantage of the need to refresh LFoundry's brand to reflect the changes within the company, the management invested a great deal of time in identifying the core values that will characterise our organisation in the future: **Resilience, Initiative, Fairness, Security and Interdependence.**

### WHAT ACTIVITIES TO PROMOTE PEOPLE ARE IN PLACE OR ARE IN PREPARATION? WHAT NEW PRACTICES AFFECTING THE WAY EMPLOYEES WORK, ENERGISE, LEAD AND MOTIVATE ARE IN DEVELOPMENT?

We believe that new, modern practices have to be implemented in order to create an environment where any single individual is free to choose to unleash their capabilities, taking advantage of the best procedures we have inherited from past operations. Our general philosophy involves implementing a total reward system able to:

- support the identification and growth of talent in alignment with the company's mission
- provide an achievable psychological contract with each individual that will enable them to do their best independent of where their talent lies

- provide everyone with the opportunity to keep up to date in their role
- reward current contribution through an effective benefit system

We are continuing to build on these new practices, the timing of which is also dependent on the budget available for the HRIS tools needed to implement them effectively.

Our new benefits portal is ready for use while the identification of a complete HR suite is ongoing.

In the mean time, we have adopted a new practice to identify talent in alignment with our mission and we have tested it on several internal managerial positions that we have opened. This has been made possible thanks to the company values that we have identified and used to elaborate the core soft skills that we consider essential for an LFoundry manager to lead and manage people.

### HOW IS LFOUNDRY'S RELATIONSHIP WITH ACADEMIC AND TRAINING INSTITUTIONS BEING DEVELOPED AND WHAT ARE ITS PROSPECTS FOR THE FUTURE?

We have a good network with academic institutions that we have been developing for several years now. We use this network to both strengthen our capability from a research standpoint as well as from an educational standpoint.

Firstly, it is important to say that research does not only mean research into scientific or technical matters.

We do research in other fields as well, such as human resources for instance, thanks to our collaboration with the relevant departments of our partner universities.

After the changeover of the company and the adoption of our new business model, namely the silicon foundry business, our capability to interact with universities and centres of research has increased and today we have many more joint projects than before, including participation

in European Funded Projects (FP7 and H2020 programs). Furthermore, we have created a system for sharing capabilities in the field of structural materials analysis, providing leverage on the assets available at LFoundry and at partner entities, such as the CNIS laboratory in Rome (we should soon be able to include some of the labs at the Universities of Aquila and Salerno). The rationale is quite straightforward: as money is always limited, it is better that we each use our available budget for different assets which we can then share, rather than using it for the same asset and then finding something is missing because there is no more money available.

Today, the most practical way in which we interact with universities is by hosting interns. These types of collaboration happen across many projects, spanning from the Technology Department to the HR Department.

The prospect for the future is to further strengthen collaborations on the educational side by designing ad hoc pathways for students who would like to develop their careers in the microelectronic field. As an *open foundry* (thanks to our MPW service) we represent a unique place in Europe to experiment with new prototypes, providing young and brilliant students with the practical tools they need to bring their ideas to life.

#### WHAT ASSETS CAN LFOUNDRY DRAW UPON TO ATTRACT YOUNG TALENT?

LFoundry is one of the few semiconductor companies owning a silicon manufacturing line in Europe. As its business is in the so called *More-than-Moore* arena, LFoundry can contribute to the development of solutions that in the future will drive forward progress in fields such as medicine, the automotive industry, surveillance, and many more besides. Young talented graduates from subjects related to Electronic Engineering or Physics can find a unique ground on which

to exercise the knowledge they have learnt during their academic studies.

On the other hand, LFoundry's business is global. It means that talented young people with an academic background in subjects related to Economics and Management can grow professionally, challenging themselves through globalised practices.

#### HOW DO CAREER PATHS DEVELOP AT LFOUNDRY?

Expertise and skills pay off at LFoundry. Depending on the ability of the individual, career progression can be made within the same discipline by improving skills and effectiveness thanks to training opportunities and personal proactivity.

Open job postings are used in order to scout talent for available positions.

We have very recently changed internal selection practices that relate to managerial positions. As we recognise that soft skills are as important as hard skills, an external assessment concerning an applicant's ability to cover a given position is carried out. The outcome is used to select the right candidate and to drive forward the career development of each participant by taking advantage of the recommendations we receive based on the opportunities for improvement that have been identified.







# 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 OHSAS 18001:2007 standard is periodically assessed and recertified by a Third Party. The company's performance on these disciplines exhibits the effectiveness of preventative and protective measures we adopt to safeguards and protect employees, visitors and contractors from the occupational risks as well as those risks associated with eventual emergencies.

## SECURITY

The Security Management System in LFoundry, according to intents of its security policy, 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 in the protection of the Confidentiality, Integrity and Availability of Information, Goods, Process, Material and Product. Its aim is to reach this goal through the suitable use of technologies, methods, and trained personnel.

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

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

The plan for LFoundry is to reach an EAL5+ level certification. In case of success this will be the first time that in Italy a company reaches such certification level.

## ENVIRONMENT

The Environmental Management System established at LFoundry according to DIN ISO 14001:2004 standard is periodically assessed and recertified by a Third Party; this exhibits the effectiveness of systems and methods we adopt as well as the continuous commitment for the environment as proof of consistent compliance to regulations and achievement of significant results in reducing the use of natural resources, energy consumption, raw materials and chemicals, disposal of wastes and employees transportation.

## ENERGY

Energy Management plays a key role in support of our plans to maximize profitability, strengthen our competitive position, and provide customers with the highest quality products through Best Key Methods implementation (BKM) which allow LFoundry to be a benchmark company in terms of rational use of energy, increasing the efficiency of energy production and utilization process management of the main sources of energy through a solid management of conventional and innovative activities and projects, while maintaining the conformity with law and code.

The energetic screening arranged in compliance with the guide UNI CEI 16247, LFoundry strives to:

- maximize its energy performance, reducing operating expenses and increase shareholder value by actively and responsibly managing energy consumption
- demonstrate commitment to our community and leadership in our industry, by reducing environmental impacts associated with energy use

- identify strategic project to achieve energy management mission

Based on the energy audit below the major activities and project accomplished during the 2015:

- site relamping of more than 30.000 sqm of parking area allow us to save more than 60% of energy saving, improve the performance and reduce the impact to the environmental
- free cooling based on the well water temperature we recovery cooling to supply fab tools and reducing electrical chiller usage
- compressed air system efficiency improvement as a revamping of the system based on the replacement of 3 old compressors with 2 new high efficiency compressors allow us to save 30% of energy consumption

Invested more than 400.000 euro in energy efficiency project and approved strategic investment on cogeneration revamping which will allow us to improve site energy efficiency of the 25% and reducing environmental impact of the 30%. Last but not least, started an internal program of energy efficiency with internal resources (site energy conservation team) with the object to reduce fab tool consumption.

## WASTE MANAGEMENT

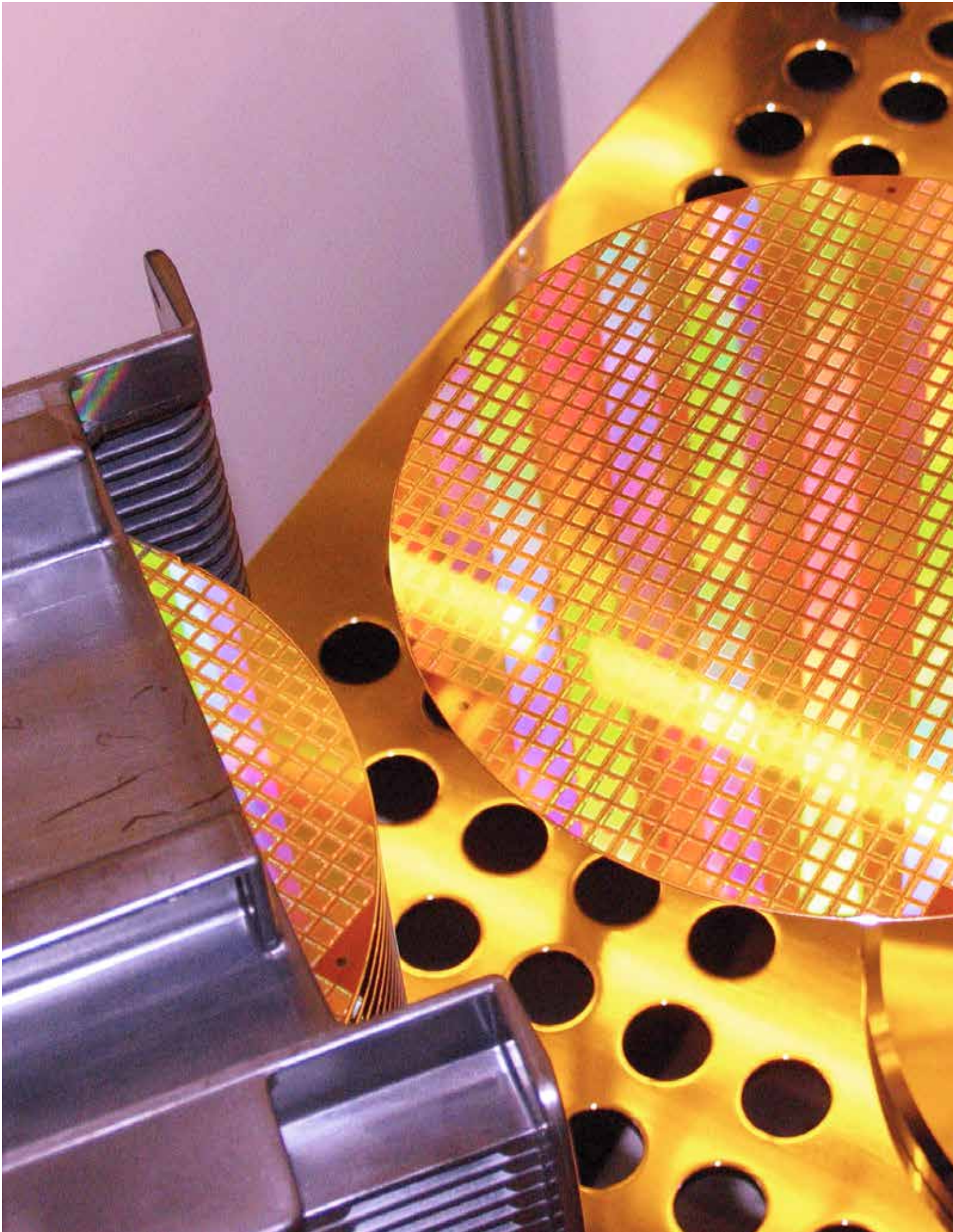
Waste is one of the area of focus of LFoundry environmental policy. Semiconductor realization end up with generation of large amount of hazardous and not hazardous waste which contribute to enviromental pollution, other than resulting in cost for a correct disposal. In order to effectively

address this environmental aspect, LFoundry actively joined SILVER project within ENIAC JU so to identify a viable industrial solution to reduce waste from Photolithography process. Results of experimentation conducted with L'Aquila University have demonstrated good possibility to degrade one of the most environmental hazardous substance (TMAH) though a specific biological purifier treatment.

## 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 in solution to improve water usage efficiency, so to reduce needs at facility incoming, as well as is focused in releasing less polluted water at final discharge for the benefit of the environment. In 2015 a small water recycle plant was installed in the facility so to eliminate suspended solid from polishing process ( CMP ) waste stream. The plant has a nominal capacity of 5m<sup>3</sup>/h and is confirming its effectiveness in providing a good recycled water for industrial purposes.











# WE CALL IT “QUALITY CULTURE”

**LFOUNDRY'S APPROACH TO QUALITY IN THE WORDS OF DR. FELICE LOMBARDI,  
VICE PRESIDENT FOR QUALITY.**

The ability to bring our customers' ideas to life, the spirit of interdependence, partnership, and fairness we instill, and the attention to a global concept of security all lead to a quality culture at LFoundry that protects our customers' projects from the moment of their inception. Our competitiveness is grounded in the ability to satisfy our customers' needs, and quality is the key which enables us to facilitate their success and guarantee its continuity.

The quality of our production is underpinned by a tightly structured and highly integrated process oriented management system, designed to ensure the safe transition from a flexible and innovative habitat in developmental stages to a mindful and controlled environment during series production. A profound application of risk management and LFoundry's deployment of the best known methods of quality management are complemented by advanced, highly customised solutions for error prevention and process control to create the right environment for any project. Through our commitment to continuous improvement we ensure that the quality of our customers' products undergoes constant enhancement, plotting a detailed roadmap to zero defects with our partners.

As a consequence of this steadfast management system, LFoundry is able to fulfill our customers' most stringent requirements, even meeting the exacting standards of the automotive industry. Our quality management system has been certified in compliance with ISO TS 16949 specifications since 2009, making us the perfect partner to satisfy the standards of a wide array of challenging market segments.

The most rewarding recognition of our efforts toward global quality is the appreciation our customers voice to us regarding the tangible improvements they see in the performance and yield of their products. This builds strong and cohesive partnerships with mutual trust, conceived in the earliest developmental stages of our collaborations and then consolidated in the management of mature products.

## QUALITY POLICY

We are committed to partner with our customers to exceed their expectations.

Our competent and motivated team is engaged in providing the best innovative and reliable foundry solution, in a continuous effort to achieve zero defect and quality excellence.

## KEY QUALITY ELEMENTS

### PARTNER WITH OUR CUSTOMER TO EXCEED THEIR EXPECTATION

- WE STRONGLY BELIEVE THAT QUALITY EXCELLENCE MAY BE ACHIEVED ONLY PARTNERING WITH OUR CUSTOMERS.
- PARTNERSHIP STARTS SINCE THE ANALYSIS OF CUSTOMERS IDEA IN ORDER TO FIND THE RIGHT SOLUTION TO ENABLE THE ACHIEVEMENT OF THE MOST CHALLENGING TARGETS, TO PREVENT ISSUES AND TO ENHANCE FURTHER IMPROVEMENTS.
- DEVELOPMENT STAGES ARE MANAGED SIDE BY SIDE WITH OUR CUSTOMERS TO ENSURE A SAFE LAUNCH OF THE PRODUCTS AS A PREREQUISITE OF FUTURE CONSTANT DELIVERY OF QUALITY PRODUCTS.

## BEST AND INNOVATIVE AND RELIABLE FOUNDRY SOLUTION

- WE BRING CUSTOMER PRODUCTS TO LIFE THANKS TO OUR INNOVATIVE AND RELIABLE FOUNDRY SOLUTIONS.
- WE FOLLOW A STAGE AND GATE APPROACH TO INTRODUCE NEW TECHNOLOGIES AND NEW PRODUCTS.
- OUR PRODUCT LIFECYCLE MANAGEMENT FOLLOWS THE INDUSTRY STANDARD APQP (ADVANCED PRODUCT QUALITY PLANNING) PRINCIPLES. IT GUARANTEES A FAST AND RELIABLE PROCESS DEVELOPMENT AS WELL AS A SAFE LAUNCH IN SERIES PRODUCTION. THE COMPLIANCE WITH CUSTOMER REQUIREMENTS IS CONSTANTLY VERIFIED IN EVERY PROJECT PHASE.
- COMPREHENSIVE RELIABILITY PROGRAM FOR PROCESS AND TECHNOLOGY QUALIFICATION ACCORDING INTERNATIONAL STANDARDS LIKE JEDEC JP001 ARE APPLIED.

## CONTINUOUS EFFORT TO ACHIEVE ZERO DEFECT

- OUR STRUCTURED APPROACH TO DEFECT AND VARIABILITY REDUCTION ENSURES CONSTANT IMPROVEMENT OF PROCESSES AND PRODUCTS.
- FEEDBACK FROM CUSTOMERS AND FROM THE FIELD ARE PART OF THE INPUTS TO OUR CONTINUOUS IMPROVEMENT AND ROADMAP TO ZERO DEFECT.

## QUALITY EXCELLENCE: MANAGEMENT BY PROCESS

- QUALITY EXCELLENCE AND SUPERIOR CUSTOMER SATISFACTION IS ENSURED THANKS TO A MANAGEMENT BY PROCESS OF THE WHOLE VALUE CHAIN.
  - from customer requirements to product development
  - from selection and management of suppliers to product fabrication
  - from monitor of processes to management review
  - from opportunity of improvement to change management
- OUR QUALITY MANAGEMENT SYSTEM HAS BEEN DESIGNED TO SATISFY CUSTOMERS NEEDS AND EXPECTATIONS, MEET STATUTORY AND REGULATORY REQUIREMENTS AND CONTINUALLY IMPROVE PROCESSES AND PRODUCTS.
- OUR MANAGEMENT SYSTEM IS CERTIFIED FOR COMPLIANCE TO ISO 9001:2008 AND ISO TS 16949 INTERNATIONAL STANDARD.

## QUALITY EXCELLENCE: PROCESS CONTROL

- WE HAVE 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 control of 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 Conformity 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



LFOUNDRY.COM