Advanced batteries. Designed for industry.

THE ESSENTIALS, 2014

saft

WHO WE ARE

€624.2m

sales in 2013

9.3%

of Group sales invested in R&D in 2013

1918

Date of foundation

Saft. The world leader in advanced and innovative battery systems for industry.

Saft has long been the world's leading designer, developer and manufacturer of advanced batteries for industry. Our multi-technology battery systems meet the needs of a variety of customers worldwide: nickel-based and primary lithium batteries in industrial infrastructure, transportation, civil and military electronics; lithium-ion solutions in energy storage, telecoms, industrial vehicles, space and defence.

Our customers include original equipment manufacturers (OEMs) — with whom we often collaborate when they are designing an innovative product which needs battery power — distributors and final end users. We continue to develop new generations of batteries for new applications and offer an enhanced after-sales service to provide through-life support to our battery systems.

WHAT WE DO

DESIGNED FOR YOUR PRODUCT

Our know-how in battery systems is available to our customers so that whatever market they are in, their products will get added value from ours.

Technologies /

Saft makes nickel-based, primary lithium, lithium-ion and silver-based batteries for a great variety of industrial uses. Our batteries — non rechargeable and rechargeable — meet a considerable number of customer demands such as weight and size constraints, usage in widely varying climatic and extreme conditions across a very wide range of markets.

Applications and markets /

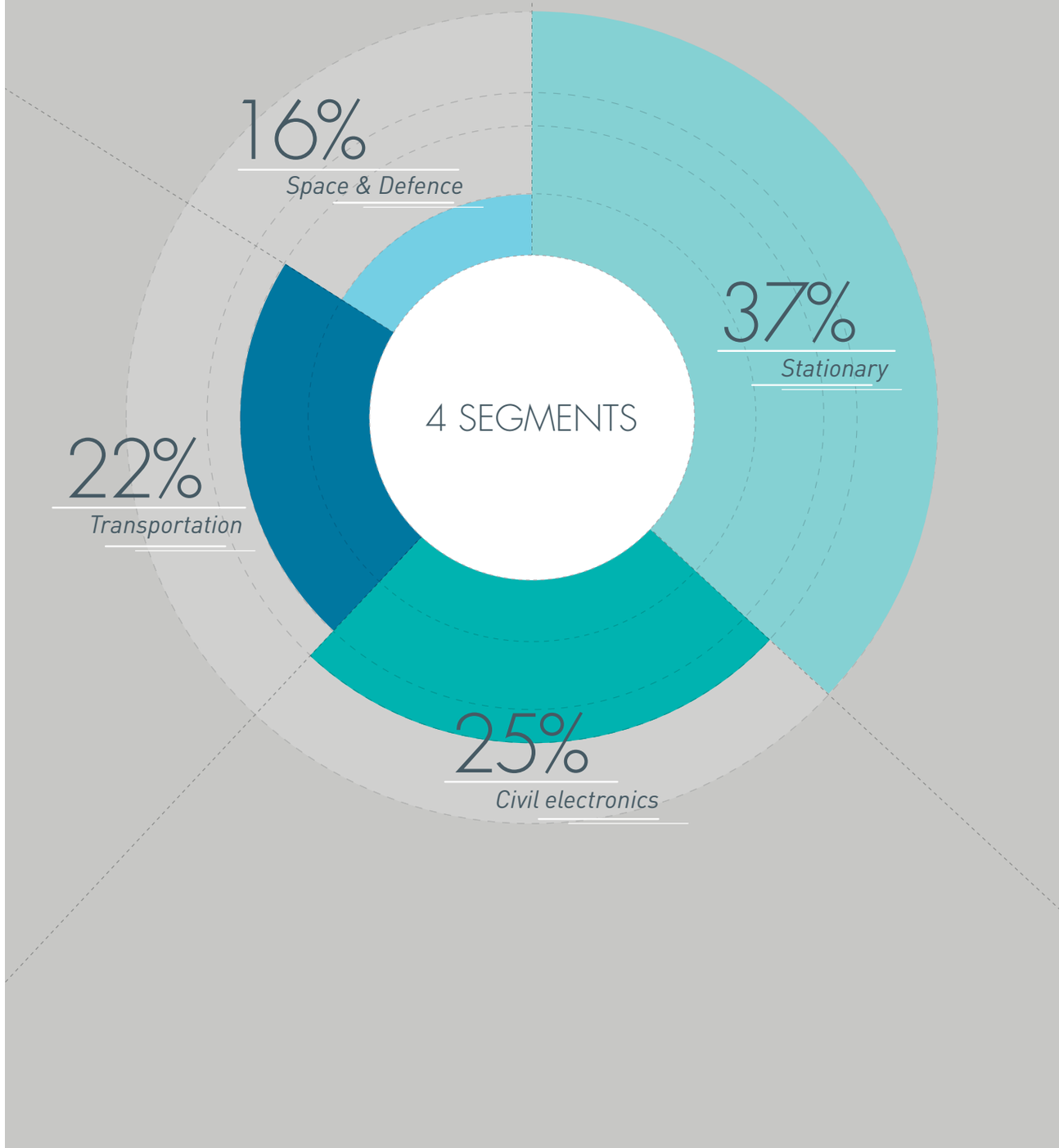
The main applications for our batteries are:

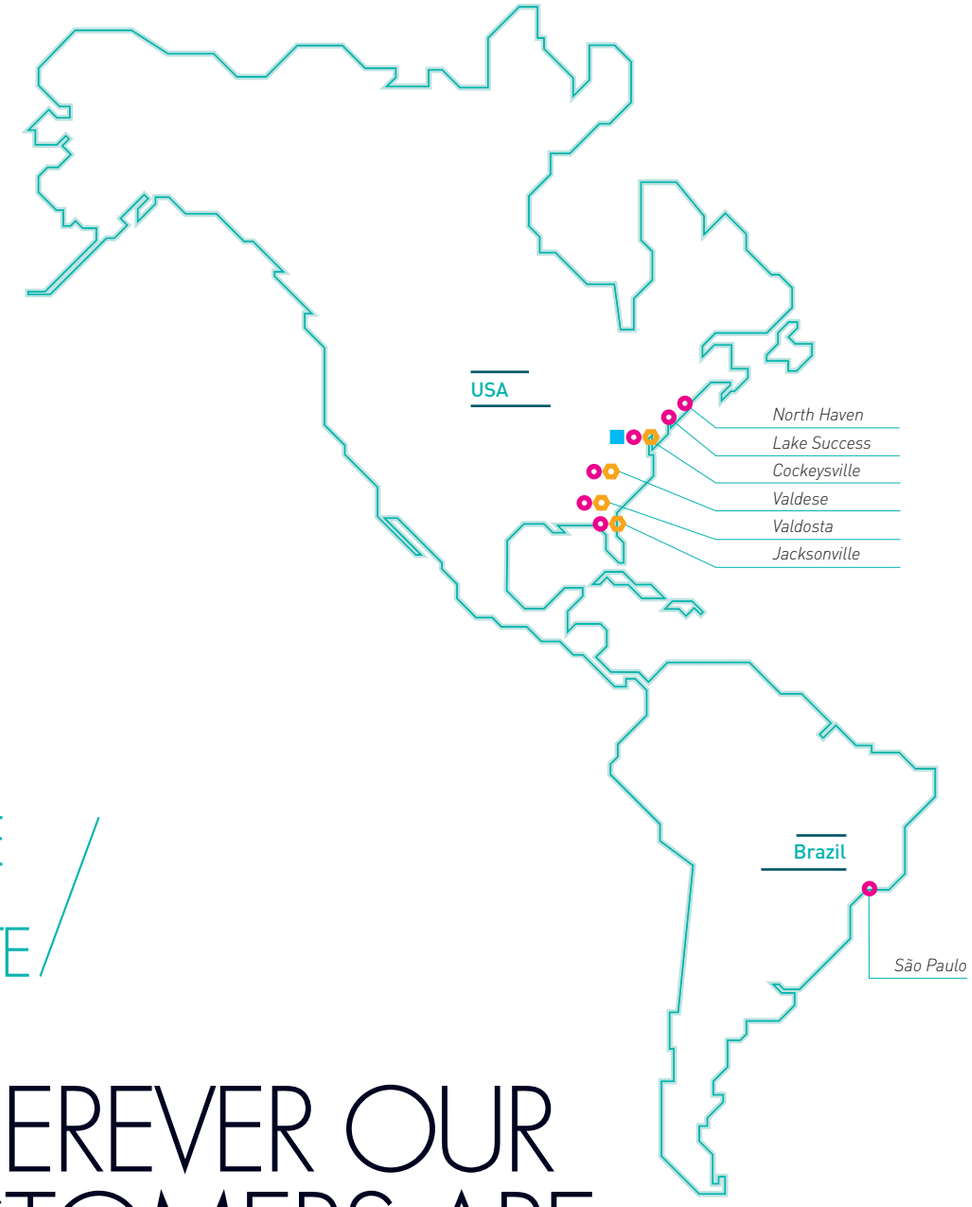
- Transportation: back-up power for rail, aviation and industrial vehicle traction.
- Stationary back-up power: mainly for the oil and gas sector, industrial facilities, telecommunications networks and energy storage.
- Civil activities: powering utility meters and electronic toll collection for example, in space for satellites and space launchers.
- Military activities : communications systems, torpedoes, missiles and military hybrid vehicles.

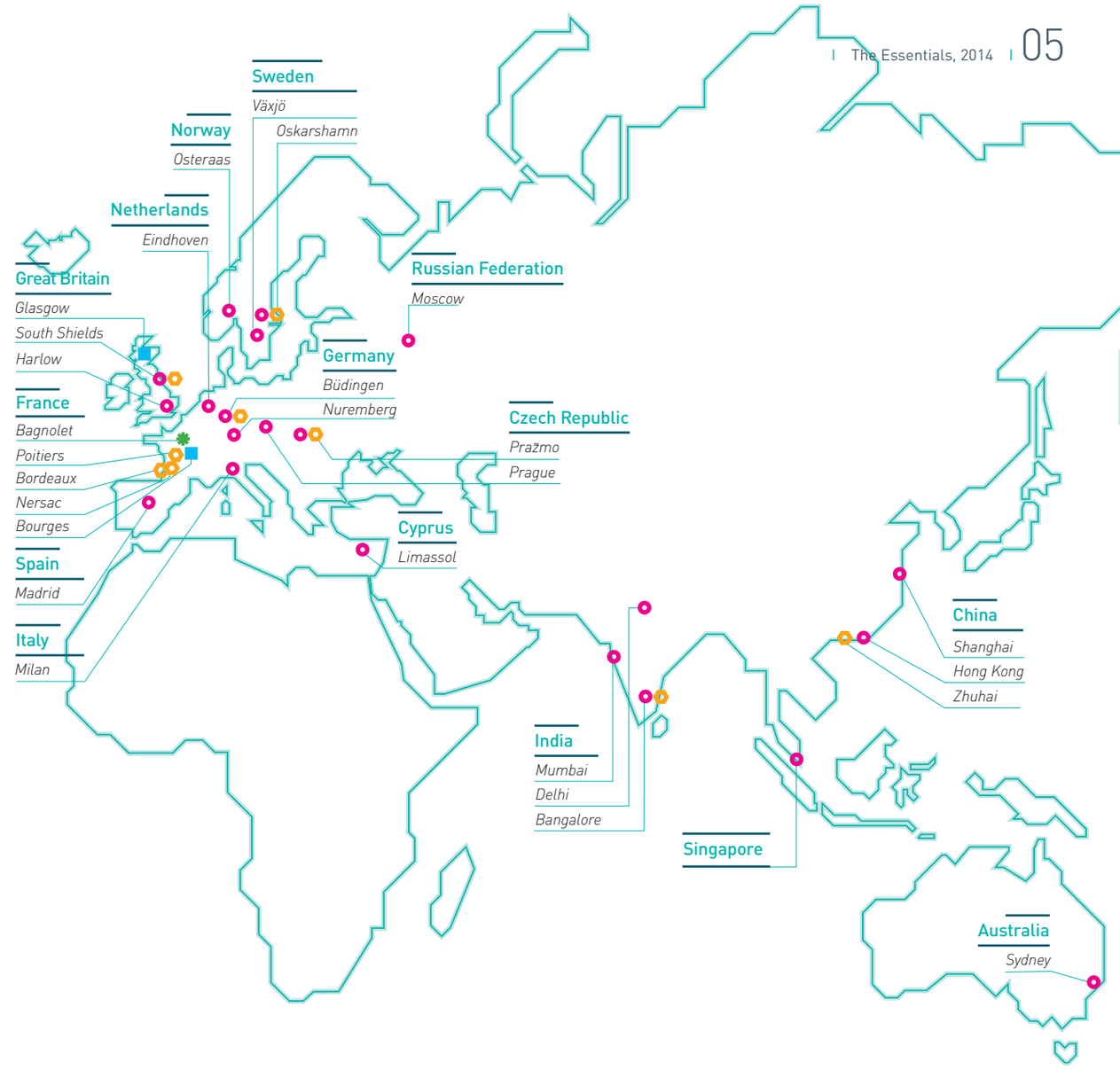
Services /

At Saft we accompany our customers throughout the life of our products. Energy storage for instance is an integrated system of chemistry, electronics and software, so Saft offers not only systems integration, but also full turnkey solutions that include services such as installation, commissioning, operation, training, maintenance and supply of spare parts for our battery systems.

2013 SALES BY MARKET SEGMENT







WHERE WE OPERATE

WHEREVER OUR CUSTOMERS ARE, SO IS SAFT

Our international network grew in 2013 with the opening of our Moscow office, consistent with our strategy of being close to our customers so that we are there when they need us.

- *Head office*
- *Saft production site*
- *Saft sales network*
- *ASB (50% Saft, 50% Airbus group)*

+3,800

staff worldwide

18 *countries with:*

30 sales offices, 14 manufacturing sites

OUR MARKET VISION

SAFT: ACCOMPANYING OUR CUSTOMERS' GROWTH

Our customers were dynamic in 2013 and we kept in step with them, notably in a sector where we are a relative newcomer: telecoms. Our lithium-ion technology was chosen by a new telecoms customer in India, while in the United States another new telecoms customer chose our nickel-based product. Always on the look-out for new markets, Saft also continued to gain contracts in the marine and industrial vehicle sectors.

Our customers are looking for high-performance batteries at competitive prices across a very wide range of applications. In some markets, highly sophisticated solutions bring value to our customers' products that they can sell on to their clients, while in others, familiar reliability allows our customers to make their infrastructure investments without risk.

Our customers, wherever they are and in whatever sector they operate, want reliable, long-life products which have a low-cost of ownership. Many of them also want a turnkey solution so we help them build their specification, design the battery system, often including communication software, and increasingly offer after-sales service to provide through-life support to the battery. We are heavily focussing on these enhanced services which we believe bring very important value to our products.

Our customers' new needs can be met because technologies we have developed are opening up an increasing number of opportunities and areas where Saft can grow. This is thanks to our high level of R&D investment which enables us to continue to develop new cost-competitive products and solutions. Solutions which are creating additional needs amongst our customers because tomorrow's generation of batteries opens doors that were previously closed.

John Searle
Chairman of the Management Board
Saft Groupe SA

OUR COMMITMENTS

INNOVATING TODAY FOR TOMORROW

With R&D investment averaging 9% a year, Saft is developing technologies today to help give its customers' products added-value tomorrow in an environmentally responsible manner.

Research & development / Work on our lithium-ion technology represents over 70% of Saft's R&D investments. First introduced on the market more than a decade ago, this technology is now entering its third and fourth generations. The company's 465-person R&D team is improving existing chemistries and developing new ones tailored for each industrial market. The R&D team also continues to improve Saft's nickel-based and primary lithium technologies.

Sustainable development / Our batteries are designed and made compliant with our environmental responsibilities. We were the first battery supplier to carry out a full Life Cycle Assessment on our primary lithium batteries for metering devices. Our longer-lasting batteries are also collected and recycled where possible and the materials re-used either to make new batteries or for other industries. We have also initiated a greenhouse gas audit at our sites in France to measure both direct and indirect emissions linked to energy.

€55m

invested in R&D

ISO 14001

all sites in Europe and China certified

WHAT DRIVES US

Addressing megatrends

SUPPORTING SUSTAINABLE TRANSPORTATION

Rail

Overview / Train and tramway customers need totally reliable products to provide auxiliary power backup for lighting, data and communications systems, ventilation and door opening functions; electromagnetic braking applications; engine starting; and regenerative traction. To do so battery systems must be powerful, able to withstand extreme weather conditions and strong vibrations, and, where possible, they should be maintenance-free and compact. →→

Solutions / With over 60 years of experience in the sector, Saft can meet these challenges. As the largest producer of nickel-based batteries in the world we have the widest range of products, the most comprehensive engineering support team and the best international commercial network. As a result, Saft addresses the evolving needs of OEMs and rail operators across the world.
Our batteries are robustly constructed ensuring predictable and reliable performance over a long period, eliminating the risk of sudden failure that can affect standard batteries which can deteriorate rapidly in the high temperature and demanding operating conditions of the rail sector. Our Li-ion Ion Board® Regen battery systems store the kinetic braking energy released by the train and later reuse it both to assist the train's acceleration or for autonomous traction thereby reducing energy consumption, diesel engine noise and particle emissions.

UK's new trains • *Saft's MSX battery systems were chosen by Hitachi Rail Europe to supply up to three hours of back-up power for lighting, ventilation, door opening and communications if the main power supply should fail, for up to 122 Hitachi Class 800 and Class 801 trains on the UK's Great Western Main Line and East Coast Main Line services. Every Class 800 and 801 train set will be fitted with at least two Saft battery systems mounted under the train floor which will perform in temperatures from -30°C to +50°C.*

Singapore's driverless metro • *Saft's MRX nickel-based battery systems will ensure back-up power for up to an hour to support emergency lighting, air conditioning, door operation and communication systems for safe and reliable operation of 42 new driverless Metropolis trains to be deployed on Singapore's Circle and North East metro lines starting in 2015.*

Aviation

Overview / Saft is the world leader in aviation batteries, with one Saft battery taking off every two seconds.
Batteries play a key role in the aircraft safety chain for autonomous engine or APU starting, emergency avionics back-up power and network regulation.
The pioneering mindset and industrial vision result in an unrivalled track-record of reliability on legacy aircraft programmes with Ni-based technology.
Looking forward, Saft's teams are working in close cooperation with OEMs to design innovative battery systems for the More Electric Aircraft. Li-ion electrochemistry and battery management system experience enables Saft to prepare high power solutions with "best-in-class" energy to weight ratio. →→

Solutions / When an aircraft passes the flight certification milestone and is ready for entry into service with Saft batteries as part of the system, the operators will request unrivalled customer support throughout the life of the programme for the next 40 years.

Our new Li-ion batteries are crucial for future aircraft programmes such as the Airbus A350 XWB, where much greater demand is made by the aircraft's electrical loads namely the APU and avionics systems on electricity provided by the batteries. Li-ion batteries are particularly well adapted to these platforms. They are compliant with the highest levels of actual design requirements integrating embedded electronic module battery management systems to achieve a very low undesirable event occurrence. In addition, these maintenance-free batteries are up to 40% lighter than nickel-based ones.

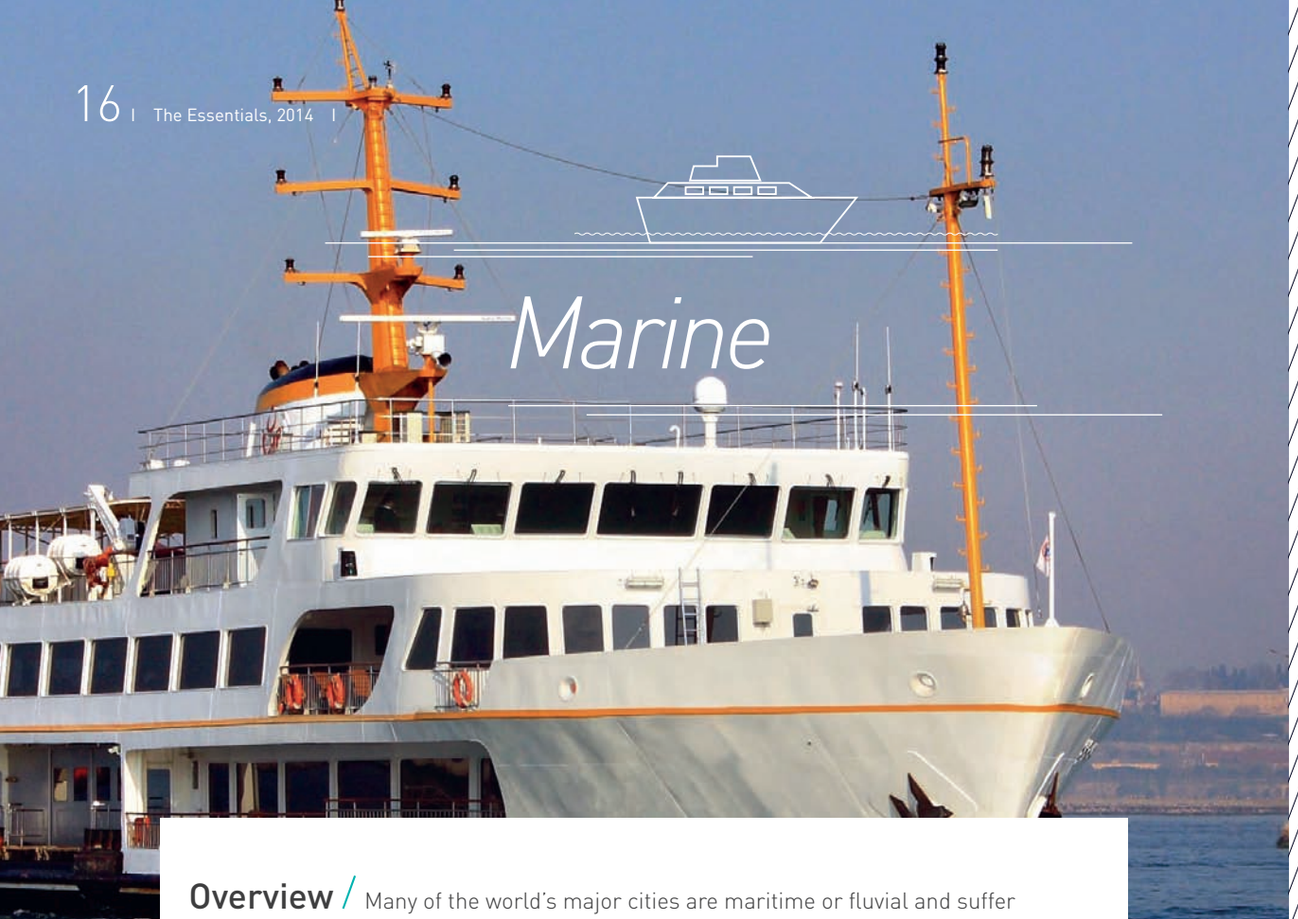
Gulfstream • *Saft will be supplying its Ultra Low Maintenance (ULM®) batteries to Gulfstream Aerospace for the Gulfstream G650® ultra high-speed and ultra long-range business jet and the Gulfstream G550® ultra-long-range business jet at least until the end of 2020. This battery was developed specifically for the Gulfstream G550® and has been supplied continuously since the aircraft was certified in 1997.*

Vehicles

Overview / Saft's decades-long experience in the hybrid and electric vehicle market together with our involvement in motor-sports which provides us with a unique technology platform to develop, test and qualify innovations in Li-ion battery systems, has positioned Saft well to deploy our battery systems in the industrial hybrid and electric vehicle market.

Solutions / Many cities are investing in all-electric buses, to lessen noise and particle pollution and Saft's rechargeable Li-ion technology is particularly well suited to these innovative vehicles. The recent introduction of Li-ion technology to power electric forklifts optimizes the vehicle's use via good ergonomics, faster charging, longer life duration and limited maintenance operation. This improves daily operation and reduces the Total cost of Ownership (TCO).

Kalmar Motor • *The pioneer of the towbarless tractor chose Saft's TBL 800 lithium-ion battery system for the world's first hybrid electric ground handling airport tractor. These play a vital role moving aircraft from their hangars to the gate and preparing them to taxi to the runway. The tractors must be totally reliable, 24/7 and in all-weather as any delay in ground handling can disrupt flight schedules.*



Marine

Overview / Many of the world's major cities are maritime or fluvial and suffer pollution both from road vehicles and the many vessels that ply their waters. So there is a growing demand for hybrid or all-electric marine craft that not only offer significant fuel savings compared with diesel engines but operate quietly and pollute less.
To encourage this the European Union is considering legislation that shore-side electricity supply is to be installed as a priority in maritime and inland ports by the end of 2025.

Solutions / Saft is a new entrant on this marine market to which our Li-ion technology is well suited. This technology for powering work boats, ferries, offshore vessels, cruise-liners and cargo vessels was first launched by Saft in 2010.
Since then Saft has supplied a 140 kWh Li-ion battery system for both electric-diesel hybrid ferries in Bordeaux, western France, and a similar system for a fully battery-powered shuttle ferry in Paris.

Stockholm ferry operator Ballerina • *The Swedish capital city chose Saft's lithium-ion (Li-ion) marine battery systems to power a new electric ferry boat that will carry foot passengers and cyclists between 10 stops on a 50-minute route through the city.*
It will operate all year, completing eight round trips per day. The batteries will be fully charged overnight with two partial charging sessions during the day.

SECURING POWER SUPPLY

Industrial standby / p.18

Telecom networks / p.20

Industrial standby

Overview / Saft's traditional expertise and leadership in nickel-based batteries is today enriched by our successful development of lithium-ion technology. Both provide certainty and reliability to the emergency power back-up systems our customers — both integrators and end-users — need. Their requirements dictate whether they benefit more from the smaller, lighter and versatile Li-ion batteries with their cycling capability or from the extensive nickel range in sectors where weight is not such an issue. We are present across a very wide range of industries from Oil & Gas, 50% of our market, to railway signalling systems but in all of them our batteries provide security, a long life-span and performance under extreme conditions.

Solutions / In the Oil & Gas sector Saft has a wealth of expertise and an excellent reputation having supplied very reliable products for decades to this market and developed a first-class commercial network to bring confidence and infallibility to our customers.
Our nickel-based batteries provide back-up power to multiple industries in this sector where they bring great benefits, notably in hot climates. For instance, the ultra-low maintenance, long-life Saft Sunica.plus battery systems power the solar energy equipment of an unmanned production platform 60 kilometres off the coast of Myanmar, while our batteries provide up to eight hours of autonomous back-up power for critical control and communication systems on a platform where temperatures range between -36°C and +40°C. Our maintenance-free Uptimax New Generation batteries will be found at the heart of power back-up systems in this sector as well as in utility and manufacturing industries.

The ECO-H system distributed by Tesco Corporation • ECO-H Technologies Inc. chose Saft's Intensium® Flex (Li-ion) battery system to provide the power and energy storage at the heart of its innovative hybrid power management systems that helps oil and gas operators reduce fuel consumption, emissions and operating costs. The ECO-H system supports immediate power demands on rigs thanks to the effective energy storage provided by the battery which facilitates peak shaving and genset load levelling.

Telecom networks

Overview / Saft has been providing advanced technology batteries to the very large telecom markets for over 15 years and we had two major successes in 2013, one with our nickel-based and the other with our lithium-ion batteries. The latter's ability to be charged and discharged many times is highly valuable where the electricity grid is weak.

Solutions / We had a significant breakthrough in expanding our customer base in the United States where we have been selling our nickel batteries for more than 10 years. Our products are ideally suited to meet the challenges of the climatic conditions in the United States.
In India we had the first breakthrough for a lithium battery we had developed. India has many challenges in maintaining reliability in its telecom network: the hot climate leads to shorter battery life and a very unstable electricity grid means that the operators are faced with regular power blackouts. Our batteries provide a new solution to these problems.

India's 4G network • *Reliance Jio Infocomm Limited (RJIL) is using Saft's specialized lithium-ion (Li-ion) telecom battery systems for broadband mobile base stations in India.*
The well proven, maintenance-free and smart Li-ion technology is behind the Evolion® concept that ensures exceptional service and long-life in telecom installations in a range of temperatures from -40°C to +75°C to keep the network operating 24/7.

FOSTERING ALTERNATIVE ENERGIES

Energy storage systems / p.22

Energy storage systems

Overview / The rising share of wind and solar energy to generate electricity in many countries is challenging for the electricity system — from generation through distribution and transmission to end customers — who all need to cope with the variable and unpredictable nature of this type of power generation. In parallel, the trend towards more distributed energy generation combined with innovative information technology opens up opportunities for smart, efficient and low carbon electricity infrastructures. Battery energy storage can solve many of the problems linked to intermittent generation, grid stability and local energy management. This sector was in its infancy five years ago but Saft believes it offers very important opportunities for its lithium-ion technology.

Solutions / Saft offers battery solutions to better integrate this intermittent energy across the entire electricity supply chain:

- At generation level: multi-MW size containerized Li-ion battery systems to smooth intermittent power generation, establishing wind and solar as a predictable and reliable part of the electricity system, especially in remote grids.
- At transmission and distribution grid levels, Li-ion storage batteries help manage load peaks and provide various ancillary services to keep grids stable and increase their hosting capacity of renewable energies.
- At end user level, kW size batteries enable local energy management in combination with residential PV systems and smart buildings.

The range of Saft Li-ion batteries for these applications covers a power range from a few kW to several MW and offers high performance, long life and high reliability even in extreme conditions.

La Réunion island • Saft has been contracted to supply, install and commission a 9 MWh battery system comprising nine Intensium® Max+ 20E containers, each of which will house 17 racks of our Synerion® energy storage modules, battery management, thermal management and safety systems to store the energy and stabilize the power from the Bardzour 9 MWp photovoltaic power plant on this Indian Ocean island.

ENHANCING PERFORMANCE

Civil Electronics

Overview / The civil professional electronics market encompasses many sectors such as utility meters which can be read by telemetry, automatic toll-road payment onboard vehicles, heart defibrillators in public spaces, and similar mobile medical equipment on carts that can be brought to patients without the need to be plugged into an electric socket. The applications all call for small, highly reliable battery cells, rechargeable or not, that have a very long life-cycle of up to 20-years and that are resistant to temperature variations. →→

Solutions / Thanks to many decades of R&D perfecting their manufacture, Saft has tailored its products to meet the demands of OEMs. As for Saft's other markets, prototypes are prepared to meet the OEM's specifications of the application and there is a period of tests before the batteries are qualified by the OEM client. The qualification and testing period can take up to two years before series production begins. Given these requirements, once Saft is selected as the supplier, it generally remains the supplier for the life of the product. Sales to distributors involve standardized products and permit a wider geographic coverage of sales. With our two major brands, Saft and Tadiran, Saft is the world's leading supplier of primary lithium technologies to our targeted civil professional electronics OEMs and distributors.

Metering in China • *Saft is expanding its presence in China where recent reforms are fostering the introduction of automated meter reading and smart meters. The first two contracts signed in 2013 for gas and water meters were followed by one to supply primary lithium batteries to one of China's top five gas meter OEMs. The A-size LS17500 cells for reliable, maintenance-free, 10-year plus service life, will power domestic smart meters installed in Zhejiang Province.*

eCall • *Saft's lithium batteries have been chosen by Actia for its ACU-II (Automotive Communications Unit), a device mandatory on all new vehicles in the European Union from 2015. ACU-II enables eCall, a Europe-wide emergency service that sends an automatic signal to alert first responders to a serious car crash and should bring them to the accident scene twice as fast as today, thereby cutting the number of European road deaths by about 2,500 a year.*

Sleep easy • *Saft's primary lithium batteries will ensure ultra-reliable, fully autonomous operation of the T4P telemedicine solution to monitor patients who suffer from apnoea (breathing stops) whilst sleeping. SRETT, a French M2M (machine-to-machine) monitoring systems manufacturer, has designed the T4P remote monitoring system to be fitted to any continuous positive airway pressure (CPAP) device that keeps the sleeping patient's airway open.*

Space

Overview / Space was the first sector to adopt lithium-ion technology because its light weight and high energy density helps reduce the overall mass of satellites and makes more payload weight and space available for revenue earning equipment. Saft's wide offering of space-qualified cells meets all the stringent requirements for successful performance of diverse missions: communications, scientific and defence with their different weight and size constraints, the ability to operate in extreme temperatures and the ability to withstand thousands of cycles for the life of the spacecraft. →→

Solutions / Saft began supplying Li-ion batteries to the space industry in 2002, building on our 50 year relationship with the sector which began in 1966. Today we are the world leader in the design, development and production of Li-ion batteries used in space, and the only manufacturer with a complete range of battery technologies for the space market. Our battery systems have proven they last throughout the average 18-year life of a satellite in orbit.
Saft's extensive list of partnerships includes Airbus Group (Defence and Space), Boeing, CNES, the European Space Agency, Lockheed Martin, NASA, Orbital Sciences Corp, Thales Alenia Space and many others. Most of our batteries in orbit are on GEO commercial or military telecommunication satellites.

The 100th satellite to use Saft's pioneering Li-ion battery technology lifted off on the Proton M rocket in Baikonur (Kazakhstan) on December 8, 2013. The Inmarsat 5 F-1 is also the 75th GEO satellite in orbit using Saft batteries. For the 100 Li-ion launches Saft provided long-life, high-energy batteries including VES 140, VES 180, VL 48E and MPS cells. Saft's Li-ion battery packs supply a voltage range of 4V to 100V .

Boeing • Saft was awarded a further five contracts in the framework of a 2009 agreement to produce Li-ion geosynchronous orbit (GEO) satellite batteries, taking the total number of contracts signed thus far to 11. The batteries deliver power when the satellite's solar panels are in the shade 90 days a year.

Military activities

Overview / Today's armed forces are looking for specific solutions for highly demanding applications. They want reliable battery systems with strict weight and size constraints to power man-portable applications such as radios, night-vision binoculars and monoculars, and C³ (command, control and communication) systems. For advanced vehicle and weapons systems applications they require long life, powerful rechargeable systems which bring performance benefits and reduced operational costs.

Solutions / Saft's lithium solutions provide reliable power for portable devices under extreme conditions. Designed and developed in close collaboration with OEMs with whom Saft has built long-term relationships, these high-performance lithium solutions meet their need for smaller, lighter batteries to reduce soldiers' loads.
Our robust silver-zinc batteries, resistant to shocks and with a long shelf life, are customized for each torpedo or missile application while ASB, our joint venture with Airbus Group, manufactures thermal batteries for tactical missiles and smart weapons.
Saft's lithium-ion technologies are today being implemented in military vehicles and other applications, enhancing their performance, safety and costs.

ADRES • Saft, with funding from the US Communications-Electronics Development and Engineering Centre (CERDEC), has developed the Advanced Deployable Renewable Energy System (ADRES). Based on Saft high energy lithium-ion technology, ADRES will store solar and wind energy to power mission-critical equipment at US Army forward operating bases, thereby reducing fuel consumption and thus cutting down on the amount of fuel transported to these remote areas.

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Saft Groupe SA
12, rue Sadi Carnot
93170 Bagnolet France
Tél.: + 33 (0)1 49 93 19 18

www.saftbatteries.com