Saft

INTERNATIONAL
Saft's customer magazine

Number 13 Spring 2000

Saft puts portable cell production and assembly in same plant

Putting our customers at the heart of our strategy

The new millennium has begun in style for Saft. We have already invested in extensions to some of our industrial facilities on both sides of the Atlantic to keep pace with customer demand.

Grégoire Olivier
Managing Director

We are conquering new markets with our portfolio of advanced technology products, and are constantly discovering new applications for our existing technologies. The following pages will give you an update on some of them.

Saft is changing fast. In order to fulfill our ambition to be our customers' supplier of choice for world class products and services, we have placed our customers at the heart of our strategy.

I am proud to be addressing you for the first time as Managing Director of Saft, and I take this opportunity to reaffirm our commitment to customer satisfaction and to continuous improvement. I am determined to make Saft your long-term partner for all your global – and local – needs.

My priorities for this year alone are to continue our quality drive, which is already bringing excellent results; to continue to drive costs down in order to offer you competitive solutions; and to continue improving service levels with increased human and technical resources.

The world is changing and Saft is changing with it. We fully intend to retain the current leadership position we enjoy in most of our markets and to be the first to offer you innovative solutions and a partnership you can count on for the years to come.

gregoire.olivier@saft.alcatel.fr

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Saft Corporate Communication department 156, avenue de Metz, F-93230 Romainville. Tel. (33) 01 49 15 34 84

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A new export structure for Saft

Pascal Moinon, Deputy Managing Director

Saft has established a new export organization, called Saft International, to oversee all sales activities in countries in which it does not have a subsidiary.

Dick Vleeskruijer,
Managing Director of Saft International

This includes both large countries where Saft's sales activities so far have been limited – the ex-URSS countries, most of Africa, South America, India, to name just a few – as well as some smaller European countries where activities have been, on the contrary, relatively important (Switzerland, Austria, Finland, Denmark and Greece).
Operational as of September 1, 1999, the new organization is a truly decentralized one. It features small groups of seasoned Saft professionals in seven offices throughout the world. "These teams will work very closely with the group's existing network of distributors, visiting them, organizing product seminars and going on joint client visits," explains Pascal Moinon, Deputy Managing Director for the new entity. Saft seeks to increase direct exports by 20% per year in the process.

Taking advantage of synergies

The new entity is responsible for selling the full range of Industrial and Portable batteries as well as Saft Power Systems – a big change from the former structure, where each product line was selling its products to often the same customers. "The new organization not only rationalizes our sales efforts but it provides us with a real opportunity to take advantage of synergies, particularly between our Industrial Ni-Cd batteries and all the power electronics," Moinon continues.
There are some exceptions to this rule, however. "We won't handle aviation batteries unless there is a specific request for assistance. It's a world unto itself," he says. Likewise, the entity will leave military batteries to Saft's specialist staff as well.
Saft International has been operational since September 1, 1999.

dick.vleeskruijer@saft.alcatel.fr
pascal.moinon@saft.alcatel.fr

The offices

- Romainville (10 people), which oversees Western European countries and Africa
- Moscow (3 people), which is responsible for CIS countries
- Budapest (8 people), with responsibility for Hungary
- Prague (5 people), which oversees the Czech Republic and Slovakia
- Cyprus (8 people), with responsibility for the Middle East
- India (1 person), which will become a Saft subsidiary at a later date.
- Buenos Aires (1 person), which is responsible for all of South America except Brazil and Argentina.

Recycling spent Ni-Cd gains momentum

With so many positive activities going on, someone should decree the year 2000 as the year of recycling spent Ni-Cd batteries, says Robert Eloy, Environment Director at Saft.

Not only has the OECD posted a list of Ni-Cd battery collectors and recyclers on its Web site (www.oecd.org/ehs/NiCd/), the entire industry is putting the final touches on a voluntary commitment that seeks to harmonize both the way Ni-Cd is collected Europe-wide and how this collection is measured and reported. The agreement also seeks to bring operational improvements to the various country organisms responsible for used rechargeable battery collection.

To achieve their goals, signatories-to-be of the voluntary commitment have adopted a new formula for measuring collection efficiency. This formula (quantities collected/quantities collected plus quantities found in municipal waste streams) is based on a sampling procedure that was first established to measure how much glass was left in household waste.

According to Eloy, this new formula is a big improvement over the previously used one, which compared apples with oranges, so to speak. "The old formula compared ratios of current quantities collected, which are measured in weight, against sales figures from several years ago, which are available in either sales revenues or units sold," he explains, adding that the results made little sense.

Today, signatories-to-be of the voluntary commitment are targeting collection levels of 75% by weight of spent Ni-Cd portable batteries (using the new formula), and 95%[2] by weight of spent Ni-Cd industrial batteries, by the end of 2003.

The new formula is already in official use in Holland, and three other countries — Belgium, Switzerland and France — have the capabilities to implement it.

Creating the means to collect

Of course, collection remains governed by individual European countries, and they are also stepping up measures to "enhance the value of used batteries". In France, for instance, Saft has been instrumental in setting up the S.C.R.A. (www.scra.fr), a privately held company created by several battery and portable equipment manufacturers (telephones, video, household appliances...) as a response to a government decree, voted in May 1999, which stipulates that "manufacturers, importers and distributors of batteries are obliged to accept used rechargeable batteries, pre-sorted by type, either from the distributors or by the commmunities themselves if these initiate their own collection programs".

Operational since July 1999, the S.C.R.A. is a collection and recycling company that recuperates used household portable rechargeable batteries. It is also preparing to collect electrical and electronic equipment. The Company will initially focus on rechargeable batteries, but is looking at the possibility of extending its field of activity to all portable batteries in 2001.

Right now, there are 500 collection points in service, from where batteries are transported for disassembly, sorting and appropriate recycling.

Eloy says he is hopeful that the convergence of so many private initiatives will lead to noticeable progression. He also hopes the measures confirm that the industry is a proactive player in setting viable standards which meet EU objectives.

robert.eloy@saft.alcatel.fr

Recycling at Saft

Of course, Saft has not waited until now to actively involve itself in environmental safety. It has been recycling industrial Ni-Cd batteries in its plant in Oskarshamn, Sweden, for over a decade now. It also has a long-standing partnership agreement with the SNAM in France to recycle larger volumes of Ni-Cd batteries (the SNAM is also beginning to treat Ni-MH and Li-Ion). Finally, the company has a stringent environmental charter, and is actively involved in all industry initiatives covering the full product life.

Saft helps cable operators secure their network

Participants in the CATV seminar recently held in Paris by Saft.

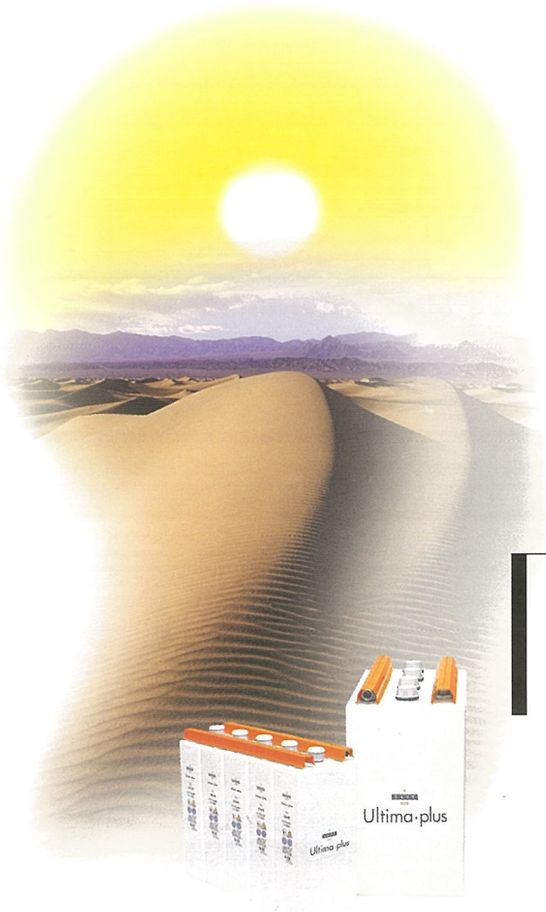
Cable operators are taking advantage of deregulation to deliver new services — including Internet and telephony— to their large and well-established customer bases.

Today, the CATV market is gaining momentum as deregulated markets themselves mature and cable operators start recognizing the need for extra security. Indeed, the stakes are higher for operators in the CATV field, especially with regards to Quality of Service. Though European grid availability is exemplary, up to 150 outages a year can still occur in local power systems, causing potentially harmful damages to equipment — not to mention to company image. As a result, "cable operators must make their networks secure and fully reliable, which requires more uninterruptible power supplies in order to provide stable and secure energy," says Florent Raison, Saft's CATV Marketing Manager.
"As a long-established supplier of power systems for communication networks in general, and telecom networks in particular, diversifying into the CATV market is a natural extension of our expertise," he continues. Indeed, the company is seeking to establish customer relationships with cable operators that mirror those the company has enjoyed with telecom operators for over half a century.
The CATV market has its own set of power solution requirements. Given that the UPS' and equipment for the back-up of optical nodes and amplifiers (50 or 60VAC) are most often installed in street cabinets, all solutions must be extremely climate-resistant and compact. The installation itself must be well thought out — where the battery should be placed, how the cabling should be organized — and local teams must be able to provide follow-up service and network remote control.

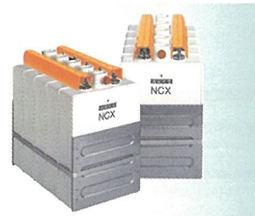
Light, compact solutions

Saft brings many of these competitive strengths to this evolving industry. "We provide a full system, capable of ensuring security at all network points," he explains. In addition to system design, Saft's offer includes the CATV UPS, a solution based on switchmode technology that was specifically engineered for this market. This UPS supplies protected remote power in a package that is half the volume and even less than half the weight than other technologies can offer — key advantages given the relatively small street cabinets in which most CATV UPS' are installed.
Other components of Saft's Power Assurance solutions for this market include optical nodes and amplifiers, back-up of headends (220VAC) as well as telecoms and transmission equipment (48VDC). Saft's presence throughout Europe is also a benefit for customers, who have access to installation, support follow-up and network remote control.
Today, Saft's CATV UPS has already enjoyed a number of successes in the UK — Cable and Wireless, Telewest, Eurobell, London Cable and Yorkshire Cable are users — and its products are currently being accredited in several other European countries. Indeed, while the market is already quite strong in the US and the UK, "the market is just taking off, and we expect it to be enormous," Raison adds.

florent.raison@saft.alcatel.fr



Saft invests to meet demand for outdoor telecom batteries



Saft is investing in both new production lines and product development to meet booming market demands for outdoor telecom batteries. In particular, it is meeting the volume requirements of a major U.S. RBOC (regional Bell operating company) and its affiliates.

Indeed, Saft's NCX production capacity continuously increased throughout 1999, and "the market is growing at such a speed that production capacity will ramp up quickly over the course of 2000," says Antoine Brenier, Marketing Manager for telecoms programs within Saft's Industrial Battery Group. "This is a market where the lapse of time between the development phase, the pilot testing, the order and serial production is extremely short. There isn't a traditional ramp-up period." The company has had batteries in test phases in the United States for two years (in Florida, Texas, Nevada and Kansas). More recently, it has also installed test batteries in Singapore, Uganda, Norway, Germany and in the UK. Saft also has potential field tests in the works in countries in Europe, the Middle East and South America.

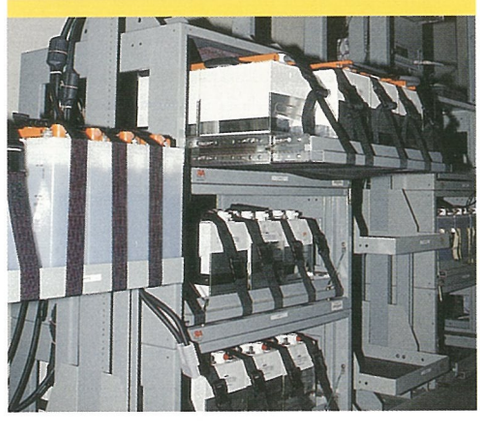
Two key market drivers

The market for outdoor telecom batteries is being driven by two developments in particular: the demand for greater bandwidth and the ensuing installation of technologies such as ADSL (which increase the delivery speed of current infrastructure); as well as the boom in mobile telephony.

Similarly, the bulk of batteries that Saft is deploying is supporting ADSL local exchange applications – particularly in the U.S. and in the U.K. Today, the U.K. is a particularly promising European market for these batteries, says Brenier. "This market has been deregulated for a while, so alternative operators have had sufficient experience with valve-regulated lead acid batteries to fully understand the advantages of investing in Ni-Cd," he explains, adding that Saft Ni-Cd batteries are more competitive on a life-cycle costing basis.

In other countries, such as Uganda, Saft batteries are protecting base stations (BTS) for the country's classic GSM network. Moreover, repeat orders are coming from a variety of U.S. RBOCs for their local exchanges, as well as from a major rail company, which has installed them in base stations along the rail line so that trains can communicate among each other.

Saft batteries in an outdoor ADSL location in California



Working to meet new needs

Saft is now developing new batteries to meet evolving needs. "We're working on products that are sufficiently compact to outfit the micro base stations that are used in particularly dense urban zones such as shopping centers," Brenier says. Such batteries require high energy density, and a capacity in the order of 30 Ah instead of the usual 100 or 200 Ah. These batteries, which are still in the laboratory phase, are being developed using lithium-ion.

A smaller capacity version of the NCX is also in the laboratory. "We're developing a 30 Ah version for customer premises applications, where GSM switching equipment is installed on pylons and have limited capacity needs," he continues. (The NCX batteries are currently available in 80, 125 and 160 Ah formats.)

Saft expects to earn some $100 million in 2001 from this market, with the total world market being ten times that amount.

antoine.brenier@saft.alcatel.fr

Backing up a multinational project

A Japanese-American consortium building a combined cycle power generation plant in Singapore has chosen a Saft solution for its back-up power.

In total, eight AEG UPS' and 16 chargers will ensure emergency lighting and process control functions for the 2 X 300 MW TUAS 2 plant, which will power the process control systems of the city-state's electrical utility. (AEG SVS is Saft's subsidiary in Germany.)

Saft won the contract for a number of reasons. First of all, the products themselves are extremely reliable and enjoy high name recognition. The AEG UPS is also one of the few capable of supporting the long-life and extended autonomy battery found inside the cabinet.

Meanwhile, Saft is on the vendor list of both Missouri-based engineering contractor Black and Veatch and Japan-based Mitsubishi (the other two contractors are Black and Veatch Singapore and Mitsubishi Heavy Industries). Finally, Saft boasts onsite support capabilities in Singapore. Indeed, "the contract itself owes much to a key Saft strength: its international presence," says Gilles Esprit, General Manager of the company's Power Systems Group.

The UPS' and chargers are slated to be delivered in May 2000, and should be operational shortly after.

gilles.esprit@saft.alcatel.fr

The Proqtect **5 INV 1 AEG UPS** will ensure emergency lighting and process control functions.

Ni-Cd makes inroads in trackside

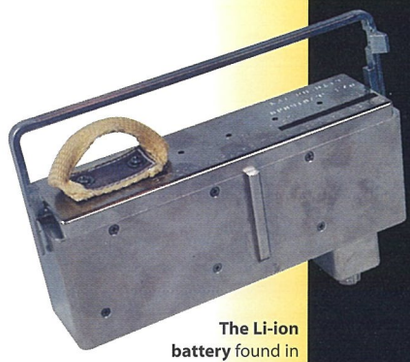
Saft is taking its popular low-maintenance Ni-Cd technology and applying it to new fields.

The Saft SPL Ni-Cd battery.

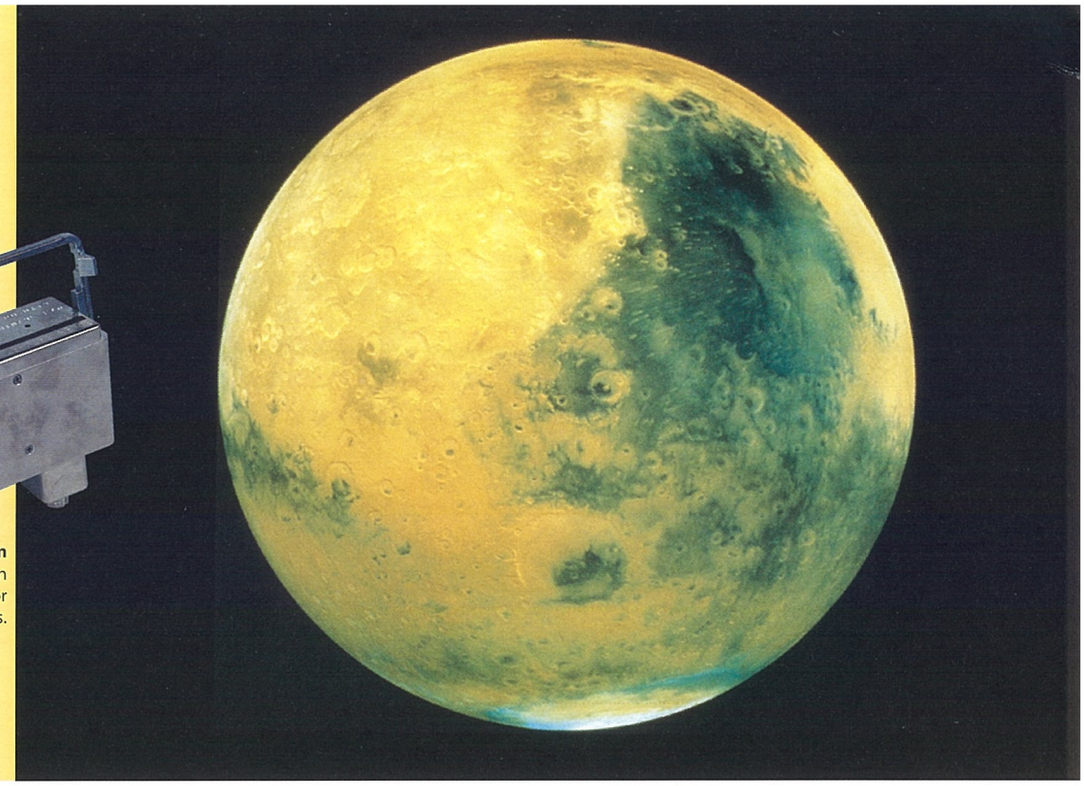
The SPL Ni-Cd battery, for example, will offer railway companies five times the maintenance performance they currently get from the traditionally-used ED batteries in trackside applications such as barrier crossings, signalling and communication systems.

Railways in the US are in the process of weighing their options in order to replace these ED batteries. Several have looked at valve-regulated lead acid (VRLA) batteries, but these suffer from short life spans. "SPL offers the best of both: low maintenance AND the long shelf life of the nickel-cadmium battery," says Tony Green, Marketing Manager with Saft's Industrial Battery Group.

The SPL is based on pocket-plate technology and uses a recombination separator. Unlike most other recombination technologies, however, it uses an open cell to make it more resistant. It consumes roughly one-fifth the



The Li-ion battery found in the special space tool used for the Hubble telescope repairs.



A world first for Li-Ion: its use in the vacuum of space

Saft has supplied the first ever lithium-ion battery to be successfully used in the vacuum of space on NASA's most recent manned space flight.

"The last Space Shuttle mission went up in mid-December to repair the Hubble telescope, which involved replacing a number of components," explains Mike Saft, Marketing Director at the company's plant in Cockeysville, Maryland. "An astronaut had to take off the telescope's panels in order to get to those components. Our battery powered a Power Ratchet Tool, a special tool used in space to take the bolts off the panels." The advantage of lithium-ion for such an application is its light weight, a critical factor for NASA, which is seeking to minimize the weight of virtually everything that goes up; its high capacity, which gives the astronauts greater confidence to complete any repair mission; and, as importantly, it is not prone to high self-discharge. This is especially critical given that the timing of space missions depends on so many unpredictable factors (weather, for instance). "This way, they can just leave the tool on the shuttle and not worry about recharing the battery if there are delays in scheduling," he says.

On to future space projects

Saft has been working on this particular project for the last five years — a long period that is due in part to the timing of repairs to the Hubble telescope, which is dedicated to exploring the universe, as well as NASA's stringent safety qualification processes. "No one had ever flown lithium-ion operating in a vacum on a manned flight in space before," Saft continues. "We had to pass numerous tests and qualifications before NASA felt comfortable with sending up the technology." Its success has led NASA to ask Saft for a next generation system to be developed for use on future shuttle and International Space Station missions.

michael.saft@saftamerica.com

applications

water used by conventional batteries, and requires topping up only every five years — a big improvement over the railways' current maintenance schedule of about once a year. The SPL has been on the market for about six months now. Saft has a number of large test batteries in the field in the US and expects to take some major orders very shortly. This process has also now begun in the UK.

anthony.green@saft.alcatel.fr

Turnkey energy for Global Crossing

Saft will be delivering turnkey energy systems to Alcatel, who is supplying an 18,000 km fiber optic ring network around most of the South American continent to telecoms carrier Global Crossing.

Saft will provide the energy systems in each of the 11 link points for the ring network.

Saft's portion of the contract involves a complete turnkey system, including engineering, design, installation and commissioning of the energy systems for each of the 11 link points on the continent. Each includes two sets of full redundancy standby diesel generators (2 time 4 x 650 KVA from partner SMDO), 480V/3 MVA AC distribution systems including Modular switching Board (MSD) and an Automatic Transfer Switch (ATS), 48V DC power systems (3000 Amp), lead acid batteries (from partner GNB) and AC UPS systems.

Saft's energy systems will power the buildings' telecoms transmission equipment, including power feeding equipment for repeaters and amplifiers, which link the fiber optic ring network to South America's terrestrial networks. Saft energy systems will also provide 4 hours' worth of battery back-up and 7 days for the total Diesel generator system.

A very complex project

"We often have worked on similar projects, both with Alcatel in projects around the world, and with France Telecom in France, but never on a project of this scale with this very short delivery," says Jean-Paul Bré, Global Sales and Key Account Director. However, "we had the capacity and expertise to put this very complex project in place. We're also one of the few back-up energy suppliers with a worldwide network capable of offering maintenance, even installation services."

The contract is mobilizing Saft's entire plant in Tours, which manufactures the group's power supply solutions and whose engineers are working hand-in-hand with the many sub-contractors involved. The entire contract will be delivered end of first semester 2000. Saft began delivering to Alcatel in the second half of January.

jean.paul.bre@saft.alcatel.fr

Backing up the 2000 Olympics

Saft in Australia is supplying back-up power to support all the main communications and back-up systems for SOCOG, the Sydney Olympic Games Organizing Committee.

The contract, awarded in late October, involves a 500 kVA AEG UPS capable of supplying 17 minutes of battery back-up. The system was delivered end of January 2000.
"SOCOG chose us over heavy competition because of our delivery timeframe and our local support and maintenance capability," says Rick Jensen, Managing Director of Saft Australia. The company is also slated to supply up to 40 UPS units throughout the Olympic site during the games, to be held in September 2000. These units will back up the Games' various communication infrastructures for radio, TV, media and computer back-up.
Saft is also in the final negotiation stages of an agreement that would make it the recognized sole supplier of DC current systems for the Games.

richard.jensen@saft.alcatel.com.av

Rick Jensen, Managing Director of Saft Australia

UK Ministry of Defense counts on Saft/Lincad solution

Saft has teamed with UK battery manufacturer Lincad to provide the UK Ministry of Defense with a lithium-ion solution called ECLIPS (Extended Capability Li-Ion Power System), which will be deployed for new applications as well as for traditional radio transmission systems used by the Armed Forces.

MoD is currently using a 12Ah, 24v battery, though the ECLIPS range features a modular design that can be easily and quickly reconfigured (6Ah and 18Ah at 24v nominal, and 12Ah, 24Ah and 36Ah at 12v nominal).
"We expect that ECLIPS will become a full 'family' of Li-Ion batteries for use throughout the MoD/UK armed services," says Richard Boyens, Sales Director for lithium-ion at Saft in the UK.
"Lithium-ion batteries are increasingly specified for military and civilian battery packs where high energy and low weight are crucial," he continues. "Our medium prismatic (MP) cells enable batteries to be designed with far greater energy density and less wasted 'dead' space within the battery case, thus leading to smaller and lighter packs." Boyens adds that lithium-ion offers better cycling performance than other battery types, thus offering customers competitive life cycle costs.

A new collaboration

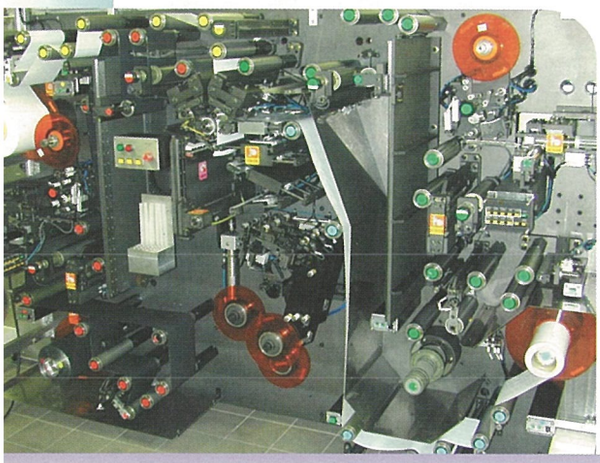
This is the first time SAFT has formally worked with Lincad, who is traditionally a competitor in the military market. Lincad will be responsible for battery charger design and manufacture, while Saft will supply the lithium-ion MP cells. The Saft/Lincad partnership won the contract over four other competitors, not only for its technical solution but for the speed with which it can deliver the products. "All the necessary technology already exists and is in production," Boyens explains. Saft had also supplied MoD with lithium ion batteries in previous contracts.
Saft/Lincad will initially supply a limited amount of batteries and chargers for field testing in August 2000. Full production is expected to follow in early 2001.

richard.boyens@saft.alcatel.fr

Guy Sarre, Li-ion project manager

New High Energy Li-ion line up and running in Bordeaux

Saft's new high energy lithium-ion pilot production line is up and running and already manufacturing cells for the automotive industry as well as for other segments such as satellites.



The HE lithium-ion cells reduce weight all while improving energy density by about 20% over comparative Japanese products.

"This pilot line proves that we can produce HE lithium-ion cells on an industrial scale with the same types of equipment we have installed and by using the manufacturing processes we have adopted," says Guy Sarre, line manager, who adds that that stringent automotive quality standards are being met. The line, located at Saft's Technical center in Bordeaux and launched earlier in 1999, will produce at least 15,000 cells in 2000; its capacity can be extended to 60,000 if it becomes necessary.

High energy AND high power

Moreover, thanks to financial backing from the French Ministry of Industry, Saft will now be able to adapt its pilot line so that it can also manufacture medium- and high-power Li-Ion cells.

The added capability reinforces the Bordeaux plant's role as a center of expertise for the development of new automotive applications such as hybrid vehicles, starter-generators and ISG-24V systems.

guy.sarre@saft.alcatel.fr

Major investments improve service at Cockeysville plant

A $20 million investment in the Cockeysville facility over the past three years will enable it to produce up to 20,000 lithium-ion cells for its core activity: space and military applications.

Khushrow Press,
Cockeysville General Manager

In fact, the site is now able to take projects from development and design on through production and delivery, from a single American site.

"We've upgraded our test facilities and manufacturing capabilities," says Khushrow Press, Cockeysville General Manager. The upgraded facilities will allow Saft to supply low volume production of batteries from pilot facilities.

"Before, if a military customer, for instance, wanted battery packs for 20 trucks, we had to supply 20 prototypes. Now, we will be able to do one prototype, and then low volume production of the others," he adds. As a result, the plant will be able to produce more packs, more cost-effectively.

"The investments will clearly help us with turnaround and product consistency," continues Press. "We've already improved product quality as equipment has come in. For instance, we have an upgraded coater. We'll continue to improve our throughput as additional equipment arrives."

Better test facilities

Cockeysville also boasts improved test facilities. "Often, customers do not have such capabilities themselves. These are very important for qualifying technology for many different applications," he continues. At the moment, the plant is testing cells for both satellite and military customers (Loral, DARPA).

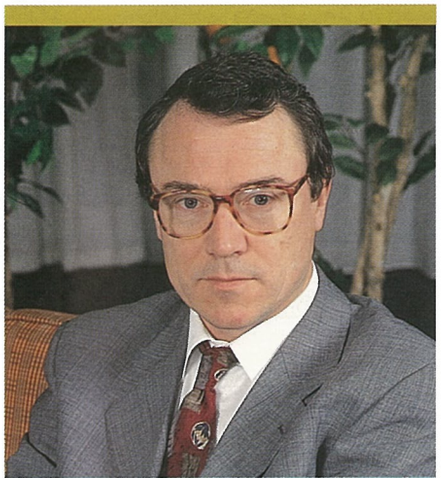
khushrow.press@saftamerica.com

Saft puts portable cell production and assembly in same plant

Combining both functions in one plant will reduce lead times and improve inventory management.

The Saft plant in Nersac, France, has long manufactured Ni-Cd and Ni-MH cells for portable applications.
Until December 31, 1999, however, the cells had to travel 15 km down the road to Saft's plant in St Yriex, where they were assembled into battery packs. Today, both functions — cell production and battery assembly — are combined on a single site in Nersac. Indeed, Saft has closed its plant in St Yriex, transferring its 200 people and 20 assembly lines to Nersac, where a new 6700 sq.m. building has been constructed to house them.
"Portable batteries are a highly competitive market, where lead times are forever shrinking and pressure on prices is strong. The new rationalization enables Saft to better meet market challenges," says Pierre Chataigner, General Manager of Saft's Portable Battery Group. First of all, having both production and assembly on a single site reduces lead times and enables a better inventory management. "We will gain in reactivity by having shorter flows, not only in terms of production, but also with regards to administration and product development," says Plant Manager Frank Cecchi.

Frank Cecchi, Plant Manager



Pierre Chataigner, General Manager of Saft's Portable Battery Group

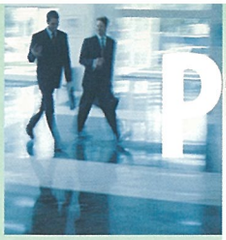
All in one space

Moreover, while the plants had both been working on project platforms, the two teams will now work in the same physical space. The same applies to teams working on quality control, purchasing, sales administration and order throughput.
Today, Nersac continues to be a strong supplier to the telecommunications industry, and is attacking new markets such as portable power tools, professional video, and small mobile vehicles such as wheelchairs.

frank.cecchi@saft.alcatel.fr

A new automotive project

Nersac is also planning to construct a building to accomodate new production lines dedicated to the automotive industry. In fact, the Charentes department has just granted the plant a subsidy for its future automotive project, which will create jobs in the region.
The plant will produce high-power Ni-MH batteries for the starter-generator and hybrid vehicle applications (the only non-Japanese plant to produce such batteries). It will also include an industrial lithium-ion battery line, to be operational at the end of 2001. (It will be the first in the world.) The plant will take advantage of all the efforts made in Bordeaux with the pilot lithium-ion line.



Partnership

Saft becoming a supplier to the auto industry

Electrical systems are increasingly important to the automotive industry. One result is more vehicles with "hybrid" power systems, which combine an internal combustion engine with an electric motor.

This is a major challenge to the industry, and the consequences are significant not only for the car manufacturers themselves but for all their suppliers — including Saft.

"The fast growing interest for advanced battery technology has had an impact on the scope of our activities with car manufacturers," says Thierry Faugeras, Director of Sales and Marketing for Saft's Advanced Technology Division. First of all, "we are moving from being only a research and development partner for the automotive industry to becoming a fully-fledged supplier".

A new focus for batteries

This is largely because the industry's priorities in terms of batteries have shifted: if Saft batteries were only considered for electric vehicles (EV) applications just a year ago, they are now looked at as essential components of new core electrical applications such as starter-generators, 42V systems and hybrid vehicles.

This shift has had a dramatic effect on expected volumes. "Before, the industry bought a limited amount of batteries from our pilot production lines for concept or demonstration cars and fleet experimentation," he says.

Now, Saft's credibility as a fully-fledged supplier rests on its large scale industrial production capability. "With its Nersac plant, Saft is clearly demonstrating it is able to manufacture large volumes while respecting the automotive standards for quality and cost," Faugeras continues.

Saft's World Class 2000 reengineering program has already led to notable progress on these issues over the last two years. At the same time, the logistics, quality and R&D audits that automotive manufacturers have done over the past few months on both the Bordeaux and Nersac plants have yielded positive evaluations.

On the purely technological front, Saft is taking full advantage of its recent successes with high energy batteries, and is working to adapt to new market requirements.

"We've had to adapt all the work we've done on batteries for EV applications, which require high energy, to these new concepts, which focus more on high power," Faugeras explains.

Take, for instance, Ni-MH. An EPIC electric-powered minivan developed by DaimlerChrysler logged 353.1 miles in a 10-hour period last November, demonstrating the concrete benefits of Saft's EV Ni-MH products, including their fast charging capability. Today, Saft has adapted its Ni-MH technology and developed high power, spirally wounded cylindrical cells, to be mass produced in the Nersac plant for 42 V - integrated starter generator systems.

Saft is taking this same approach to lithium ion. The company initially developed high energy Li-ion technology for EV applications, which has been evaluated successfully by car manufacturers such as Renault (see next page). Now, Saft is also

Thierry Faugeras, Director of Sales and Marketing for Saft's Advanced Technology Division

fully-fledged

DaimlerChrysler's EPIC electric-powered minivan logged 353.1 miles in a 10-hour period last November, demonstrating Ni-MH's fast charging capability.

introducing medium range and high power lithium ion cells, which are under consideration by manufacturers such as DaimlerChrysler for their new hybrid programs.

Consolidating efforts around projects

These market evolutions have meant structural changes for Saft as well. As the automotive industry begins to streamline the number of technology options it is exploring and gradually moves towards more standardized solutions, Saft is also consolidating its technology efforts around these specific projects (EV, hybrids, starter-generators and 42V systems). As part of this approach, Saft has set up multi-disciplinary battery integration teams, which again mirror similar teams in the industry. According to Faugeras, Saft's teams, located in dedicated structures such as the Technical Center in Bordeaux, haved added to Saft's credibility amongst manufacturers. "After all, these teams truly enable us to co-engineer with our customers," he stresses.

See following page

DaimlerChrysler successfully completes launch of EPIC electric minivans in California

Saft batteries equipped EPIC electric minivans

The U.S. Postal Service in San Diego, California, will put 45 zero-emission EPIC electric minivans into service this year under an agreement with DaimlerChrysler Corporation.

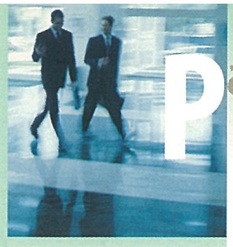
The EPIC, or Electric Powered Interurban Commuter, is the electric version of DaimlerChrysler's popular Dodge Caravan minivan. The vehicles will be delivered in the first quarter of this year.

The EPIC is powered by twenty-eight, 12-volt Ni-MH Saft batteries that deliver up to 80-90 miles and can be recharged within 30 minutes — much less than the typical 8-10 hours needed to recharge other electric vehicles. In a recent demonstration of fast-charge capability, an EPIC logged more than 350 miles on the streets and expressways of Atlanta, Georgia, in one 10-hour period.

With delivery of 45 EPICs to the San Diego Postal Service and commitments to other customers, DaimlerChrysler has successfully leased all of its current production of electric minivans. DaimlerChrysler's next generation electric vehicle is currently under development and will be introduced in the fall of 2002.

DaimlerChrysler has exceeded its commitment to place electric vehicles under the Memorandum of Agreement with the California Air Resources Board. A total of 62 EPICs will be in use at Postal Service offices in San Diego, Harbor City, and Huntington Beach. Xpress Shuttle, a shuttle service that operates out of Los Angeles World Airport, has 11 in service, with nine more being ordered. Other major users include the Department of Defense at Navy and Air Force bases and the University of California at Los Angeles (UCLA). The delivery service UPS plans a fleet of 13 EPICs for use in southern California.

There are also some 25 EPICs in use in the State of New York.



Renault now testing Saft Li-Ion technology

As electrical requirements create priority shifts in the automotive industry, companies like Renault are looking to Saft for solutions that will handle their increasing energy needs.

"New automotive technologies require an increasing amount of electrical energy. Until recently, a lead acid battery was sufficient for our requirements. But no longer. We are actively seeking battery solutions capable of stocking more energy while offering greater peformance," says Antonio Moretti, Deputy VP in Renault's Department of Special Vehicle programs.

Saft's relationship with Renault dates back to the early 1980's, when the constructor began developing its first prototype electric vehicle using Ni-Cd batteries, the Express, which has since evolved to become the Kangoo.

For the time being, Moretti says Ni-Cd remains the most reliable electrochemical couple for EV's, but "the promise of lithium-ion means we will be able to use it not only in EV and hybrid vehicles, but also in starter-generator and 42 V applications. That's a key advantage of lithium-ion. It has a high energy density AND high power, making it usable across a range of applications," he says.

Clearly, Saft has the technological expertise required in this technology, and can already supply Renault with Li-Ion cells that will allow it to conduct preliminary tests, he continues. Saft is currently sizing a battery that will allow Renault to go ahead with these. The tests will then verify the battery's performance in both an all-electric version of the Kangoo, as well as in a range-extender, hybrid version.

Renault should then be able to begin serial production of a Li-Ion version of the Kangoo in three years.

"This will be a big step for Saft," he says. Nonetheless, "the company already has pilot lines and has begun deploying significant means to strengthen its industrial capacity and ensure that stringent industry requirements in terms of both quality and cost reductions are met," he says.

evsaft@saft.alcatel.fr

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This is especially important as alliances continue to mark the industry (Daimler/Chrysler, Renault/Nissan, Ford/Volvo): these foster the development of corporate technology strategies. "This could lead to choosing preferred global suppliers, and creating synergies with competence centers," Faugeras adds.

Saft, of course, is also implementing a global key account manangement structure which mirrors its customers'.

As the nature of Saft's automotive work moves from experimental to industrial, the source of its funding also evolves. Public authorities have long been willing to heavily subsidize cutting-edge R&D projects, but, "industrial programs are leading us to establish commercial partnerships with our customers," says Faugeras.

"We still have many challenges to meet, but the many efforts we've made give credibility to our quest to become a fully-fledged supplier," he concludes.

evsaft@saft.alcatel.fr