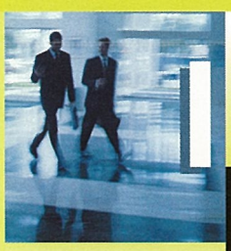
# Saft



NTERNATIONAL
Saft's customer magazine

Number 12 Summer 1999

Saft onboard experimental satellite

# Lithium-ion gets ready for revolutionary space flight

# Saft: a long-term reliable partner for the 21st century

On the eve of the 21st century, customers are becoming suppliers of systems and architectures rather than simply providers of products. This strategic evolution requires that they integrate a wide range of advanced products and technologies from key suppliers, who must also adapt their efforts. In this context, we at Saft recognize that quality, competitiveness, globalization and technological innovation bring the highest value to our customers. Therefore, we consider these areas as key success factors for Saft.

Jean Brunol
**Managing Director**

**Quality:** This is a mandatory prerequisite for our products. After all, Saft AC and DC Uninterruptible Power Supplies (UPS) and batteries operate as either sole energy sources or as a critical security back-up systems. As quality requirements become more stringent and the demand for systems conformity increases, Saft must provide ever more reliable solutions. To ensure this, Saft embarked on a World Class quality initiative in 1999 involving both products and processes in R&D and manufacturing, as well as suppliers and selected customers. Our objective for this program, which will be fully deployed in early 2000, is to reach a tenfold improvement.

**Competitiveness:** You are all operating in highly competitive markets, as we are. Cost is a daily concern for our company, and a key factor in our massive World Class 2000 reengineering program. Moreover, it's also key to our commitment to 'value for money', whereby we avoid costly overspecifications of both the solutions we offer you as well as those embedded in our products.

**Globalization:** Given our worldwide operations, Saft is often sought out for global partnerships, which bring win/win benefits for both customers and suppliers. We successfully operate several such partnerships and we are committed to creating more wherever possible.

**Technological innovation:** This is a key priority for Saft. Through our World Class 2000 program, more than 50% of our product portfolio will be completely renewed by year end. Look for new power tooling Ni-MH batteries; long-life, highly reliable telecoms batteries for outdoor applications; Ni-MH and Li-Ion batteries for EV and automotive applications; as well as intelligent rectifiers and industrial UPS.

We are proud of what we've accomplished so far, but we fully recognize that continuous improvement is a ongoing process. We hope you recognize our commitment to this process, which reinforces Saft's position as a long-term and solid partner for the 21st century.

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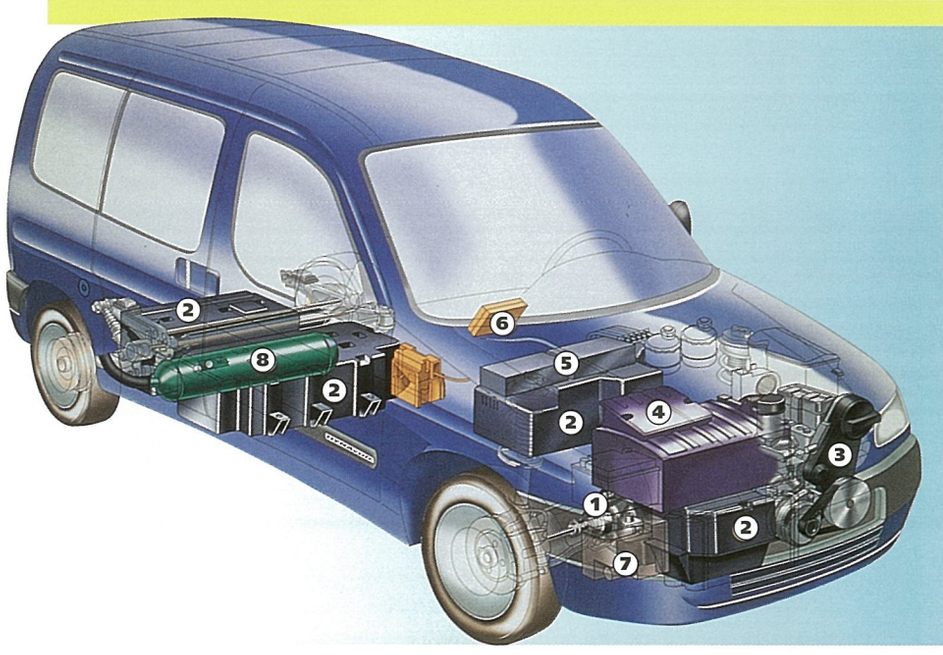
# The automotive industry: a new world of opportunity for Saft


**Saft has long been a leading supplier of the batteries found on many forms of transport, including trains, airplanes and buses. Today, the company is gearing up to add another segment to its roster: automobiles.**




Indeed, Saft has not traditionally served this important industry with significant volumes. There are serious indications, however, that this may be about to change.

The automotive industry is undergoing a revolution, and it is opening the door to requirements for more advanced battery technologies. "Until now, these projects were R&D only, with a lot of prototype vehicles," says Thierry Faugeras, director of sales and marketing for Saft's Advanced Technology Division. "Today, these are becoming serial commercial programs, which is a brand new development."

As a result, car manufacturers are creating new transversal, core-competence teams dedicated to specific projects. These teams integrate skills and expertise which had so far been absent from the industry, and cover areas such as electronic systems, electric motors and new generation batteries. "Again, this is new for us; before, we were not consulted," says Faugeras.

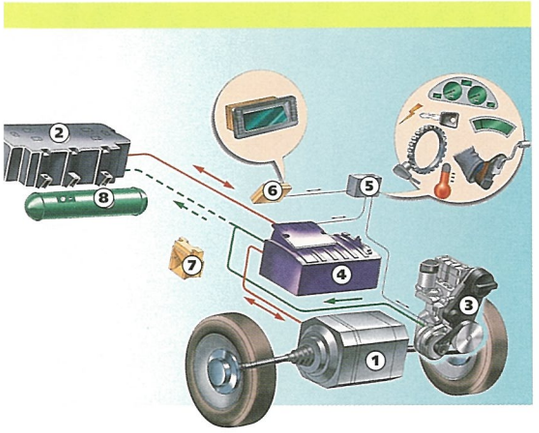
These developments have had a positive impact on Saft. "Over the last 12 months, we've seen a marked increase in interest in either hybrid vehicle systems or in new concepts for internal electric networks for thermal vehicles," Faugeras continues. Indeed, Saft has been solicited for projects related to new automotive electric networks, hybrid vehicles and electric vehicles. If all were to materialize, it would multiply the Advanced Technology Division's business by 5 to 10 within the next three to four years. "Clearly, this is a major source of potential growth for Saft," he adds.

## New architectures for electric networks

The most recent and promising development for Saft is driven by the emergeance of 42 V standards for automotive electric networks, which all European manufacturers are working towards. The ever-increasing number of functions which use electricity in cars — air conditioning, automated seat positioning and in the longer term, electric braking and electrically-assisted direction — requires a greater amount of power which cannot be satisfied by the current 12 V network and its lead-acid battery. The 42 V trend is also being driven by environmental legislation, notably the EU directives which seek to reduce $CO_2$ emissions — something attainable only through decreasing fuel consumption. New advanced power trains concepts — integrated starter-generators (ISG), direct injection — are seen as the solution to achieving this goal. The integrated starter-generator, for instance, is slated to appear on the market in late 2001, and will help reduce fuel consumption in urban situations by about 20%. Such devices also require 42 V, thus necessitating a more adapted battery. "We're attacking this market with a modular approach," Faugeras explains. Saft can offer these manufacturers a Ni-MH

**The Citroën Berlingo Dynavolt is one of a new generation of hybrid vehicles, a segment in which Saft is currently involved.**
**This vehicle consists of (both photos):**

**1** electric transmission motor
**2** traction battery
**3** auxiliary GPL thermal group + integrated starter-generator
**4** command calculator for electric motor
**5** command calculator for auxiliary group
**6** program selection and energy management
**7** heating group (GPL); on smaller diagram: exterior socket
**8** GPL reservoir with discharge valve




spiralled cylindrical battery for which it has a plant (in Nersac, France) capable of producing large volumes today. "This is a technology we have today for tomorrow's vehicles," he continues. The battery is geared to manufacturers who want to have a 42 V battery by the end of 2001. For programs with commercial launches beyond 2003, Saft also offers high-power lithium-ion, which has a compatible industrial roadmap. This more advanced technology is developed in the framework of the PNGV program (Partnership for a New Generation Vehicle), sponsored by North American car manufacturers.

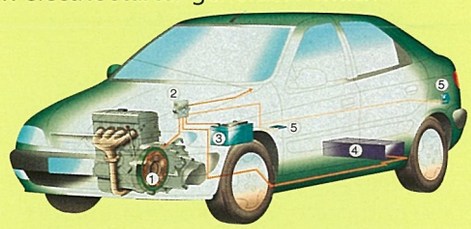
## Hybrid and electric concepts for cleaner cars

"We have the same technology options for hybrid vehicles as we do for 42 V projects, even if in the long-run, lithium-ion is the ultimate choice," says Faugeras. Hybrid vehicles all allow drivers to alternate between a thermal motor and an electric one. Here, the battery enables the car to function electrically (in dual-mode) for 20 to 30 km; the car also gets a power boost when it accelerates. Eventually, these will allow manufacturers to reduce the size of their thermal motors and, again, reduce pollution.
Finally, Saft continues to be the main supplier of batteries for electric vehicles, a segment which remains a market with medium-term growth possibilities. In the U.S., more specifically in California, the market is legislation-driven. Chrysler has committed to Saft's Ni-MH battery for its EPIC mini-van, which will be launched in 2003. Meanwhile, in Europe, the market drivers are slightly different. France is exemplary in this domain; it has the largest fleet of EVs (about 5000) in circulation. "This creates a base from which to refine the marketing issues surrounding the EV, which is perfectly adapted to segments such as urban community transport." Here again, after several years of supplying nickel-cadmium, Saft's more advanced technologies are leading to autonomy and price advantages. Thanks to pilot lines in Bordeaux, Saft already has an existing production capacity of several hundred EV Ni-MH and Li-Ion batteries per year.
Gaining recognition as a volume supplier to the automotive industry is a challenge, because it requires a new corporate culture and new skills. Nonetheless, Faugeras believes Saft has the "technical skills and competence to design reliable battery systems for automotive applications. We also have the industrial know-how to ensure mass production at optimized costs," he explains.
"Finally, we are the only supplier with a technological roadmap which includes Ni-Cd, Ni-MH and Li-Ion."

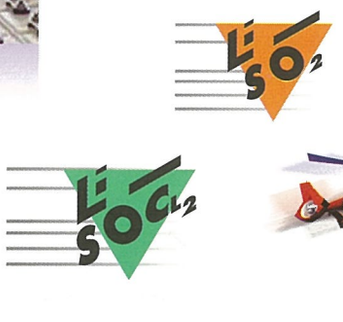
## PSA Peugeot Citroën takes on the hybrid market

**PSA Peugeot Citroën has high hopes for its Dynalto hybrid system, first presented on the Citroën Xsara and which the group plans to market early next century.**

"We don't consider this hybrid market as a niche market," says Joseph Beretta, manager of research and advanced projects within PSA Peugeot Citroën's Innovation and Quality Division. "Users get essentially the same services and functions from this hybrid vehicle as they do from a thermal-engined car, plus a host of new advantages". A key part of this similarity is an initial price that's much more in line with traditional car prices. "There will be a price difference, but it will correspond to the advantages this car brings," he notes. These include an improved driving comfort, particularly in the start-up phase, as well as up to a 20% decrease in fuel consumption.
The Citroën Xsara Dynalto owes its performance and relatively low price to its status as a 'parallel' hybrid: that is, it does not feature electric traction as true hybrids do, but rather, an electric starter-generator which



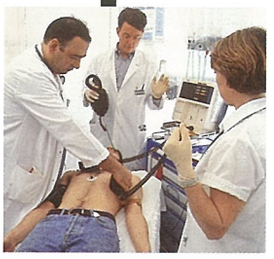

functions as an electric motor in the start-up phase, and then as a generator during the driving phase (the starter-generator functions in 42 V). Beretta expects this type of motorization to be used in other models as well.
PSA Peugeot Citroën also has other hybrid vehicles in its range. The Berlingo Dynavolt, introduced at the Geneva Auto Show this year, is a serial hybrid light delivery car which features not only an electric traction motor that is a direct offshoot of an EV motor, but an auxiliary GPL thermal group as well, making it a truly environment-friendly vehicle.





# More civilians discovering the appeal of primary lithium

**After many years of steadily supplying defense markets with primary lithium batteries, Saft is branching out and finding a host of civilian applications for its long-life products.**



Take, for instance, defibrillators. Once fixed devices that could only be used by doctors in hospitals, several companies are now marketing portable automated external defibrillators for use in airplanes, police cars and other emergency vehicles. These user-friendly devices will not function if they detect a heartbeat. "An alkaline battery would not be powerful enough in this application, which requires a battery with a high pulse capability and high capacity, resistance to high and low temperatures, as well as longevity and reliability," says Detlef Stevenson, vice-president of sales for primary lithium in Valdese.

## Great long-term performance

For similar reasons, primary lithium is now used in marine safety applications such as the locator beacons and lights found on life vests and rafts on airplanes, ships and ferries. "This market is legislation-driven: batteries must be replaced at least every five years, and lithium is the only technology to have this kind of longevity," he says.

Back on terra firma, Saft is now working to develop a new market for shopping cart wheel brakes. Many shopping carts in the U.S. are stolen, and at $300 apiece, the losses can add up quickly. Saft has supplied two-cell battery packs, which fit into a device attached to the cart's rear wheel. It supplies power to a small electric motor, which activates a block in the wheel. "If cart travels beyond a pre-set distance, then it's activated," explains Stevenson.

Longevity is key here, too. After all, "if the ultimate goal of using such a device is to save money," Stevenson continues, "it makes little sense to use batteries that will require frequent replacement."

Finally, Saft is providing 400 batteries for a National Geographic-sponsored team of speleologists exploring the Chiquibul caverns in Belize, the largest natural caverns in America. The batteries are used to power the flashlights and lights that are so necessary to a successful mission. Saft's lithium batteries allow the expedition to go in with fewer batteries and a much lighter load.

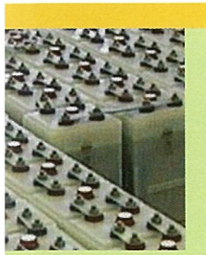
## Hospital back-up power in Brisbane

*Saft Australia has won a contract to provide back-up power to the Royal Brisbane Hospital, the largest in Australia's State of Queensland. The contract, which is the result of three separate tenders, calls for Saft to provide six UPS systems for computer system back-up, as well as 15 BCMP substation protection and control battery systems (four medium-voltage and 11 low-voltage). "This is a prestigious contract for Saft Australia, because of both the competition — at least 10 suppliers were vying for the contract — and the importance of the site," says Ross Hargreaves, northern regional sales manager for Saft Australia. "These systems provide back-up power in life and death situations." The contract also opens doors for Saft, because the Queensland Government is modernizing other hospitals throughout the State. Hargreaves attributes Saft's success in part to the time it spent getting its equipment specified by the consultants handling the project on behalf of the hospital. This process is typical of many Queensland Government projects, whereby outside consultants define needs and weigh the various competitive proposals.*

# Greater capacity for Saft AAA Ni-MH cells

**The telecoms market changes every two years, and Saft's new AAA Ni-MH 650Ah battery is proof positive that the company is capable of responding quickly to evolving needs.**


"Only three months ago, 100% of our AAA cells were of 600Ah," says Chahriar Esmaili, director of engineering at Saft in Tijuana. However, the market is asking for an increase in capacity and a greater running time of the cells. Consequently, Saft is planning to upgrade all of its AAA cells to 650Ah. One of the key characteristics of the AAA batteries is their long storage performance. "When batteries are not used for a long time, they lose some of their performance," explains Esmaili. "The AAA batteries reduce this irreversible loss by a factor of three. With the 650Ah cell, users get 9% more capacity as well." Though the AAA 650Ah cells will ultimately replace the AAA 600Ah cells, these will co-exist in 1999. "Our three lines are capable of manufacturing both without any problem," he continues. "Our objective this year is 26 million cells per year, and 32 million by 2000." The first industrial run of the 650Ah cell was made in April 1999, with a commercial launch at the end of that month. This involved a sharp ramp-up: from 300,000 cells in April, the company is now able to produce 1.8 million VH AAA cells per month. Saft's AAA 650Ah cell has already been qualified by major market players such as Ericsson, Siemens and Alcatel.



## Nickel-cadmium batteries for Queensland Rail

Queensland Rail is presently taking delivery of 33 X 110 V sets of SBM 84 nickel-cadmium railway batteries, which will equip 33 new 3-car electric trains built by Adtranz-ABB. This is the first time the rail authority forsakes lead acid in favor of nickel-cadmium — a switch that took Saft five years to negotiate. "The customer made this decision based on life-cycle costing and nickel-cadmium's reliability and performance in traffic," says Ross Hargreaves, northern regional sales manager for Saft Australia. The Saft batteries supply auxiliary power under emergency situations, providing lighting as well as enabling the train to restart.

Queensland Rail had had several problems with train breakdowns with lead-acid batteries, which was costing it a lot of money. Now that the authority has equipped its new trains with nickel-cadmium, "they are looking very closely at upgrading all their trains to this technology," says Hargreaves. As a result, Saft has the potential to supply another 100 battery sets to this customer in the near future.

## Saft improves its offer to the rail industry

Saft has long supplied the rail industry with powerful and robust SRX and SRM nickel-cadmium batteries. Until this year, however, Saft sold these cells assembled into battery crates, which customers then adapted into battery boxes that fit their own equipment.

"Since the beginning of the year, we've been selling more and more integrated solutions, whereby we supply custom-designed boxes," says Anne-Marie Billard, Saft product manager for the rail market. This is particularly true with new, rather than replacement, orders, which constitute about one third of the market.

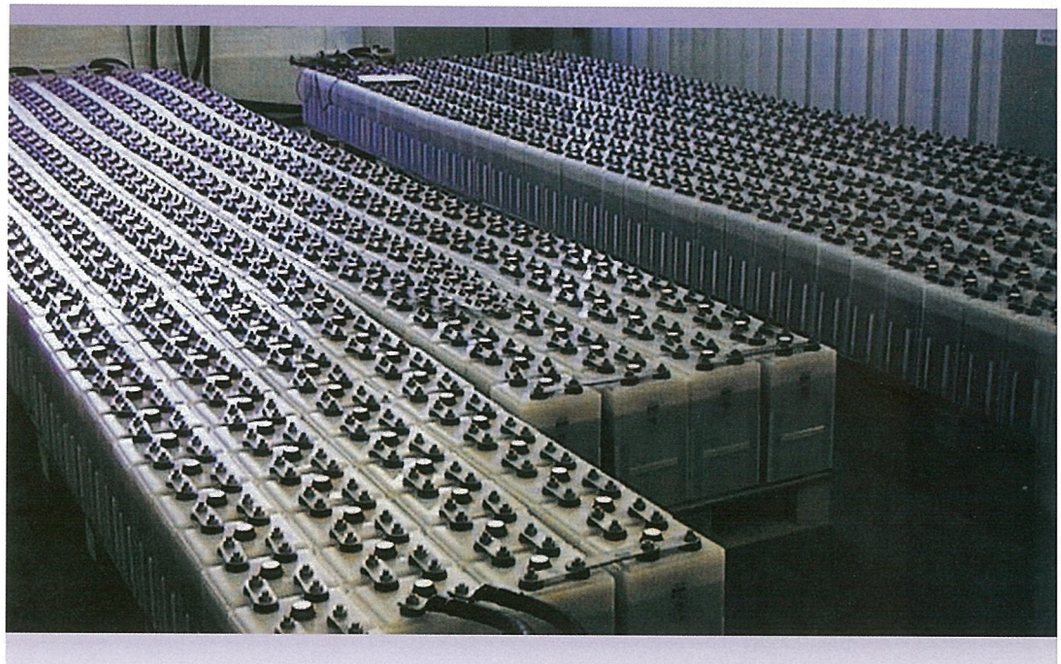
This is only one of the developments Saft is adding to its successful line of SRX/SRM batteries. The products themselves have been improved: they now feature a new, reliable topping up system and thus, a more efficient maintenance process.

Saft has also developed a software program which enables it to provide its customers and prospects with accurate life-cycle costs for the battery. "They give us all their operational constraints: temperature, estimated number of kilometers, the lifespan of the equipment, energy costs and so on, and we can tell them how often they will have to change the battery, as well as how often they should undertake preventive maintainance," she explains. Most rail cars have a lifespan of 30 years, and both the SRX and SRM last about 15.

"This way, we can clearly show that even though Ni-Cd is more expensive at the outset, it has very advantageous life cycle costs," she concludes.

# A breakthrough contract for Saft Ni-Cd batteries

**Saft has won a breakthrough order from Credit Suisse for nickel-cadmium batteries to back up the UPS systems which safeguard the bank's mission-critical central computers.**



The contract, which took close to a year to negotiate, covers the supply of 26 high-power SPH Ni-Cd batteries — almost a total replacement of the lead-acid batteries the bank had long relied on to perform the same functions.

Lead-acid batteries have a limited lifetime, and after a certain period, they are prone to sudden death. "The trouble is, it's very hard to predict when this sudden death is likely to occur," says Markus Frei, battery project manager for Statron, Saft's representative in Switzerland.

As a result, Credit Suisse had been planning to replace its lead-acid batteries every four years as a measure of security. After all, says Dominique Debon, Saft's export manager for industrial battery sales, Credit Suisse transmits millions worth of electronic money daily; a failure can mean very heavy losses.

"We then proposed that Credit Suisse compare the 4-year lead-acid replacement project with nickel-cadmium," continues Frei. Though Ni-Cd's initial cost is higher, its overall lifetime cost is more economical as it lasts 3 times as long, and it comes with a full 12-year performance guarantee— which corresponds to the lifespan of the entire computer system.

## Comparing life-cycle costs

Credit Suisse was impressed, but it waited until Saft's quality assurance experts in Bordeaux, where the SPH batteries are produced, could demonstrate the batteries' performance in operation before accepting the delivery. Once the installation is completed in September, Saft will have 26 SPH batteries (half at 300 kVa, half at 250 kVa) in Credit Suisse's two central computer rooms in Zurich. They will provide 15 minutes of back-up in the event of a power failure.

This is the first time that Saft supplies nickel-cadmium batteries for this type of application — a factor Debon attributes to its higher costs. But as banks and many other users of large computer systems move to new generations of UPS systems — and lose faith in lead-acid — Debon expects a bright future.


## Ni-Cd gaining ground in the outdoor telecoms market

**Saft has a parallel solution to meet the demands of the booming outdoor telecoms market: the NCX and Ultima Plus nickel-cadmium batteries, and they are stacking up a list of successes.**

Test batteries have already been installed in a number of U.S. states, including Texas, California and Nevada — all states where climatic challenges are great (there are also batteries installed in Connecticut). Several U.S. operators are placing regular orders for both


# Taking advantage of the brand image

**Uniross, the Saft unit that sells to the consumer market, is launching a range of accessories for camcorders under the Polaroid brand on the European market. This range includes five camcorder batteries, one charger as well as a corresponding backpack.**

"Our market research shows that many users believe they'll get a better quality film by using a Polaroid battery," says Clotilde Heibing, marketing manager at Uniross. Uniross will be supplying a range of technologies to meet market needs. Two-thirds of the products will be Ni-MH, one fourth, Ni-Cd and the last, but growing portion, Li-Ion.

"This new offering will be positioned between the original batteries (the ones sold with the camcorder purchase, which represent one-third of the market) and the brand-name replacement batteries (which hold another third)," she continues. "In fact, we're creating a whole new market segment all while bringing added value." Original batteries tend to be the same brand as the camcorder, while replacement batteries also include brands such as Duracell, Varta and Energizer.

## Following camcorder sales

The market for camcorder batteries varies according to country; in France, there are 335,000 camcorders sold yearly, while in Germany, that figure is 532,000.

For every camcorder sold in Europe, an average of one replacement battery is sold. Since research showed that many buyers found buying a camcorder battery too complicated, the Polaroid range will feature a transparent packaging that will allow buyers to verify thickness and precise dimensions. It will also provide all essential consumer information on the front of the battery. Saft will also launch a Polaroid-branded video range later in the United States this year.

the NCX and the Ultima-Plus; a Canadian company has even reordered its second batch of batteries. The NCX is also being tested in Singapore and Germany.

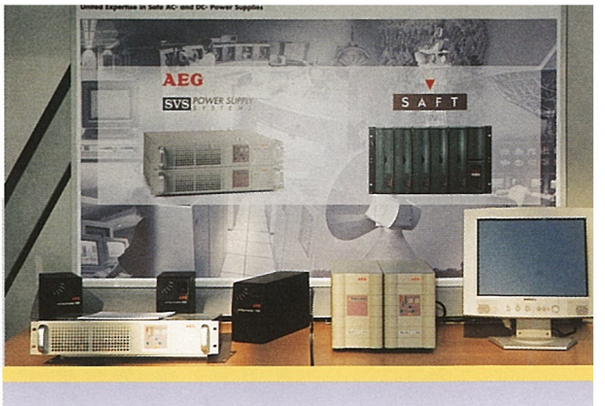
"This is a market where VRLA (valve-regulated lead acid) has been the traditionally-used technology. But operators are disappointed by its performance, and are ready to look at a new technology," says Loic Mahé, general manager for telecoms programs within Saft's Advanced and Industrial Battery Group.

"Both our batteries are complementary," says Mahé. "The NCX is compact, but more expensive (2 1/2 times the price of VRLA), while the Ultima Plus is bigger and less expensive (only twice as costly as VRLA)."

Industrial production of the NCX battery began in June 1998, and investments have been launched for a second production line that will triple the company's capacity.

Given the market's 15 to 20% annual expansion, sales projections increase to the tens of millions by the end of 2003.

For their part, Ultima Plus pocket plate cells are already being produced on an industrial basis in Oskarshamn in Sweden.




# A wider range of UPS — at market prices

**Saft customers in the UPS field are benefiting significantly from the company's recent acquisition of AEG SVS Power Supply Systems GmbH .**

*"For the first time, Saft is able to better serve a wider range of customers as well as provide a complete offer across the range of UPS," says Gerard Ascher, AEG's general manager in Germany. Saft can offer this expanded range at market prices, a new development Ascher attributes to the expected increase in sales volumes due to the merger.*

*This reinforced range of UPS makes it easier for Saft to sell these products to customers of other Saft products.*

*It also opens the door to two new market segments. Long a supplier to the industrial sector, Saft now has a product range for telecom operators, whose more sophisticated IT systems require standard UPS products at market prices. It also has access to the IT networks of large, data-intensive companies and collective bodies: banks, social security networks and the like.*

*AEG UPS systems have long enjoyed an excellent reputation. "Saft customers now have access to this top-range technology," he says. The acquisition also allows Saft to reinforce its position in Germany, where AEG is one of the market leaders. AEG customers also benefit, thanks to a much larger worldwide network. "A customer who buys our product can access it anywhere in the world and get the same service quality," says Ascher.*

# 1999: A Year of Quality at Saft

saft CUSTOMER SATISFACTION 2000 total quality

**If 1998 was the Year of Innovation at Saft, 1999 is its Year of Quality. Though Saft's industrial units have long had their own quality procedures and programs, *"the Year of Quality marks the first quality initiative that encompasses all of Saft,"* says Marc de Rycke, who is responsible for the special mission.**

"It is thus an opportunity for us to implement a very large number of improvements," he says. Of course, the Year of Quality fits into a wider framework: the World Class 2000 reengineering program launched by Saft two years ago. Each of the five areas being examined by World Class 2000 — industrial processes, R&D, purchasing, human resources and logistics — has a quality component to it. "But this year, we wanted to go deeper. The Year of Quality is a starting point for continual process improvement," he says.


## Preparing the future

All quality initiatives have an ultimate goal: to increase customer satisfaction. To this end, each Saft unit has put forward six separate projects, each linked to either the customer, new product development, supplier relationships — indeed, many have integrated suppliers into their teams — or manufacturing. This initiative has generated some 80 projects so far throughout Saft's plants, all of them at varying stages of completion. "I expect new projects to come along, even before the teams have finished," says de Rycke. Interestingly, each project is being led by a pluridisciplinary team rather than by Saft quality experts — after all, quality is everyone's responsibility. The teams, established in the first quarter this year, spent an initial few weeks training themselves in PDCA (Plan, Do, Check, Act), the tried and true process-improvement methodology. "Most teams have finalized their planning stages and are now into the solutions and testing phase. The goal is to reach a final phase by the end of the year," he says.

## Getting it right from the start

The outdoor telecoms market is taking off, and thanks largely to its NCX battery, Saft is beginning to register successes on this high-potential market. To ensure it gets off on the right foot, Saft managers in Bordeaux have decided to re-examine the contract review process for this particular range of batteries. "It is critical that we are perfectly clear about end-user requirements, both from a technical and a quality standpoint, from the start," says Pierre Bourg, quality director for Saft's transport division in Bordeaux

# New relationships = new customer service imperatives

**Improving customer service is not a perfect science. "Customer service is a mixture of reliable, efficient routines and 'soft' service," says Lars Erik Johansson, quality assurance manager at Saft's plant in Oskarshamn, Sweden. Getting the balance right is always key to success.**

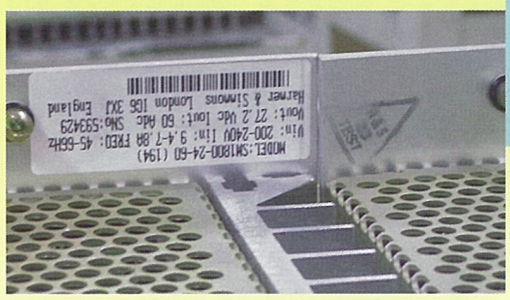
"Saft Oskarshamn is now organizing its battery deliveries directly to the customers instead of via local representatives. That means direct contacts with the battery users," he continues. It also means a much wider range of customers. Whereas the factory was once delivering just to large customers who placed weekly orders, it now finds itself doing the same thing for much smaller customers who only place orders once a year.
An initial step is defining clear responsibilities between the Saft plant and its sales representatives in the various countries. "We have to ensure we meet the needs of our internal customers if we want to meet the needs of our external customers," says Nilas Linder, project manager for the team.

## Setting specific goals

The team's ultimate goal is to define what the optimum customer service center would be like. "We have a center, but it doesn't have access to all the necessary knowledge," Linder adds. "We are now in the planning process, sorting all the details in order to identify the most valuable practical actions."
The team looking at this issue includes representatives from logistics, order administration, expedition, the final assembly line and after-sales, as well as two sales area managers, respectively from Germany and the U.K.

and Valdosta (which also oversees the NCX battery). Not only do "we have to confirm we have the right people in front of us," he continues, but "we also have to ensure that all the right questions are asked." Defining these questions is the job of the project team set up to examine and improve the current process. "We need to know things like: where will the battery be used? Will the customer require First Article Inspection or a source inspection? What kind of label do they want?" says Bourg. The team, which includes representatives from development, sales, marketing, customer service and quality, is now in the data collection phase, using the experience gained in other sectors of activity in the transport division.

# Guaranteeing product conformity at Saft's plant in Hainault




Saft's plant in Hainault, U.K., produces some 1000 rectifiers per week. Given that every single rectifier has its own test and safety records, it is critical that each is properly identified, with a serial number on the battery, the packaging and the dispatch order. A project team has been set up to make this numbering process as fool-proof as possible.

"A wrong serial number could have several potential repercussions for the customer," says Janet Bulbeck, quality manager in Hainault.
It could mean delays at export, the wrong test records, even warranty disputes. "The team set up to look at this issue is currently looking at a list of possible causes of what may go wrong in this several-part process," says Bulbeck. The team includes representatives from production, test engineeing, production planning and contract administration.

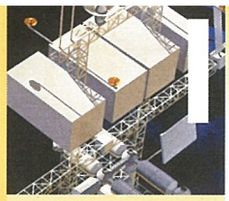
# Going for a faster turnaround

**Shortening delivery times is certainly critical to getting a product into a customer's hands faster — but it's not the only factor involved.**

"If we have, say, a 10-week delivery time and it takes us two weeks to acknowledge the order, then the customer is really looking at a 12-week period from the time he orders to the time he receives it," says Tom Alcide, manager at Saft's primary lithium plant in Valdese. That's why a team is now in the process of examining how to minimize this acknowledgement period. "We're not a stock business. We build every order as it comes in," Alcide explains.

## Identifying key factors

"If we get an order for a product we make consistently, then it takes two days or so to acknowledge the order. However, if we get an order for a product we build only once a year, our logistics department has to see how long it will take to get the materials in-house. Production has to schedule it, it has to go to contract review, we may even need a design review," he continues.
The team, which consists of representatives from production, logistics, contract review, customer service, engineering and accounting, is now collecting information in order to shorten this process.



# Lithium-ion gets ready for revolutionary space flight

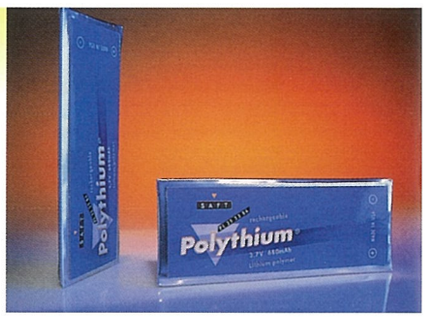
**Stentor is a French experimental telecommunications satellite that will provide in-orbit qualification of a host of new technologies – including lithium-ion batteries from Saft.**

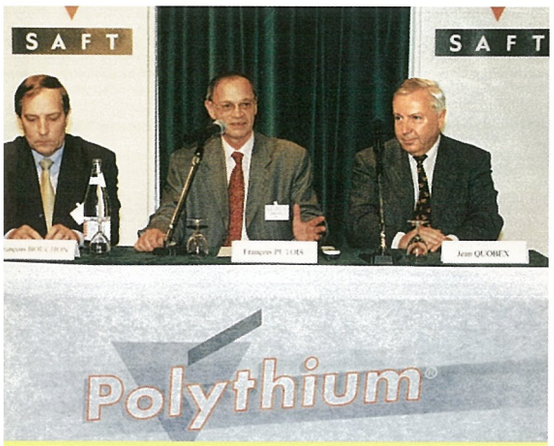
"The appeal of lithium-ion for this application is that it reduces the battery weight by about 50%," says Jean-Pierre Semerie — a tremendous advantage when an average satellite battery weighs about 400 kg! "This allows satellite operators to use the gain either to put on extra equipment — antennae and the like — or to decrease the cost of the launch."
The Stentor project got off the ground in 1995, when both the CNES (French Space agency) and ESA (European Space Agency) contracted Saft to develop a lithium-ion battery based on the cell used for electric vehicle applications.
The initial plan was to put one battery made of ten 100Ah lithium-ion cells aboard along with a Ni-H2 battery (Ni-H2 is the most commonly used technology for satellite batteries today).

## Gaining confidence

As developments progressed, confidence in the battery grew. The CNES then took the option of including two smaller lithium-ion batteries adapted from 40Ah cells — without the Ni-H2 battery to back them up. They confirmed this decision in January 1999, leaving Saft's lithium-ion batteries as the sole source of power on-

# Saft puts super-thin Polythium® battery on the market



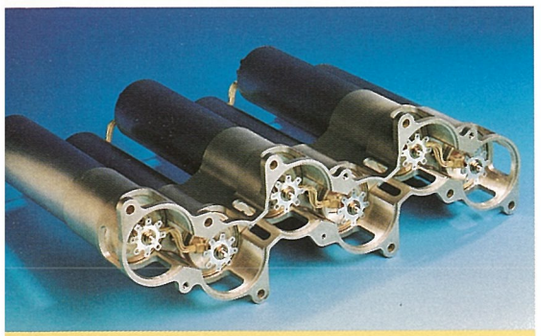




The Portable Division's **François Bouchon,** commercial director and **François Putois,** general manager, join Saft technical director **Jean Quobex** at the battery's May inauguration launch in Paris.

**After almost two years of development and tests, Saft has now begun volume production of its innovative Polythium® battery for upscale portable telephone applications.**

"Today, we have a design that meets the requirements of the telecom people so we are now focusing on real industrial issues," says Ric Raines, general manager of Saft's lithium polymer project in Valdese. Initial plans are to produce 20,000 cells/month by December, and 6 million cells annually in 2000. "We already have a 6 million/year capacity in some of the process steps. We're now completing the engineering on the rest," he continues.
The Polythium® battery features all the advantages of lithium-ion and adds an extra dimension: "it can be very thin — as thin as 1 mm," says Raines. This is a big advantage given that the smallest available prismatic lithium-ion battery is 5 mm.

board Stentor. Saft will qualify the battery this summer and has begun construction of the two flight models, which will be



delivered to Alcatel Space at the end of 1999. Stentor will be launched in the second half of 2000.

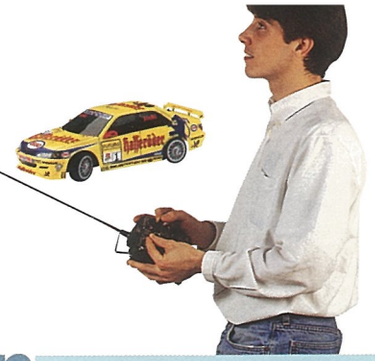
Saft's lithium-ion battery will be used to complement the solar panels which normally power the satellite during peak consumption periods, and to replace these when, twice a year for an hour, the satellite is without sun. The former is particularly important because Stentor uses plasmic propulsion, which enables it to maintain its orbital position without a reservoir of fuel. This propulsion method lessens the overall satellite weight, but requires a greater amount of sophisticated onboard electronics, which can increase energy consumption.

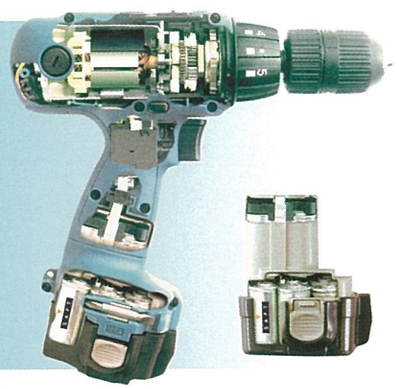
Indeed, some experts project that by 2002, sales of lithium polymer could exceed those of lithium-ion, which today makes up the bulk of this market.

## Easier manufacturing

While a handful of manufacturers are ready with similar products, Saft boasts two major advantages. The first is its experience in the rechargeable lithium market, something many other challengers do not have. "There are a few technology start-ups on this market who not only have to master the technology, but the market challenges as well," says Raines. Moreover, Saft's production process is the most manufacturable: there are fewer steps, and it avoids some of the difficulties featured in other processes. This will ensure that Saft ramps up to full capacity quickly and lessens the likelihood of delivery problems.

# A come-back made possible by innovation



**Saft is counting on its new VH $C_s$ nickel-metal hydride cell to make a noticeable return on two portable battery markets from which it had virtually disappeared: power tools and home appliances, as well as remote-control (R/C) models and other power applications.**

"The only way to get back on track after several years' absence is through innovation," says Philippe Ulrich, sales director for portable batteries, and the VH $C_s$ is a case in point. First of all, the cell uses nickel-metal hydride in a market dominated by nickel-cadmium. "The most powerful nickel-cadmium battery on the market today has a capacity of 2Ah. Changing technology allows us to bring capacity up to 3Ah — a considerable technological leap," he continues. The VH $C_s$ also has been designed to have a discharge ability of up to 40 amps, a necessity in applications such as power drills, electric saws, vacuum cleaners and small-scale model airplanes.

Saft began sampling the cells almost a full year before industrial production actually began in May 1999. "We had to truly work hand-in-hand with our customers, to prove to them that we had a European presence, a strong technical product and a corresponding service offering," says Oliver Amiel, VH $C_s$ design and industrial project manager. The efforts seem to have paid off, particularly in the R/C segment, which has welcomed the cell with open arms. "Early press coverage has been very positive," says Claude Cau, technical and industrial director for Europe at Saft's plant in Nersac, which manufactures the cells.

## Ideal for R/C models

Enthusiasts can now keep their model airplanes up in the air for 15 to 20 minutes instead of the previous 10 to 12. Moreover, as the $C_s$ format is widely used in this segment, users can simply replace their former batteries with this new one: for the same size and weight, they get 50% more runtime, though the charging process is somewhat more rigorous. (Saft is currently helping market leader Graupner to adapt its chargers for Ni-MH.)

Saft will produce about 4 million VH $C_s$ cells this year, with annual production rising to 25 m by 2000. According to Ulrich, Saft expects to obtain a 30% share of the 12 M Euro market for R/C models, and 15% of the 50 M Euro market for power tools and home appliances.

# GNB: A global partnership

**Saft first started its partnership with GNB, a leading supplier of lead-acid batteries and an important player in the traction power market, in North America in the early 1990s. Today, the two companies are consolidating their relationship thanks to Saft's new traction charger production line in Australia. Here's the story.**

**Richard Jensen,** managing director of Saft Australia.

**Richard Jensen, Gordon Beckley** (GNB) and **Mike Fitzgerald** at the inauguration ceremony for Saft Australia's new production line.

When Richard Jensen, managing director of Saft Australia, approached lead-acid battery manufacturer GNB with a business proposal in October 1998, he wasn't exactly meeting with a first-time prospect. Indeed, GNB had been a Saft customer for the past four years, buying traction chargers for the flooded and wet-cell, maintenance-free lead-acid batteries it supplied to the forklift truck industry. However, GNB had been buying these chargers from Saft in Canada, and the costs and long lead times inherent in buying components from across the globe was hurting its competitiveness down under. "With the freight charges, duty and wharfage fees they had to pay, they were at a 13 to 14% disadvantage in the marketplace," says Jensen. "Plus, they were experiencing 16-week deliveries. I knew we could do it in four." Jensen also knew that if he could deliver this particular product — a 50 Hz traction charger — locally, Saft could expand its share of the Australian power electronics market. Meanwhile, at Saft's plant in Toronto, director Mike Fitzgerald was looking for new ways of better servicing its largest customer: GNB North America, which it had been supplying since 1992. GNB, one of the continent's biggest players in motive power and a major supplier of lead-acid batteries, was (and is) a $20 million (Cdn) account for Saft in Canada. After sharing the business for six years with one other manufacturer, Saft was now GNB's sole provider of traction chargers, and keen on accompanying the company in North America as well as throughout the world. "It was pretty clear that GNB was struggling with shipping and delivery in Australia. We needed to create a relationship there to keep the business," says Fitzgerald.

This combination of factors led to a technology transfer from Saft in Canada to Saft in Australia. "Once this transfer was approved, we had a joint team working together to actually improve on the product," says Jensen. The result is a brand new production line, capable of producing ten 50 Hz, 240 V (Aust) units per day. The line, which officially started July 1 of this year, not only enables GNB to avoid extra costs and onerous delivery times, but the product improvements made to coincide with the transfer should help GNB bring its share of the Australian forklift market from 25% to 40% in the medium term.

## Better local service

Local production has other benefits as well. "There will be economies of scale for both sides," says John Cowpe, sales director of GNB in Australia. "Stock levels will be enhanced and we'll provide a quicker turnaround to customers." Saft Australia will also manufacture the chargers directly in 50 Hz — North America being a 60 Hz market, the units formerly had to be adapted by Saft Australia before they were delivered. The units will also meet Australian


**Saft** and **GNB** staff at the line inauguration.

EMI and RFI standards.
Thanks to the product improvements, "we are bringing new technology to the Australian marketplace. We're bringing chargers to a much higher level," says GNB's Cowpe. This local production "will certainly help us in approaching the forklift truck industry with a one-stop offering that is equivalent to a fuel tank."
Saft Australia benefits as well.
"We're currently looking at substantial business in Australia with this new production line, and eventually more if you add Southeast Asia," says Jensen.
Meanwhile, back in Canada, Fitzgerald and his team are busy working on developing four new products that will interest GNB in North America, Australia and other parts of the world (Canada is home to Saft's motive power R&D). Indeed, Saft wants to help its customer conquer new markets, particularly in Southeast Asia and South America. It has also identified 14 other charger models which it will design to work in a 50 Hz mode (South America also functions at this level). These will be transfered whenever sufficient volumes justify it.

# Saft Australia inaugurates new production line

Saft dignitaries from France and Canada joined GNB executives, other customers, the Sydney Chamber of Commerce and New South Wales Senator Steven Hutchins for the official inauguration on June 15 of Saft's new traction charger production line in Sydney, Australia. "We spent the afternoon walking everybody through the line, then finished with a cocktail party, to which we also invited our eight suppliers," says Richard Jensen, Saft's managing director in Australia. The new line is the first major investment Saft has made to its plant in seven years.
With two new employees, Jensen expects the line to reach its production cruising speed of 10 units per day by March 2000.
The new line brings Saft's activities in that country to three: traction chargers (the new line), charger rectifiers and assembly functions for Saft's Advanced and Industrial Battery Group.

**The GNB battery-charger package meets stringent international quality requirements.**

N2306

# GNB: An innovative force in lead-acid batteries


This truck, operating in a regional center for Argos, a UK retail catalogue distributor, uses GNB's battery-charger package.

GNB is a worldwide supplier of single-source lead-acid power systems, offering its customers maintenance-free batteries along with chargers that protect their battery investment. In Australia, "we are the market leader in traction batteries," says John Cowpe, sales director of GNB in Australia.
"Customers benefit from the fact that they're maintenance-free, which takes away many of their occupational health and safety concerns."
These batteries are sold along with SCR 100 and Champion CHP 100 chargers, both of them manufactured to specification by Saft. The SCR technology used ensures the battery receives the exact current and voltage it needs during the charging cycle, thus extending battery life.
GNB batteries and the accompanying chargers are widely used by forklift trucks in large food warehouses and in similar applications.

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