Saft

INTERNATIONAL
Saft's customer magazine

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Business and regional aircraft: the power of jets

p. 8

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From the president's desk

André Tain

The first half of 2001 was a time of change for Saft. We completed the integration of Hawker Eternacell, acquired last year. This process involved transferring new technologies and assets to Saft's Valdese facility in the U.S., and making Hawker's South Shields plant Saft's new U.K. base. These complex operations went very well, and were completed in record time — in fact ahead of our own schedule, and with minimal disruption to our customers.

We anticipated the impact of the worldwide slowdown in the mobile phone market by closing our Mexican facility in Tijuana and consolidating production in our French plant in Nersac. North American customer service was reorganized so that we could continue providing strong customer service there.

At Saft, we are constantly adapting to meet the challenges that we face as well as those that you, our customers, face. Our only motivation is to continue providing you with the best solution, and the best quality at the best price.

André Tain
Chief Executive Officer

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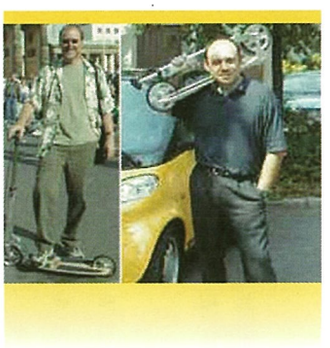


Scoot electric — and make a clean sweep

High-energy rechargeable batteries help those riding on scooters, and those sweeping up floors get it done faster

On the electric move, by train or car

Mediterranean-headed travelers like new high-speed train service from Paris, while fleet-operators switch to electric with Renault's e-Kangoo

Jets ahead: for biz or short-haul

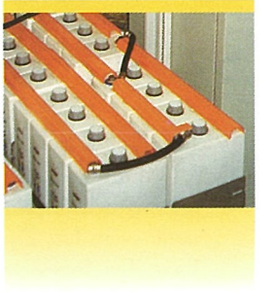
Business and regional jets are the aviation market movers. Saft is flying to the same destinations

Testing the (lithium) limits

High in the sky, or deep in the sea: Saft's primary lithium technologies love the challenge

Environment and safety

Brussels recognizes the Ni-Cd edge in terms of both environmental and safety issues.



Telecoms dream come true

Lower opex? Not a dream. A reality — with Saft Ni-Cds installed in infrastructure from all OEMs

Lighter space lift-offs

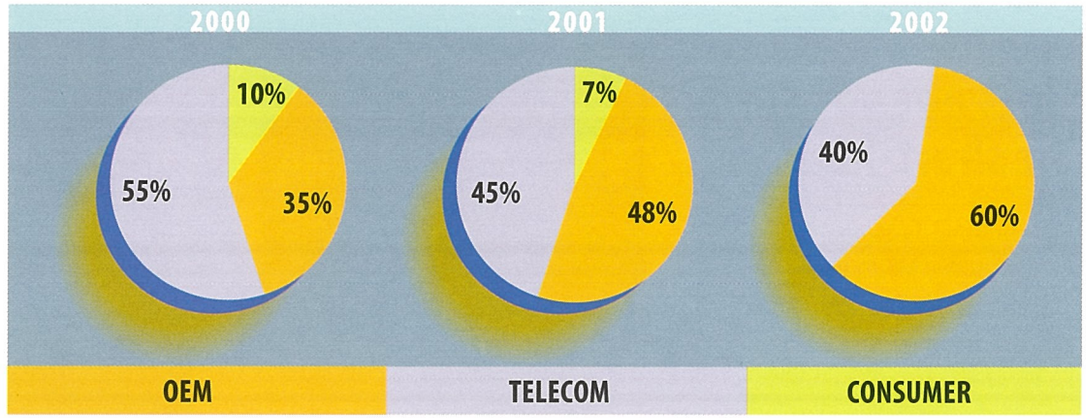
Overweight at launch for your spacecraft? Switch to lithium-ion batteries, and you'll save

Markets

Rechargeable Battery Systems

Market drivers for rechargeable high-energy power sources have rewritten the industry's needs. Saft has adapted to the new market trends with the launch of Rechargeable Battery Systems (replacing Portable Batteries).

Breakdown of Saft Rechargeable Battery Systems sales by market



Metal hydride is the "in" word for the high-energy rechargeables that have won market praise. Chemically speaking, the correct term is "nickel-metal hydride", which is abbreviated as Ni-MH. Saft Ni-MH cells are attracting strong interest for high-energy applications like power tools, electric bikes and hybrid cars.
Sale of its direct-to-consumer businesses (trading under the "Uniross" brand in Europe and as Saft in North America) and shutdown of AAA cell production for phones have repositioned Saft in what is often called the "portable" market.
At the same time, nickel-metal hydride cells — in Cs, D, F and 4/5 SF sizes — have developed well along with Ni-Cds for original equipment manufacturers, helping make up for lower consumer sales.
Larger, more powerful batteries with more energy are the direction taken by Saft's customers, especially in mobility and automotive applications.
Customers are also interested in complete systems. That's why the Saft product group is now called Rechargeable Battery Systems. Lots of products are ready for applications from e-scooters, from the U.S.'s Nova Cruz, to battery-powered dust-busters, signed by Germany's Kärcher (boxes). ■

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Kärcher 50:

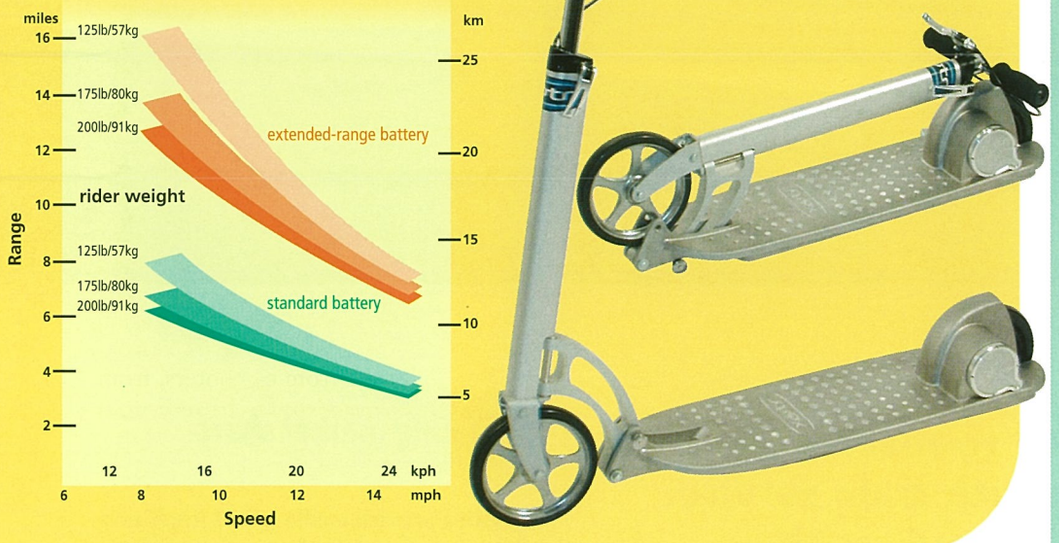
The new Kärcher battery-operated broom for in-between clean-ups is designed for use whenever it is too much bother to get out the vacuum cleaner. It is suitable for both hard-surface and carpeted floors.

Revolutionary e-scooter

Xootr eX3 is the exotic name (it's pronounced "zooter") of a pioneering personal transport system developed by Nova Cruz, based in the U.S. It's powered by Saft's nickel-metal hydride batteries.

Weighing in at under 20 pounds, the Nova Cruz e-scooter makes technology waves for many reasons. It totally redefines its market category, with its 24-volt brushless DC motor and Saft Ni-MH batteries (packs of 21 VH Cs cells). The scooter accelerates up to 20 km/h in just five seconds, and takes its rider to destinations up to 25-km away with its extended-range Saft batteries (graph). When most users arrive at their destination, they simply carry the Xootr with them. It weighs a little more than a laptop (including its Saft Ni-MH battery) , and folds down in about five seconds. It even fits into a half-height gym locker. Hello, Xootr. Bye-bye, bike. **(http://www.xootr. com/xootr/scooters.asp)** ■

eX3 range on level pavement



Home sweet home

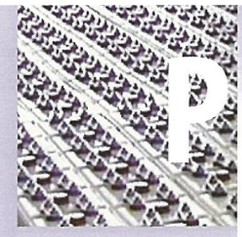
Following the shut-down of Saft's facility in Tijuana, Mexico (which was completed by the end of June 2001), operations of Saft Rechargeable Battery Systems addressing the needs of portable OEMs have been fully consolidated into its European facility at Nersac, France (photo).
This strategic action reinforces Saft's overall market competitiveness and helps expand its worldwide market opportunities.
OEM customers of Saft's portable rechargeable batteries now benefit from the world-class Nersac manufacturing site which features highly efficient automated equipment. And it's home to 100 R&D engineers and technicians dedicated to product development and technical support.
To ensure service continuity to its North American customers, ownership of Saft's consumer operations there has been transferred to engineers and managers formerly with Saft. The new firm's name is North American Battery Company (or NABC). North American OEM sales and marketing teams were not affected by the reorganization and have been growing Saft's business in their markets while keeping a high service level for their customers in industry. ■

forget plugging in the vacuum cleaner

The Kärcher 50, which comes with Saft rechargeable batteries, is just right for those quick clean-ups where it is too much effort to get out the vacuum cleaner or dustpan and brush. Sweeping crumbs from the floor after meals, for example. The Kärcher "broom" is simply taken out of the cupboard and is immediately ready to use.
The broom turns on and off by a foot switch. Weighing only 2 kg, the broom is easy to carry and maneuver. It's suitable for sweeping both hard floors and carpets. And forget filter bags!.
This saves time and money — and makes emptying the dustpan simple.
The Kärcher 50 sweeps up everything, coarse or fine, from flour to peanut shells or fallen leaves from your house plants. To make the job easier, it is equipped with a wire brush powered by a Saft battery. Indeed, Saft's technology and products on the Kärcher 50 include eight VRE Cs 1300.
They provide extremely high power and reliability, a very long lifetime and a cycle life of over 500 charge-discharges — plus zero maintenance. ■

Technical "clean-up" data

Area cleaned per battery charge: 50 m²
Battery running time: 20 min
Width vacuumed: 250 mm
Tank capacity: 0.5 l
Weight (including battery): 2 kg
Battery voltage: 4.8 V
Dimensions (length x width x height): 220 x 280 x 90 mm



Rail speed: faster still — with safe stops

New rail infrastructure in France enables operator SNCF to reach higher speeds for its north-south train service. Saft batteries ride on-board, as they have since the TGV's launch 20 years ago.

Speeds have been heading upward since the launch of the TGV (its initials stand for high-speed train, in French) in 1981 with Paris-Lyon service. Saft's Ni-Cds were on those pioneering trains, as they are on the latest duplex models that race passengers at still higher speeds (up to 300 km/h) between Paris and now — with the new infrastructure completed south of Lyon — Marseille, the "hub Med" of France's Mediterranean coast. Saft batteries provide an extra measure of safety. With trains running at 300 km/h over stretches as long as 700 km, SNCF's on-board engineer has to be able to stop the train within just a few kilometers if catenary power fails. To do that, Saft batteries kick in — ones that now feature electrodes with sintered and plastic-bonding technologies.

Those technologies reduce maintenance by spacing out inspection of a battery's electrolyte levels, from every 12 months to as many as 18 — or even up to 24 months. Each of the two locomotives hauling the TGV duplex service has Saft's SRX 1300 batteries, supplied to ALSTOM, SNCF's TGV manufacturer. For rail operators, lower operating expense helps improve bottom-line results.

Winning market share

With Paris-Marseille travel times now down to just three hours, rail is taking business away from its airline competitors. Indeed, what enterprise would not be happy to see volumes nearly triple in 10 years? TGV ridership rose from 30m in 1990 to 80m last year. The SNCF expects nearly 850,000 travelers to shift from air to rail this year alone.

More than $3 billion was invested in upgrading and building rail infrastructure (bridges, passenger stations and much more — often with striking architectural effect) as part of the launch of this new service. Investing in the future pays off, whether in higher-speed rail lines…or lower-maintenance batteries. SNCF's new Paris-Marseille service proves it once again. ■

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e-drive with Kangoo: simply better

Electric driving with Renault's new Kangoo EV is simply better, for all the community's stakeholders. Residents benefit, thanks to the vehicle's pollution-free performance — and so do fleet operators, from its lower operating costs.

e-Kangoo, with Saft Ni-Cds: launched by Renault in July 2001.

Kangoo is a familiar car shape on Europe's roads and highways. Now the same shape comes with electric power, delivered by Saft Ni-Cd batteries. The vehicle looks the same from the outside as a Kangoo operating with an internal combustion engine. Inside, however, Renault has retooled everything as part of its commitment to a cleaner environment. Renault's e-Kangoo program commitment dates back to the 1990s — and represents an investment of several million dollars.

"It's the right battery for this car, and for the next few years," says Alain Lebourg, head of Renault's alternative power division, referring to the Saft Ni-Cds on-board the e-Kangoo. "I've been driving electric Kangoos for a year," he continues, even though volume production of the EV began only in mid-2001. "Saft has made substantial progress in its battery's performance," adding: "We plan to sell this car across Europe."

Lebourg's team addresses the specific market of operators of "professional" and "government" fleets — which also includes small and mid-size firms as well as independent contractors. According to Lebourg, their cars run on average about 30 km a day — and their average speed is about 13 km/h. An EV like the e-Kangoo is ideal for this usage.

Cutting costs...electrically

Lebourg and his marketing team have carefully calculated fleet operating costs. The good news is that the e-Kangoo will cut them for most fleets.

An electrically-powered vehicle in France, for example, benefits from tax exemptions at several levels. And a monthly maintenance fee of about $100, where Renault will take care of the fleet operator's e-Kangoo service, is less than the fueling costs of a diesel vehicle.

As fleet operators seek to cut costs, and urban environmentalists argue for reduced pollution, the e-Kangoo seems the logical solution. The vehicle features zero emissions (of either air or noise pollutants). It comes in two models, one for delivery-van purposes (with two seats) and the other for up to five passengers. While their sticker price is about 12,000 euros, many European nations offer rebates, depending on the country. In France, for example, parking an EV is free in many parking lots. An operating permit (known in France as a "carte grise") is free for EV owners in metropolitan areas. Other administrative fees are reduced as well — and sometimes waived.

Operators of highway fleets now increasingly realize that, for intra-urban purposes, EVs represent the solution of choice. The low distances and speeds that Renault's Lebourg have documented mean that most fleet operators don't focus on whether a delivery van runs fast — even if an EV with Saft batteries drives faster than 100 km/h. The first-generation batteries deliver a range of 100 km, and extended-range batteries (due out in early 2002) can drive 300 km between charges. Since traffic conditions limit speeds for fleet vehicles, electric power makes their economics more productive.

Ni-Cds: solution of choice

And Ni-Cd batteries, according to Renault's Lebourg, are the solution. "They're the best power for this generation of e-Kangoos, which stretches out until 2007 or 2008," he says. Renault is also trialing Saft's lithium-ion batteries for its cars, but doesn't expect to market any for four or five more years. Fleet operators should take a close look at the electric option. That's the message behind Renault's launch of e-Kangoos, delivering value to business users across Europe with Ni-Cd batteries from Saft. ■

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Partnership

Biz & regional jet markets take off

Jet-powered aircraft for business (or "biz") and regional routes are fast taking off, joining their prop predecessors. Orders are way up, and OEMs — Bombardier, Embraer and Fairchild Dornier — are busy indeed. Saft's Ni-Cds are flying high, too.

Much of the recent news in the aviation industry concerns major next-generation programs, such as Airbus's A380 Superjumbo or Boeing's SonicCruiser. Other headline-grabbers are new corporate and regional jets, which are becoming strategic players in long-term business and airline profitability. The former enable executives to visit multiple sites in a single day, while the latter are efficiently feeding international hubs with traffic from smaller airports.

These jets are a new breed of aircraft. Designed from the ground up as profit-builders for their users and owners, they are redefining the landscape of aerospace production at the same time as they transform the business plans of the world's largest corporations and carriers. The transportation solutions they deliver are backed up by technology that meets the highest standards of performance and reliability — including their electrical systems and batteries.

Bombardier selection

In this context, Bombardier selected Saft for its "super" mid-size Continental business jet. The all-new jet was launched at the 1999 Paris Air Show. Ground runs began in early June this year with low-speed taxi testing later the same month. Actual flight testing began in August 2001.

"In developing the Bombardier Continental," said John Holding, group ▶

"Regional" range...up to 1,500 miles!

Flying halfway across a continent makes a plane more than "regional", it would seem. Yet Brazil's Embraer calls its ERJ 145 family a regional jet solution — for passenger airlines whose operations often span the globe. In most cases, they'll be flying the plane with Saft batteries.

Why drive a thousand miles when you can fly them — especially in the comfort of an Embraer regional jet? Saft batteries began flying on the Brazilian aircraft OEM's service-providers with the Emb120 family of turboprops.

The regional passenger transportation market has changed — and so has the notion of "regional". Once a question of several hundred miles, or kilometers, regional service now covers half a continent — or even more.

On-board batteries for these jets come from Saft and are used for auxiliary power on the ground (for example if mains supply is interrupted) or to provide onboard engine starting. For both the Emb120 and ERJ 145 families, Saft batteries have been chosen as the reliable source of aviation power.

Orders for the ERJ 145 alone extend to more than 800 aircraft, with customers large and small from around the world selecting the jet. And Saft will be shipping customized batteries to Embraer, on time, and on target, to ensure satisfaction of the end-user: airlines — and their regional passengers — worldwide. ■

executive vice-president for engineering and product development at Bombardier Aerospace, "we have undertaken the most extensive ground test program to date. The purpose is to accelerate systems' maturity before they are installed on the aircraft," he noted. Batteries supplied by Saft are a key component of the aircraft's electrical system.

Props losing market share

In the changing regional market (on routes under 350 nautical miles), where the aircraft technology of preference has shifted from turboprops to jets, Saft has also moved in with new high-tech products. Several changes are worth pointing out. From 1992 to '97 (when jets accounted for only 100 deliveries a year to regional airlines, and turboprops for 250), Saft's technology won market share. By 1999, the regional aircraft market proportions had reversed, with 280 jets and 110 turboprops delivered. And Saft batteries flew on nearly all those jets.

Recognizing the importance of feeding regional traffic into their more profitable long-haul hubs, major carriers formed alliances with regional airlines. The financial strength of the majors allowed them to purchase newer, more efficient aircraft — such as regional jets from Bombardier, Embraer and Dornier, satisfying the business traveler's preference for smoother, faster jets.

Saft adapts

Last — but not least — probably the most significant change in this market relates to how most aerospace players subcontract both aircraft development and manufacture. Saft's relationship with commercial aviation OEMs is evolving rapidly as it handles complex business models and decision-making processes effectively. Addressing these market changes presented Saft with many challenges, ironically due in part to the company's strengths in supplying batteries for larger, long-range jets such as those for the Boeing and Airbus families. Dealing with manufacturers of business and regional jets was a different situation, requiring innovative strategic relationships as well as an understanding of these new customers — and their customers. Indeed, Saft's skills in global team-playing have proved crucial. This combination of technology, flexibility and global team-playing has won Saft orders for its Ni-Cds from Bombardier Aerospace for its CRJ series, from Brazil's Embraer (for the ERJ family of turbofan regional jets — box) and from U.S.-German manufacturer Fairchild Dornier for its 80- to 100-seat DO728 jet. Having made the transition, on time and in the right way, Saft has ensured its place in the booming markets for business and regional jets. ■

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Sky-high, sea-deep: lithium LOVES it

Flying way out at the edge of the earth's atmosphere — or plunging to new dark depths beneath the seas, lithium batteries from Saft love the challenge of delivering high performance in extreme environments.

What do you do for power when you're flying 30,000 meters (100,000 feet) above the earth's surface? That's higher than the Concorde flies, and nearly where low-earth-orbit (LEO) satellites reign. The sun is a great power source, of course. But for those hours when the sun is not available, batteries are the only recourse. In the case of a NASA-designed uncrewed aircraft called Helios (photo), the U.S.'s AeroVironment chose lithium power from Saft. Meanwhile, for deep-sea diving, to film wrecks like the Titanic as well as other sea-floor treasures, Dark Matter also chose Saft. The company has developed remote-control subs for very deep sea-diving expeditions. It approached Saft seeking a battery to power its vehicles — and Saft's lithium won hands down.

Web in the sky

The AeroVironment plane's striking outline — a flying wing, with 14 propellers — is enough to grab a reader's attention. The International Herald Tribune published an article, with a photo, in its July 12 edition. But the headline on the article is, unfortunately, misleading. It reads: "Sun-Powered Plane Has a Mission". The "mission" is clear: to act as a surrogate satellite, delivering high-speed Internet access at highly affordable cost. What's a bit muddy, in the headline, is where the power comes from. Because although the flying wing does run off solar power — when the sun is shining on its panels — in dark periods it's Saft lithium batteries that provide the juice. AeroVironment liked lots of things about Saft's cell (technically known as the LO26SHX), which is manufactured at the company's North Carolina plant. The cell features light weight plus the ability to deliver high continuous drain output and operate in wide temperature ranges, from day-time desert heat to extreme cold at high altitude at night. For AeroVironment, it was a cost-attractive power solution with a demonstrated track record of performance and safety in various defense applications.

The aircraft relies on 480 of Saft's lithium cells (the LO26SHX) as main ship batteries plus 35 other cells (known as LO30SHXs) for emergency back-up power.

"If we get to 100,000 feet," says John Hicks, manager for NASA's Environmental Research Aircraft and Sensor Technology project, referring to test flights in mid-2001, "we've proven our point." For more information on this exciting technology, and

AeroVironment's plans to produce a fleet of sky-based Internet servers, visit www.aerovironment.com.

Sea-floor power... planets away!

At the other extreme that Saft's lithium loves, there's the sea floor.

The Dark Matter subs require power under extremely high pressures of the deep dark sea. Saft's engineers in Valdese successfully developed an over-filled LO26SHX cell design to meet Dark Matter's requirements.

The customer has tested Saft cells to 10,000 pounds per square inch (20 times the cell's normal vent pressure!).

The first diving missions were successful, and the battery is now launched as a new production product for Dark Matter. The first 60 units were delivered in the first half of 2001, and Dark Matter expects to continue ordering 300-400 batteries a year for a year-long filming contract and to carry out other missions all over the world.

For example, Dark Matter recently came back to Saft for 10 more batteries to power new deep-sea missions in Micronesia (in the Pacific Ocean).

And news of their "deep success" has spread to NASA, where officials have expressed interest in the technology for space missions to Europa, a moon of Jupiter. Initial plans call for deep-ocean probes there.

Saft's lithium batteries at the bottom of a sea on a Jupiter moon — a zillion miles away, and way underwater?

Talk about extremes! Saft will take your power there, if and when you need it. ■

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New lithium manganese dioxide primary cells

At the China International Battery Fair, Saft launched its new "LM" range of Lithium Manganese Dioxide ($LiMnO_2$) cylindrical primary cells. The two Saft plants producing the cells each have an annual capacity in excess of 1m units.

Crowning substantial investment in research and technology by Hawker, Saft's new $LiMnO_2$ family features excellent performance over a wide range of temperatures plus an outstanding shelf life — with no voltage delay when put into service even after several years of storage. They combine high voltage (nominal 3.0 V), high capacity (from 350 mAh up to 10.5 Ah) and high-rate capability.

The new LM cells are ideal for medium- to high-power applications when a solid cathode system is most appropriate. They are designed to provide a compact, reliable and long-life source of power for a broad range of applications in defense and industrial communication as well as general electronics, especially those requiring either a high pulse current or back-up power for memory retention.

British, American manufacture

The new range is manufactured at Saft plants both in the U.K. (at a South Shields facility, acquired by Saft from Hawker in early 2001) and the U.S. (Valdese, N.C.), where Saft transferred the small cell production and introduced performance improvements. Currently, it comprises six cells [box].

All the LM cells have a 3.0 V nominal voltage and a typical operating voltage between 2.5 and 2.8 V with a stable discharge voltage on low current. They are capable of operating over a temperature range of -40°C to +70°C, and have a 10-year shelf life at ambient temperature with an extremely low self-discharge — typically just two percent a year. In addition, there is no voltage delay when put into service, even after being stored for several years. ■

Name	Size	Weight	Capacity	Application
LM 14250	1/2 AA	9 g	350 mAh*	Used by U.S. Navy battery with performances according to specification 6092PS079A
*When discharged at 41 mA to 2.4 V				
LM 17130	1/3 A	8 g	450 mAh*	The BA-5372 battery pack by the US Forces with performances according to MIL-PRF-49471/9
*When discharged at 4.5 mA to 2.0 V				
LM 22150	1/3 sub C	15 g	950 mAh*	The BA-5368 battery pack by the US Forces with performances according to MIL-PRF-49471/13
*When discharged at 40 mA to 2.25 V				
LM 26500	C	60 g	4.5 Ah*	Can provide a maximum constant current of 2.0 A
*When discharged at 500 mA to 2.0 V				
LM 26600	5/4 C	72 g	5.5 Ah*	Can provide a maximum constant current of 2.5 A
*When discharged at 500 mA to 2.0 V				
LM 33600	D	116 g	10.5 Ah	Can provide a maximum constant current of 4.0 A
*When discharged at 1000 mA to 2.0 V				

Brussels supports Ni-Cd users

Early this summer Ni-Cd battery users in industry, the services and other applications got good news from Brussels. A possible ban on the sale of nickel-cadmium batteries in Europe, proposed by the Environment services of the European Commission, was unanimously rejected by all the other services of the Commission.

The Environment services of the European Commission has been considering legislation regarding batteries for some time now. It's no secret that they have also been trying to phase out Ni-Cds, pretexting the availability of substitutes. Saft, as chair of CollectNicad, mobilized considerable resources over the past two years — and particularly over the first half of 2001 — to oppose the principle of a ban, which would potentially threaten the livelihood of customers in the automotive, railway, stationary, emergency lighting, aviation and many other industries. After several months of intense activity informing all interested parties about Ni-Cd batteries, all but one of the Commission's services were convinced. They agreed that Ni-Cd batteries do not present any risk to human health or the environment, so a ban would be totally unjustified.

The good news came at the end of June, when all the other Commission services supported Saft's arguments and unanimously rejected the proposal which was proposing to ban Ni-Cd batteries in 2008. The Environment services must now make a new proposal for a battery directive. But this proposal must (1) take into account scientific evidence of the absence of risk and (2) prefer collection and recycling to a ban. ▶

Recycling: a Ni-Cd reality today

For several years already, Saft and its partners in Europe and North America have actively promoted recycling of spent Ni-Cd batteries.

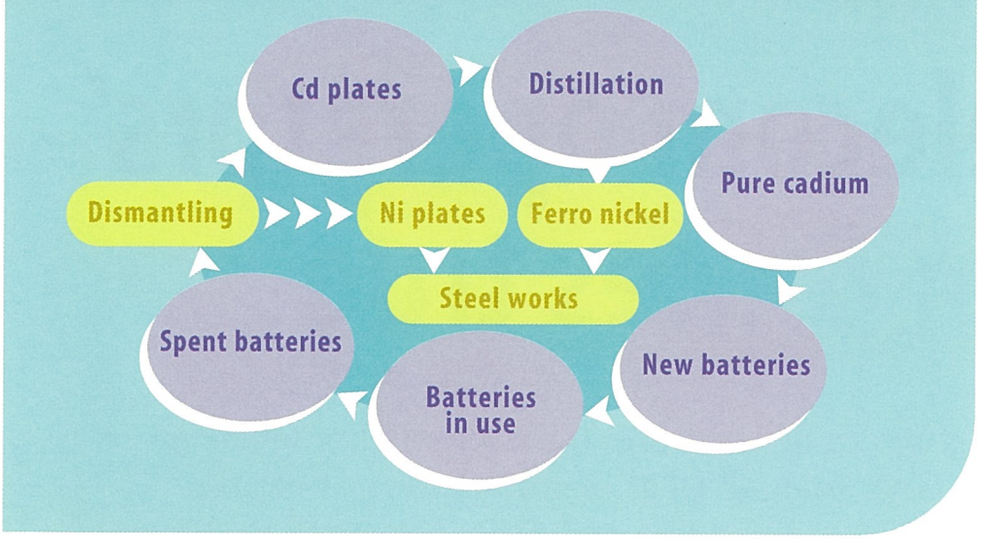
Nothing could be easier than recycling Ni-Cd batteries. Nickel and cadmium melt at two substantially different temperatures (500° and 1000° C), The nickel retrieved from this reprocessing is then used in making stainless or special steels. The cadmium returns to the battery manufacturing plant, to be reused in the same way as the raw materieal. Recycled cadmium offers the same power storage and recycling characteristics as mineral fresh out of the earth.

As an example, an electric vehicle operating with Ni-Cds compares well with regular cars that operate using exhaustible resources such as fossil fuels (gasoline, diesel fuel or liquid natural gas). In addition, an EV is a zero-emission vehicle at point of use and is also totally silent.

High recycling rate

In Europe, electric vehicles (EVs) mainly run on Ni-Cds due to the batteries' robust performance and service life. The Ni-Cd share of the EV zero-emission market there is 85%, supplying power for Europeans riding scooters, buses and EVs, not to mention fleet operators' vehicles. Three-quarters of the materials contained in these EV batteries are recycled — the battery represents a quarter of an EV's weight — 80% of the weight of a vehicle must soon be recycled by law. Saft aims to achieve these objecives wih the cooperation of its customers — and their customers. Recycling the battery is easy: but to do this, Saft needs to get the battery back. ■

Recycling of the nickel-cadmium (cadmium is recycled and re-used to manufacture new electrodes



Collection and recycling: a permanent trend

The next stage is to work to obtain a piece of legislation that serves the interests of Saft's customers. Collection and recycling are becoming more and more the norm in all areas.
In our industry, we will be judged in the future on our collection and recycling performance for all battery technologies and applications.
And sustainable development is already being integrated into Saft's corporate policies.
Although this is not the end of the story, this success is an important first step for Saft's customers. It was a team effort, involving those of you who rely on the many benefits of Ni-Cd battery technology and who actively supported the important effort to convince officials in Brussels of the safety and value of nickel-cadmium — and to guarantee its use for many years to come. ■

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List of collection points for nickel-cadmium batteries for EVs in Europe

The owner of the battery via the local automobile network sends the battery at the end of its lifetime to the following collection points.

Country	Company	Address
Austria	RUMPOLD	Roseggergasse 4 A-8793 Trofaiach
Belgium	WATCO ECOSERVICE	Steenbakkersdam 16-18 B-2340 Beerse
Denmark	H.J. HANSEN	Havnegade 110 DK-5100 ODENSE C
Finland	HANSABATTERY	Ruukintie 20 C 02330 ESPOO
France	SNAM VIVIEZ	Rue Jean Jaurès F-12110 VIVIEZ
Germany	HUNSRÜCK SONDERTRANSPORT GmbH	Industriegebiet III D-55768 Hoppstadten-Weiersbach
Irelande	RETURNBATT LTD	Unit 35, Melitta Road Kildare Enterprise Centre - Kildare
Italy	BLU AMBIENTE	Via Molise 1 I-20098 St Giuliano Milanese
Netherlands	W.A. VAN PEPERZEEL	Tolweg 22 NL-3851 Ermelo
Norway	AS BATTERIRETUR	Postboks 97 N-1740 Borgenhaugen
Portugal	IPODEC Portugal	R. Miguel Bombarda n° 71 Qta dos Almosteis 2689-508 Sacavem - Portugal
Spain	SAEZ DE MATURANA	Portal de Betono 26 A E-01013 Vittoria
Sweden	SAFT NIFE	Jungnergatan – Box 709 SE-572 28 OSKARSHAMN
Switzerland	RECYBAT	29 H chemin du Coteau CH-1123 Aclens
U.K.	G & P BATTERIES	Crescent Works Ind. Park Willenhall Road, Darlaston WS10 8JR Wednesbury

The collected batteries are sent to the recycling companies (SNAM France or Saft Nife in Sweden.

Collect…and forget: spent Ni-Cd service

Users of Ni-Cd batteries need to know how to get their spent batteries collected for recycling. Saft has invested in this requirement, notably through significant participation in Europe's CollectNicad and a similar organization in North America.

After all their years of service, are your Ni-Cds ready for recycling? Saft — your original battery supplier — is most happy and willing to take them back. You just need the right address to find us. In Europe, the nearby chart gives you the closest address (and other contact details) for EV battery collection. But as a strategic move, Saft has become a key investor and lead player in a non-profit organization known as CollectNicad, an industry group that includes both Ni-Cd battery manufacturers and their OEM customers. The association's goal is the promotion of the collection and recycling of Ni-Cd batteries from both industrial and consumer applications. ■

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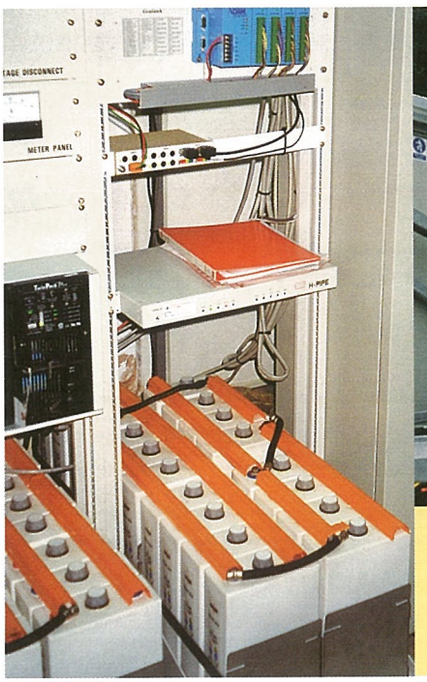
Telecom operators' dream comes true

Infrastructure costing less to operate and featuring higher levels of reliability is now available from all OEM manufacturers of mobile infrastructure — as well as of fixed-line and other telecoms equipment. The new competitive edge is the low-maintenance technology of Saft's Ni-Cd batteries, specifically designed for telecoms applications.



Above: a transportable GSM base station equipped with Ericsson radio transceivers and Saft Ni-Cd batteries. Left, a fixed base station on the Pacific Rim with Siemens infrastructure — and Saft Ni-Cds.

Welcome aboard, OEMs from 'round the world: industry-leading names like Lucent, Alcatel, Motorola, Fujitsu, Ascom, Eltek, Emerson, Nokia, Ericsson, Siemens and Nortel. They all have deployed equipment powered by Saft's family of Ni-Cd batteries for telecoms applications — whether for local access cabinets (services like high-speed Internet) or for mobile network base stations (since they can easily replace lead-acid batteries) or still other uses.

The Ni-Cds have been designed to be identical in terms of form, fit and function (although in some cases, minor cabinet modifications are necessary to accommodate the Ni-Cd technology's improved performance).

While OEMs may have been hesitant to replace lead-acid batteries with Ni-Cds, their customers — telecom operators — insisted on their bottom-line benefits from this investment in infrastructure. As a result, all telecoms infrastructure manufacturers worldwide are now aware of the competitive edge that Saft Ni-Cds deliver to their own customers. Their cabinet racks enable operators to benefit from the added value of Ni-Cd batteries.

Pacific Rim reliability

Delivering a dial-tone to mobile phone subscribers requires a base station that can operate in all conditions, including with — and without — mains current.

If a power grid fails due to a storm or other major incident, cellphone users still expect to be able to get calls through, just as they would on their fixed line.

Manufacturers of telecoms equipment have been told that their mobile infrastructure should reach the same extremely high levels of reliability as their fixed-line switches, which demonstrate some of the highest up-time of any computer-based application.

For calls on mobile phone networks, this reliability requirement means that the base station must be able to continue taking calls even if its mains power fails.

And operators in "hot" territory (either with high temperatures — or high user demand) are realizing that Ni-Cd is the power backup technology of preference, since it cuts operating expenses (opex) substantially and features greater reliability than the earlier-generation lead-acid batteries.

A Pacific Rim mobile operator, for example, is replacing lead-acid batteries with Ni-Cds from Saft (photo) in its Siemens-built base stations because it needed to replace the earlier-generation battery technology every 18 months. Saft's Ni-Cd batteries last as much as eight times longer: 12 years or more, on average.

Infrastructure…on the move

A British mobile operator has also switched to Saft's Ni-Cd batteries, in this case for its transportable base stations. These are high-value players in the operator's business plan. They can be quickly carried on a truck to a location where a base station has gone down, to ensure service continuity. And they can be temporarily located at sites where traffic levels are expected to spike due to a high concentration of mobile subscribers: events like a sports championship, or an outdoor concert. At an intermission, mobile phone usage shoots up — and the operator who lacks capacity at that particular site loses critical revenue opportunities, as well as having a tarnished service image in the eyes of its subscribers. The solution for this British operator was an easily transportable base station, manufactured by Ericsson, with Saft's Ni-Cds.
It's a win-win solution, because the operator picks up more billable traffic and runs a network with unrivaled reliability.
The operator doesn't want to lose a single minute of traffic…so the battery absolutely has to work. Saft's Ni-Cds do, reducing down-time risk.

Reduced monitoring, maintenance

In Scandinavia, meanwhile, a mobile operator not facing particularly tough temperature extremes (where Ni-Cd easily outperforms lead-acid) chose Saft, too. Why? Once again, it reasoned that lower operating expense justified the investment in the battery technology that additionally offered greater reliability. Lead-acid batteries, they realized, require a lot of monitoring and maintenance. Ni-Cd batteries don't. Operators are looking for savings everywhere possible. Less maintenance and monitoring means fewer staff, and that in turn means lower operating expense. Saft's Ni-Cd battery people in telecoms infrastructure applications are proud to offer customers a more direct path to profitability through lower opex — and higher reliability. ■

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Addressing naval applications

The Dauphin battery development group has been set up by Saft to address all naval defense requirements for energy storage systems with its proven lithium-ion technology.

Dauphin's mission is to carry out full development programs to provide — at required levels of cycle life, safety and reliability — cost-effective bulk energy storage systems for applications such as all-electric ships, new and already in-service submarines (whether nuclear-powered or conventional), autonomous underwater vehicles (AUVs) and remotely operated vehicles, and exercise torpedoes. The same team also develops and supplies batteries for uncrewed aerial vehicles, launchers and missiles. The Dauphin group leverages the comprehensive range of lithium-ion cell expertise that Saft has developed and manufactured. Its wide range of options covers the full spectrum of naval energy storage requirements, providing energy storage systems that are energy — and power — dense, highly efficient, flexible and responsive, easy to operate, with no environmental impact and requiring minimal maintenance. They also display exceptional cycling and calendar lives (up to 15 years for Saft's Li-ion HE cells.)

Two different families of cells are currently being produced:

- Prismatic cells (initially developed for portable defense applications) can be used for small AUVs, launchers and missiles.
- High-energy/high-power cylindrical cells, initially developed for electric vehicle applications and now fully qualified for space — and selected for commercial GEO spacecrafts to be launched in the near future (see story, p. 16).

They are ideally suited for bulk energy storage requirements such as large AUVs, exercise torpedoes, submarines and all-electric ships. ■

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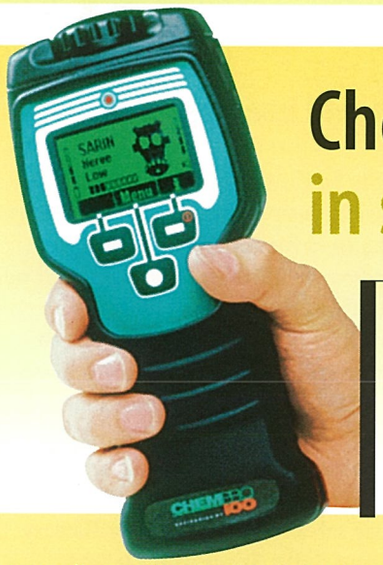
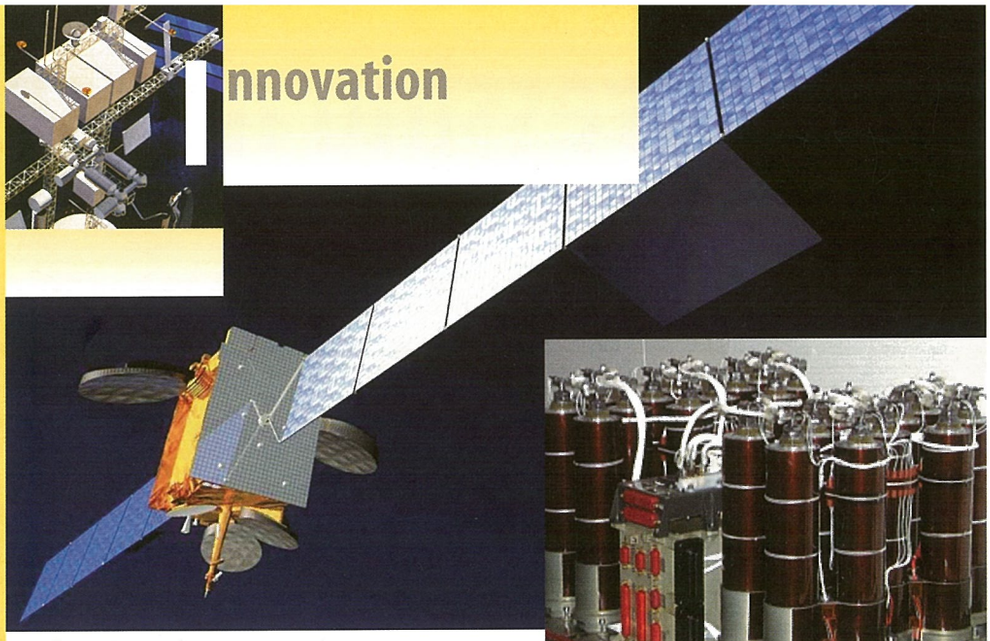
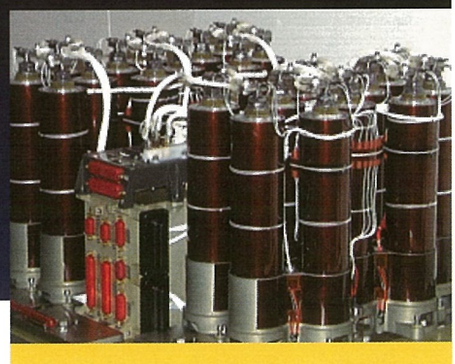


ChemPro100: small in size, giant in features

A handheld chemical agent detector manufactured by the Finnish firm Environics, ChemPro100 features next-generation technology including rechargeable lithium-ion cells from Saft.

According to Environics, Saft's "ion mobility cell" delivers improved sensitivity and selectivity. The ChemPro100 can be used either as a personal detector or a monitor for surveying after an event. It's easily upgradeable and operates with low life-cycle costs (no consumables or special storage maintenance). The user benefits from password protection, audible and visual alarms and an automatic built-in-test capability. Its easy-to-use menu-based interface includes adjustable settings and sensitivity modes. The fully ruggedized device meets military standards, weighs under 700 grams, and measures just 100 x 220 x 45 mm. ■





Space weight-loss: launch-cost savings

Lighter batteries spell lower launch costs for satellite operators. Lithium-ion batteries from Saft, selected by Eutelsat and Astrium, will pioneer the space power technology in 2003.

For the first time ever, a satellite in commercial service will operate with lithium-ion battery cells — and Saft is supplying them. The W3A, as the geostationary (GEO) satellite is to be known, will belong to Eutelsat and enable the operator to consolidate its market position in Europe for multimedia services. It selected Astrium, part of the space division of European Aeronautics Defence and Space, to supply both the platform and the payload.

Based on work done by Saft's Bordeaux and Poitiers teams to specify Li-ion batteries for satellites, both Astrium and Eutelsat have agreed to put Saft's Li-ion battery cells on the W3A, set for launch in mid-2003. The same technology will be trialed on the Stentor experimental satellite, which is expected to launch end-2001 or early-2002. The lighter-weight batteries reduce launch costs for Eutelsat, since lithium-ion technology reduces platform weight by a hundred or more kilograms, compared to current-generation nickel-hydrogen batteries. The Li-ion battery for the W3A satellite will have 140 VES cells, manufactured on a pilot line in Bordeaux and based on Li-ion technology that was developed for electric vehicles.

On-board benefits

Benefits to Eutelsat include a stronger expansion path into customers in Africa plus its in-orbit redundancy program. According to Astrium, the W3A will be Eutelsat's most powerful satellite, performing both fixed and broadcast communications missions on Ku and Ka bands. The payload also features on-board digital multiplexing for up to five channels.

Annie Sennet, director of worldwide satellite sales for the Specialty Battery Group of Saft's Space and Defense Division, observes: "This commitment to Li-ion technology is already spawning much greater interest on the part of other players. Li-ion saves 30-50% of battery weight, enabling the operator to offer more on-board services or reduce launch costs. Saft hopes this is the beginning of a new era in satellite batteries, especially for big GEO commercial programs."

Space industry analysis

Experts in the space industry agree that lithium-ion is the solution of choice to reduce launch weights, saving money for satellite operators. An industry analyst notes, "Boeing is actively developing lithium-ion batteries for advanced spacecraft." As a result of a survey conducted by Boeing, Saft is the top-ranked supplier of lithium-ion cells — "and the second-ranked supplier is far behind Saft," according to the industry analyst. Boeing hopes to continue enhancing its long-term relationship with Saft since it doesn't manufacture lithium-ion cells. Its satellite business, however, would be a major purchaser of the components. Stentor, a technology-proving satellite ordered by the French space agency CNES, will be the first operational GEO spacecraft to fly with lithium-ion batteries — made, of course, by Saft.

U.S. market interest

"Today," says the industry expert, "batteries represent about 500 kg at launch for a satellite. With lithium-ion technology, satellite operators will save a hundred or more kilograms in launch weight — and the corresponding sum in money."

Saft is setting its sights on growth potential in the U.S. market. Saft's Sennet adds, "We expect to finalize our space lithium-ion discussions with Lockheed Martin in the third quarter of 2001."

Lockheed Martin and Boeing are the top-ranked space firms worldwide, according to a survey this year by Space News. States Sennet: "We feel that, by adding names like Boeing, Lockheed Martin and TRW (the industry's fourth-ranked player) to the outstanding accomplishments that we've made with Astrium and Alcatel Space in lithium-ion battery technology, Saft is ideally positioned to be the world leader in this on-board spacecraft power solution."

Launchers to the ready: your lift challenge is lightened, with Saft's lithium-ion batteries powering your spacecraft. ■

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