

# Saft



**INTERNATIONAL**  
Saft's customer magazine

Number 18 Spring 2003

**Icy skytop:  
at 3,000 meters,  
Ni-Cds save  
money for telcos**

p. 10

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# 2003: a hard year to predict

To our customers,

The year just finished was, for many of you, a difficult one. The global economy shifted into lower gear, and uncertainties weighed on many investment decisions. In this environment, I am happy to report that Saft achieved good results. This healthy performance is mainly due to the global scope of our operations, and our ability to address a broad range of market segments with a family of battery technologies that continues to expand. Like our customers in the aviation and telecommunications industries, we of course felt the reduction in these industries' investment. But the breadth and depth of our product offer enables us at Saft to do well in other industries, compensating for any weaknesses elsewhere.

For Saft, growth in 2002 was particularly impressive in defense applications and for our industrial primary lithium products. Prospects for further growth in these areas remain bright, and we are confident that more traditional industries will experience a comeback in the medium to long term as well.

The outlook for 2003 remains cloudy in many industries and markets. But once again we expect Saft to grow. This positive assessment is based on our ability to address customer needs in so many geographies and applications by supplying state-of-the-art battery solutions that are tailored to specific needs in markets that themselves are growing.

And one further point is worth making: you can rely on Saft. We're in business not just for this year and next, but for as far out as you can see. Some of our finest products are still performing effectively after dozens of years of service.

Saft will be here to see them through their lifetimes — and the lifetimes of their successors.

On behalf of all of us at Saft, I wish you and your teams success in 2003. May we all benefit from the beginnings of a sustainable recovery in the world's economic growth.



John Searle

A handwritten signature in black ink that reads "John Searle". The signature is fluid and cursive, with a large initial "J".

John Searle  
Chief Executive Officer

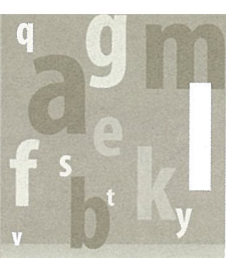


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Saft Corporate Communication, 12 rue Sadi-Carnot, F-93170 Bagnole. Ph: +33/1 49 93 17 07. e-mail: jill.ledger@saft.alcatel.fr



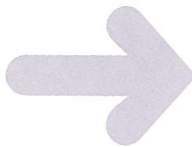


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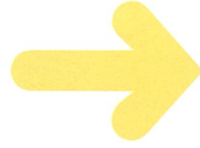
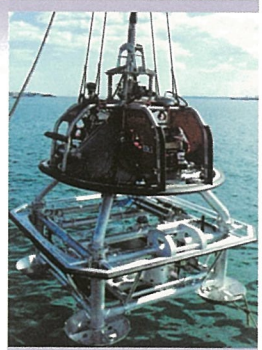
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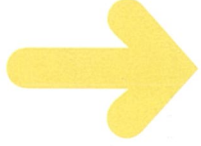
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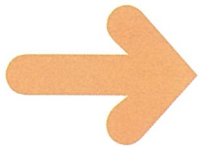
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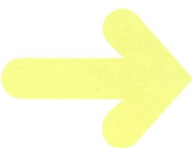
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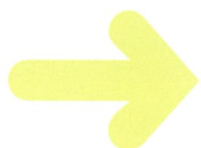
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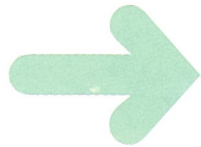
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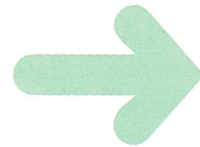
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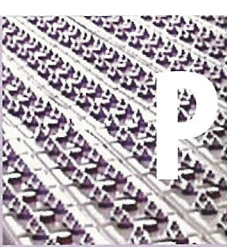


## Getting traction

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U.S. military hybrid electric vehicles adopt Saft's automotive battery technology





Power solutions

# Colibri: one tough mobile system



It's waterproof....

A new pen-operated mobile system aimed at the utility market features advanced ruggedization and Saft's lithium-ion batteries.



Named "Colibri" (which in Spanish and French means "hummingbird") because it's lightweight and operates very fast, like the hummingbird's wings, the device represents a breakthrough in handheld computers. Its ruggedization extends its ability to operate reliably, including under such conditions as rain, dust, cold and even mud. It also easy to

operate in bright sunlight due to its highly reflective 8" x 4" color screen. And data can be entered using either the keyboard or an "active pen" system. Colibri is just one of many products made by Mettenmeier Mobile Solutions, part of Germany's Mettenmeier Holding. Ingo Rameil, the company's marketing manager, comments, "We've been using Saft batteries for quite a number of years, and now appreciate the lithium-ion technology." The waterproof Colibri comes equipped with a 3.6 Ah 10.8 V battery (comprised of Saft cylindrical VL cells) that delivers up to five hours of operating time — in other words, easily enough for a half day of work in the field. Since the battery can also be recharged in cars, users benefit from still greater flexibility in planning their work schedule.



Rugged for work in the trenches: Even in broad daylight, the screen's advanced technology makes it easy to read.



## Complementary primary lithium batteries

Saft's plant at South Shields in the U.K. (acquired from Hawker Eternacell) has revamped its lithium-thionyl chloride cells with a new electrolyte, sharing expertise with Saft's engineers in Poitiers, France. Pictured here is the LST 17330, representing the former T32 cell. The batteries' new electrochemistry and mechanics increase their resistance to abuse while improving their start-up and pulse characteristics. The LST 14250 and LST 14500 replace, respectively, the former T04 and T06. ■

## European markets

In addition to utilities, Rameil says the Colibri is a solution for professionals who rely on geographical information systems (or GIS) in outdoor conditions. These could include cadastral surveying, energy and water network maintenance, processing of pixel graphics and aerial photographs, and environmental data collection as well as a variety of other applications in agriculture, forestry and elsewhere. Rameil believes it would be particularly practical for developers of third-generation mobile networks as they identify outdoor sites for their UMTS infrastructure.

The Colibri is compatible with all major surveying systems, and its communications capability extends to GSM and high-speed Ethernet connections (enabling the user to download data stored in data banks). It uses GPS signals to obtain positioning information. First launched in Germany and Austria in the year 2000, the Colibri is now available in Switzerland, France, the Benelux, Denmark and the U.K. ■

[e.hauser@alcatel.de](mailto:e.hauser@alcatel.de)



# Listening for earthquake warnings... underseas

The sea bottom is an ideal place to listen for seismic evidence — the early tectonic movements that can warn of a potentially devastating earthquake. Italian researchers have installed a lab deep in the Ionian Sea, with Saft's lithium batteries to power its instruments.

Plunged to the Ionian Sea bottom last October at a depth of 2,105 meters, or more than 6,400 feet, an observatory known as the SN-1 (the initials stand for Submarine Network) is the first node of an Italian submarine seismic network. The aim of the network, being set up by Italy's national geophysical institute, is to improve its monitoring capabilities compared to the current infrastructure, which had been totally land-based. The node itself was built by Tecnomare, the marine engineering company of the ENI group, which consulted Saft to get a power solution. And the project is supervised by a Italian-German team working within earlier European programs known as Geostar 1 and 2.

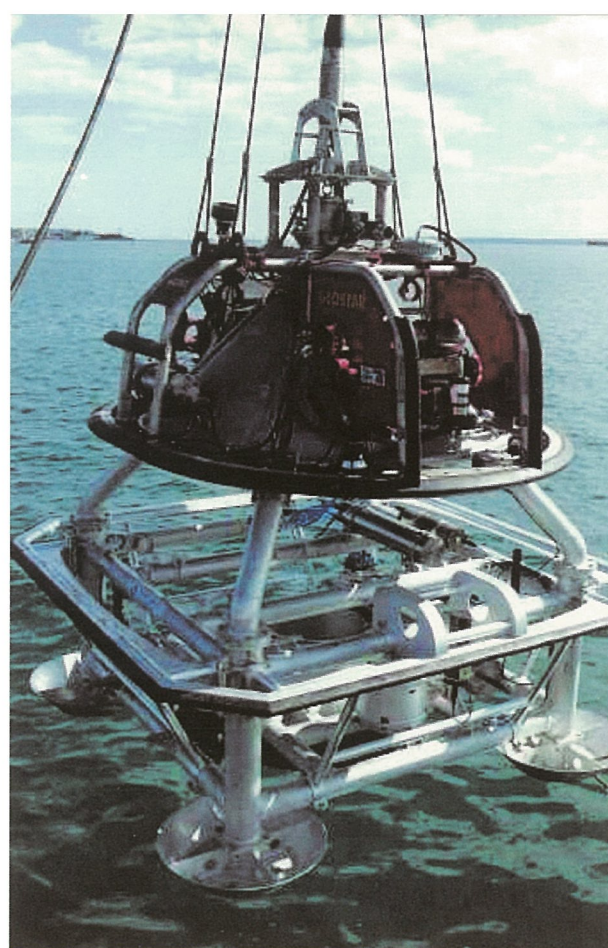
Development and reliable operation of marine observatories — especially those running for as long as a year at depths of 4,000 meters — completely depend on the availability of enabling technologies, such as power, underwater communications, materials, electronics and still more. In the case of SN-1, Saft supplied a 14-volt, 2,000-Ah primary lithium battery pack that powers all the node's applications during the project's initial phase. Later, an undersea cable connection will link the node to the shore and the batter-

ies will provide power back-up for basic functions including data acquisition and local data storage.

## A history of earthquakes

The regions near the SN-1 node (in particular Sicily) are no strangers to earthquakes. Among the most famous and destructive was one at Syracuse in 1990 — not to mention one in Messina in 1908. Geologists note that the particular shape of the Italian peninsula makes it difficult to ensure effective monitoring of the principal marine seismogenetic structures with only a land-based network. By December, the SN-1's operations were checked via acoustics telemetry from a surface ship. The node's manufacturer, Tecnomare, reported great success, in particular highlighting the reliable operation of the Saft battery at a depth where the pressure is quite high — and the temperature quite low. The Italian researchers are now planning further nodes to increase their ability to detect seismic activities. ■

[cesare.giuggioli@alcatel.it](mailto:cesare.giuggioli@alcatel.it)



Ready for the plunge: the SN-1 node is about to start its descent down to the floor of the Ionian Sea off Sicily, with its Saft lithium batteries poised to provide power. The Saft Li-ions performed successfully in testing by Tecnomare at 0° C.

## Sea-bottom lab “payload”

The SN-1's high-tech “listening” devices operate automatically, powered by four Saft lithium-thionyl chloride batteries, with more than four hundred LS 33600C cells. The node weighs 1500 kg at surface level — and 800 kg when submerged on the seafloor 25 km offshore of Sicily. Its “payload” (or listening instruments that report on tectonic activity) comprises five significant devices:

- A three-component broadband seismometer that is tuned to 100 Hz;
- A prototype gravimeter, listening to 1-Hz activity;
- A hydrophone, set to acquire 80-Hz data;
- A three-component current meter at 2 Hz;
- A sensor that makes conductivity (salinity), temperature and depth/pressure readings. ■





# Bittersweet space in 2002

For Saft, 2002 was a year both bitter and sweet in space and related batteries. Due to heavy-launcher teething problems, Saft's proven Li-ion batteries for the next-generation Stentor satellite never reached orbit. Yet many spacecraft — not to mention launchers — flew with Saft batteries on-board.

A recap of Saft's 2002 space achievements.

Satellites are, as always, the hostage of their launcher. It can be a great satellite, but if the rocket doesn't deliver it to its assigned orbit, then it's worthless. In seeking to augment its lift capacity, launcher Arianespace apparently bet on rocket-cooling technology that, given the failure of its December launch, still needs more time.



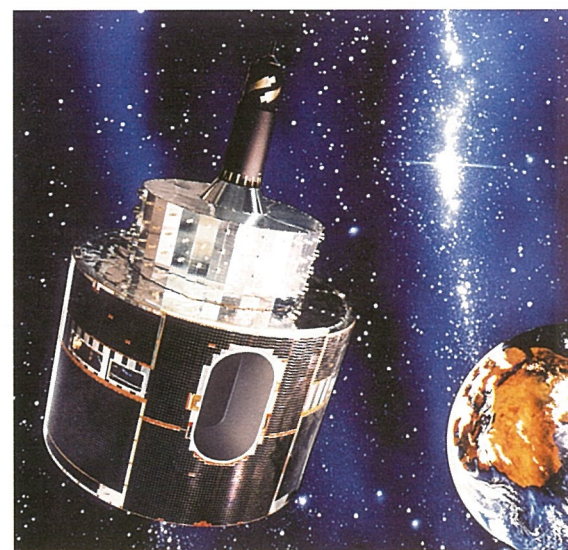
**SPOT 5's eagle eye:** from its sun-synchronous orbit (where the satellite passes over the same part of the Earth at roughly the same local time each day, SPOT 5 is delivering resolution up to four times finer than its predecessors. It takes photos of swaths of the Earth that can be 60 km x 60 km or, when its two high-resolution geometric instruments are used, 60 km x 120 km. Saft's batteries are on the spacecraft, helping deliver commercial images for applications that require scales from 1:25,000 to 1:10,000.

Seeking to orbit a 10-ton package into space, Arianespace combined payloads consisting of both the leading-edge scientific satellite Stentor (with proven lithium-ion batteries from Saft, which were set for further testing in space) and a commercial spacecraft, HotBird 6. A single launcher failure of Arianespace's next-generation rocket unfortunately sent both into the Atlantic.

Arianespace engineers are examining data to determine the cause and solutions. Saft batteries were planned to power both "birds", as satellites are often referred to in space jargon. But Saft batteries also flew on dozen satellites launched in 2002 that did reach their planned trajectory — and that have achieved profitable and efficient performance for their owners, in a range of applications. All were built by Alcatel Space.

## A large array of applications

Space is a place suited for a wide variety of applications, including not just telecoms and media broadcasting (next-generation applications that Stentor would have tested), but also observation and navigation. Saft batteries are helping power a number of a satellites that perform these space-based missions. In August, for example, Arianespace's Ariane 5 successfully lofted Atlantic



**Meteosat (MSG-1)**

Bird 1, a 2,700-kg satellite with Saft's nickel-hydrogen batteries, that is now carrying telecoms, Internet and other related services between North America and Europe with its 24 Ku-band repeaters. With its Saft batteries, it is expected to fulfill a 15-year service lifetime.

Earlier in the year, the Intelsat 905 satellite was successfully launched aboard an Ariane 44L vehicle. Operating with Saft's NiH<sub>2</sub> batteries, it has begun offering capacity for telephony, corporate networks, Internet, video and hybrid space/terrestrial solutions to customers on its 72 C-band and 22 Ku-band transponders. It features high-power Ku-band spot beam coverage for Western Europe and much of North America and additional C-band capacity to customers in Europe, the Middle East, Africa, North America and South America. It was an Ariane 5 that took up a weather



# Korea reaches towards space

In what the publication SpaceDaily termed a "landmark" event, South Korea launched a liquid-fuel rocket that carried a Saft lithium battery. The suborbital mission was successful.

*Known as a sounding rocket, the KSR III was launched by the Korea Aerospace Research Institute, or KARI. The Saft battery, which technologically was identical to the one developed for Stentor (except for the electrolyte), powered the engines' hydraulic actuator pump. The battery consisted of 10-Li-ion VEL 140S cells. A KARI representative expressed appreciation for Saft's "cooperation for supplying the Li-ion batteries on time for [rocket] assembly...and for...the quality of your newly assembled batteries." The launch represents a crucial step in Korea's bid to join the world's top aerospace nations. The Korean Ministry of Science and Technology said the launch has secured the technology needed to develop a satellite-launching vehicle by 2005. ■*

And U.S. satellite fleet operator SES Americom is expecting its AMC-9 satellite to be launched early in 2003 into a geosynchronous orbit serving the North American market with twenty-four 36-MHz C-band transponders and twenty-four 36-MHz Ku-band transponders, all providing service into the U.S. In short, the year just passed encompassed a range of high-impact thrills — and disappointments — in the world space industry. Proud to have played a vital role in all these projects during a very busy 2002, Saft is also looking forward eagerly to the upturn in the cyclical satellite industry, forecast for next year. ■

[annie.sennet@saftamerica.com](mailto:annie.sennet@saftamerica.com)

Final integration of Hispasat 1D on a Spacebus 3000 platform at an Alcatel facility.

satellite known as MSG-1, with Saft's Ni-Cds, the first of three birds that the European Space Agency is expected to launch in the series. Built by Alcatel, the second-generation 2,000-kg craft will report on meteorology from its geostationary position over the Gulf of Guinea, off the African coast.

And in an application mixing telecoms and meteorology, the latest satellite of the India Satellite Research Organisation's INSAT-3 series, INSAT-3C, was launched by Arianespace in January, also with Saft's NiH<sub>2</sub> batteries. After in-orbit testing, INSAT-3C went into operation in July.

## Observation role, too

In an application similar to Atlantic Bird 1, 4,100-kg Stelat 5 entered service this year, providing interactive IP connectivity across the Atlantic between the U.S.'s East Coast and Western Europe as well as throughout Africa and the Middle East. A user's satellite dish can be as small as 60 cm (24"), depending on location. With nickel hydrogen batteries from Saft throughout its 15-year service life, Stelat will also broadcast TV programs using advanced steerable Ku-band technology.

In a completely different application — Earth observation — an Ariane 5 first lifted

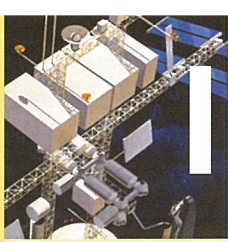
Envisat into its low-Earth-orbit in March, followed by an Ariane 4 rocket with SPOT 5 in May. [Ed.'s note: see photo and caption on preceding page.] The latter reached a sun-synchronous orbit and entered commercial service after two months of successful testing.

## And U.S. launchers

In addition to riding Ariane rockets to orbit, Saft-powered spacecraft also ride U.S. (and other) launchers. For example, in November a Delta 4 made its inaugural flight carrying Eutelsat's W5 satellite. The 3,000-kg W5 carries 34 Ku-band transponders. The satellite has a design life of 12 years, with an end-of-life power generation capability of 6,000 kW. It's already begun providing a range of telecommunications users and service providers for video distribution and contribution links, occasional-use video, particularly satellite news-gathering as well as Internet backbone connections. W5's coverage is enabling Eutelsat to increase its market presence in Asia as far as the Pacific.

Also from a U.S. launching pad, but on an Atlas rocket, Saft batteries rode into space in September on the Hispasat 1D satellite, consolidating Spanish telecom operator Hispasat's positions thanks to a significant increase in the operational capacities of its fleet.





Innovation

# World's first Bluetooth payment terminal

Signed Ingenico, the world's first payment terminal using the Bluetooth wireless technology is now on the market. Saft batteries are powering these newly released Ingenico 7300 and 7700 models.



Harald Bluetooth, monarch of Denmark in the 10th century, not only unified his country but also conquered Norway. Now, his power to make (political) connections has inspired modern-day technologists to use his attribute "Bluetooth" as a name for a wireless standard that is conquering homes and the workplace, including merchants and restaurants. The Bluetooth standard connects devices to each other, pairing them. Paris-based Ingenico, the world's leading manufacturer of electronic payment terminals, is now the first supplier to launch remote, handheld terminals using the Bluetooth standard. And Saft is supplying the nickel-metal hydride (Ni-MH) batteries that enable the terminals to operate when away from their docking station. As Ingenico boasts an installed base of over 6 million terminals in more than 70 countries, the potential of its

Spacious dining service: even patrons at tables seated far from the cash register can use the Bluetooth-enabled Ingenico 7700 — and be ensured of encrypted transmission of their transaction data — thanks to Saft's Ni-MH.

Bluetooth advance is obvious. In 2001 alone it sold 1.5 million terminals. "As it is a universal and open standard," Ingenico's engineers state, "in portable payment transactions Bluetooth delivers a successful, highly secure and open answer for the entire network environment."

## Wide service area

Among the important breakthroughs that Bluetooth offers in this application is its digital radio technology. This provides greater performance for merchants, enabling them to bring the payment ter-



# U.S. self-contained emergency lighting: liking Saft's Ni-Cds

**Compact yet powerful:** Ingenico's next-generation Bluetooth terminals feature compact size — and powerful capabilities. Their Saft Ni-MH batteries (with five VH 11 1500 cells, delivering 6 volts and 1500 mAh) measure only 15 x 72 x 52 mm and weigh just 145 gr. Starting with a full charge they handle roughly 200 transactions.

minal easily to clients. The Ingenico 7700 can be used as far away as 200 meters (660 feet) from its base. Communication quality improves, too, and with its frequency-hopping capability and inherent error correction, Bluetooth guarantees highly stable radio transmission. The terminal's autonomy is extended, partly because the Bluetooth standard is very economical on power. This feature, together with Saft batteries, make the Ingenico 7700 particularly well-suited to the portable payment environment. Bluetooth is an ideal radio solution for network configurations ranging from two to seven payment terminals. Merchants obtain higher performance levels since several devices can transfer data simultaneously at a high speed of up to 700 kbps. It can also provide substantial savings, since even when the network reaches out to other devices, only one phone is needed — thus considerably reducing a merchant's phone bill. Frequency hopping also enhances security, which also extends to authentication, cryptography and network-addressing methods. The open, universal Bluetooth standard — which has been adopted by IT leaders worldwide — unlocks still more opportunities for the connectivity of Ingenico's latest payment terminals. Look for them next time you use your charge card. ■

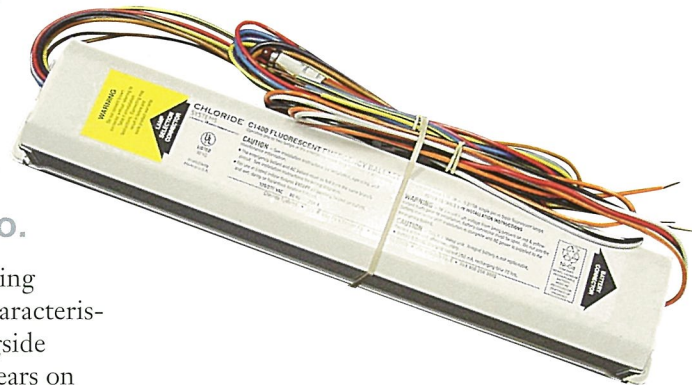
[jean-paul.emeriau@saft.alcatel.fr](mailto:jean-paul.emeriau@saft.alcatel.fr)

Chloride, a leading U.S. supplier of emergency-lighting solutions, is switching from an Asian supplier to Saft. Because of the need for just-in-time deliveries, suppliers must be highly reactive. For Chloride, Saft America is — compared to those in Asia. And Saft's Ni-Cd batteries bring total reliability too.

Batteries for emergency lighting applications need special characteristics. These include living alongside heat-producing light bulbs for years on end — with no reduction in battery capability to be reliable when a mains power black-out hits. The back-up battery needs to kick in, immediately, no matter how long it has waited, ready to serve. Chloride supplies a variety of emergency lighting fixtures, ranging from flood lights to exit lighting and what are known as "ballast-type" lighting, set in the ceiling. Chloride has chosen Saft to supply its VT DU nickel-cadmium batteries (an upgrade, compared to Saft's VT D technology) for these ballast lamps, mainly because of Saft's North American logistics capabilities. Customers rate the VT D and the VT DU as the best available products (within Saft's particularly large VT product range) for the emergency lighting application. So it's no surprise that Saft leads this market worldwide.



**Lighting up exits:** emergencies generate special battery requirements. Ni-Cd does the best job.



## Meeting UL norms

Saft has facilities and offices in the U.S. — in Georgia, North Carolina, Maryland, New York and Connecticut. It is the North Carolina plant that will be most useful to Chloride in supporting logistics for these top-of-the-line battery packs. In the U.S., the standard-setter is the UL, or the Underwriters Laboratories' norm — in this case for emergency-lighting equipment to be steadily exposed to a harsh 55° C environment and, in a mains outage, to operate for 90 minutes. For Chloride, Saft's batteries will do the job for its fluorescent tubes. ■

[blake.frye@saftamerica.com](mailto:blake.frye@saftamerica.com)





Extreme power

# Cutting telco opex with mountaintop Ni-Cds

Northwestel, a telecoms company (or telco) in northern Canada, chose Saft's Ultima.plus nickel-cadmium batteries for a repeater station on what is a hard-to-reach location, facing some of the worst weather that the Arctic can deliver.

In terms of operating expenses (or opex), however, the Ni-Cd batteries will be saving Northwestel money.

thanks in part to Saft's Ni-Cd Ultima.plus battery technology.

Despite the environmental challenge, says Northwestel's Barry Sugden, "Our service and performance standards are as high as any other operator in the world." He adds: "To meet our customers' expectations, we need the best equipment and support we can find. Saft is certainly helping us to meet these expectations."

## Limiting helicopter visits

With helicopter-only access to a site like the one on the 8,600-foot-high mountain (roughly 2,700 meters) where Northwest installed Saft's Optima.plus, the best way to cut opex is to avoid having to visit the site for maintenance. That's what Ni-Cd batteries accomplish, compared to the lead-acid batteries that they replaced. Fewer visits by maintenance engineers also reduces the chance of what Sugden describes as an "even worse" option than

In fact, Northwestel supplies more than just basic "telco" voice and fixed-line services. Delivering mobile, multimedia and other telecoms services to subscribers — including Internet access and other data services — is part of its requirements. In its remote part of Canada, Northwestel was seeking to maintain or boost service reliability while, if possible, reducing opex. Northwestel's service area is enormous,

setting records in all dimensions. Canada's longest river runs through it, and its highest peak rises there — and it also is home to the country's deepest lake and biggest island. Its mountain-top microwave radio tower in Nahanni (as the national park in the Northwest Territories is called) now helps deliver a range of reliable narrow- and broadband services to its customers — spread across nearly 4 million square kilometers —





**Weathering wintry cold in Canada's Yukon: The relay station's equipment is powered (and kept warm) by Saft's Ultima.plus Ni-Cds when there's no sunshine for solar arrays to use. Saft manufactures a complete range of Ni-Cd batteries for telecoms networks: the Ultima.plus (installed here) and the compact NCX.**

having to fly personnel in: that's "not being able to get them out", he says, if a storm should unexpectedly arise.

## Hybrid power solution

Thankfully, not all days are snowy or cloudy in Nahanni. The relay tower's power first comes from a photovoltaic array of solar panels that can generate 1,500 watts. They power the telecoms relay equipment while also charging the Ultima.plus batteries: four parallel strings of 20 cells delivering about 800 Ah of storage capacity.

When there's no sunlight, the Ultima.plus batteries take over, backed up by a diesel generating set that fills in until the battery's charge current drops to a preset level. (The diesel genset is also used to provide heat for the enclosure. When the engine is off, a small diesel furnace supplies heat, drawing 200 watts when burning and 50 watts on standby.) This hybrid power solution turns out to be just what the doctor — or telco — ordered. The site's load varies between 350 and 600

watts, depending on what equipment is turned on.

## Less maintenance, longer service life

Northwestel chose to replace valve-regulated lead-acid (VLRAs) batteries on its Nahanni mountaintop site because the performance, reliability, long service life and lower maintenance costs make Ni-Cd batteries a cost-effective solution. The VLRAs lasted about four years, whereas the service lifetime of Saft's Ni-Cds stretches out to as much as 20 years. And the Nahanni repeater station is just the start. Northwestel is now using Saft's Ni-Cds to start generators in examining ways Ultima.plus batteries can be used more frequently in telecoms standby applications: Still other ways for operators in the highly competitive multimedia service industry to drive more revenue through to the bottom line, thanks to lower opex. ■

[ole.vigerstol@saftamerica.com](mailto:ole.vigerstol@saftamerica.com)

## Arctic explorer relies on Li-ion



**When planning his 2002 expedition to the North Pole, French explorer Jean-Louis Etienne realized that his power requirements pushed the limits still further.**

The battery had to operate in  $-20^{\circ}\text{C}$  conditions and survive storage at  $-40^{\circ}\text{C}$ . And he needed constant display of its state of charge. Only Saft's rechargeable lithium-ion VLE cells were able to deliver these performance levels. Safely back from his mission, Etienne said he was very satisfied with the batteries that, for the first time on his several polar expeditions, allowed him non-stop access to electrical power at any time he wanted. ■





**E**volving planet



# Renewable energy solutions tailored to remote needs

In both cases (one on an island off the coast of Sweden, and the other in Australia's outback), the solutions are hybrid, combining solar and wind power for the first, and solar and diesel for the second. Saft's Sunica batteries are especially designed — as the “Sun” in their name indicates — to use solar energy generated by photovoltaic systems. This application specifically requires efficient batteries with a long cycle life and a potential for both shallow and deep cycling — an assignment that the Sunica technology handles perfectly. The power needs in the two remote locations were as far apart as the facilities themselves are geographically. In Sweden, the island where the Sunicas are

From high up in Scandinavia to way down under in Asia Pacific, facilities that are too remote from the regular electricity grid rely on renewable energy solutions that integrate Saft's rechargeable nickel-cadmium batteries.

installed is the largest in an archipelago of 900 islands, islets, reefs and rocks that forms a national park. As such, it's the year-round home of a park ranger and it also naturally welcomes many visitors. In 1986 it was estimated that laying an undersea power cable to Bullerö, as the island is called, would have cost \$100,000. Instead, in 1988 the low-cost hybrid system was installed — initially with lead-acid batteries. But in 1993, it became clear that the life-cycle efficiencies of Sunica's Ni-Cd technology would be greater. And the Sunica batteries installed then are still operating, a decade later, and won't need replacing for many more years.

or 200 miles, northeast of Adelaide) on Mt. Edwards required autonomous local power. Cummins Power Generation, a unit of the U.S.-headquartered \$5.7 billion Cummins company, proposed a hybrid system that combines the advantages of both solar and conventional diesel generation. Founded three-quarters of a century ago, Cummins has from the beginning specialized in diesel power technology. That capability complements a photovoltaic generator mounted on the roof of the diesel generator's container. Inside the container are Sunica batteries and an automatic control system.

The solar array supplies the transmission tower's main power while also charging the Sunica batteries. At night and at peak times, the Sunica batteries step in to fill the gap. And if the battery capacity decreases to a pre-set level, the diesel genset kicks in with back-up power.

The solution is so efficient, in terms of renewable energies, that even in low-sun winter months, the diesel genset starts up only around once a week. So, even though they don't know about the Mt. Edwards “tower power”, Spencer Gulf TV viewers are supporting an environmentally responsible transmitter — delivered by Cummins and Saft. ■



**Sunica battery features:** installed on Mt. Edwards (top photo) in the container under the solar panels, the pocket-plate technology features a special spill-proof vent and an extra electrolyte reserve that ensures almost supervision-free operation and a long interval between topping-up. Their expected service life-time can reach 20 years, and there's no risk of lead-acid's “sudden death”.

## Tower power

In Australia, not only was the facility on the opposite side of the world; it was also a different hybrid type and at the top of a mountain, rather than at sea level. (Sunica's Ni-Cds love temperature-range challenges!) In the area around Adelaide in southern Australia, Spencer Gulf Telecasters delivers TV service to viewers spread out across the Spencer Gulf area. A remote transmission tower (about 300 km,



# Self-launching sailplane flies higher

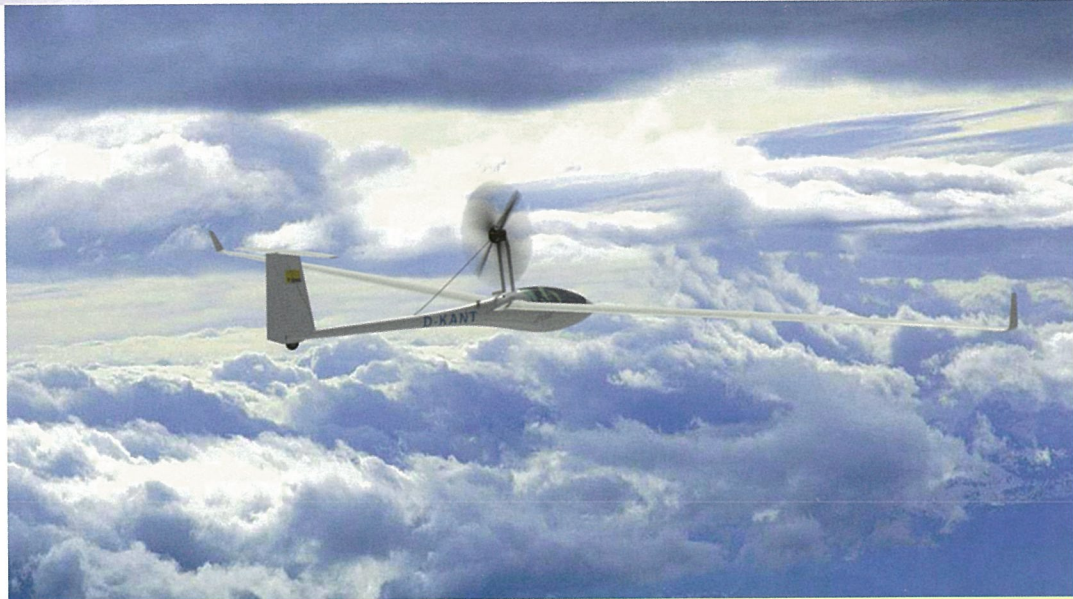
By using lithium-ion batteries from Saft, Lange Flugzeugbau has enabled pilots of its Antares sailplane to reach higher altitudes and stay in the air longer.

Set up just six years ago, Lange Flugzeugbau has been driven from the outset by a single idea: to harness its employees' abundant enthusiasm and know-how to develop, build and market an almost-silent high-performance "motor-glider". And the German company's team members frankly admit that the fascination of gliding "runs in their blood".

So it's no surprise these gliding enthusiasts were ecstatic when they discovered last year that Saft's Li-ion technology could launch the plane to an altitude of 3,000 meters (9,480 feet) — 1,100 meters higher than was possible with the previous battery technology. What's more, the battery's charger is directly integrated into the Antares, enabling the sailplane to travel cross-country for several days. The people at Lange Flugzeugbau have achieved these performance levels using their expertise in aeronautical engineering and vast experience with composite design — plus an international network of specialists. For example, its engineers developed a new propulsion system that features high performance and nearly silent operation. It's also "environmentally friendly," they note.

## The "ideal choice"

The batteries that help Antares to deliver this new experience are composed of Saft's MR (medium-range) lithium-ion



"Motor-glider" of the future: the high-tech propulsion system turns a pusher propeller that is extended above the wing for take-off and powered flight. To switch into soaring mode, the pilot retracts the complete propulsion unit into the fuselage by simply pulling a lever. This improves the sailplane's aerodynamic efficiency.

cells, which were originally developed for hybrid- and electric-vehicle applications. Seventy-two VL 41 M cells are wired in series, delivering a nominal voltage of 260 V. "The low weight [of about 76 kg] and high voltage level of the system result

in a high specific-energy density," the Antares designers observe. "All in all," they declare, "lithium-ion cells are the ideal choice." All aboard for higher, longer and happier gliding! ■

[ginette.kergoat@saft.alcatel.fr](mailto:ginette.kergoat@saft.alcatel.fr)

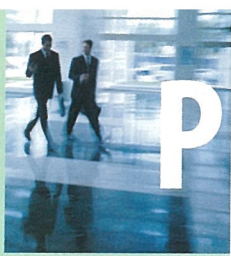
## Gulf desalination plant back-up power

Italy's Enelpower, which is constructing a 750-MW power generator for a desalination plant in Qatar (to remove salt from the Gulf's waters), will be installing Saft's Ni-Cds for back-up power purposes. A total of 1728 SBL cells in eight Saft batteries will back up a 110-volt system for up to eight hours, supporting critical DC and AC systems that include motors and emergency lights. Saft's nickel-cadmium technology was preferred over previously spec-

ified lead-acid batteries due to Ni-Cd's more predictable lifetimes and its greater tolerance of extreme environmental conditions such as those in the Middle East.

The desalination plant's production capacity will reach 40 million gallons of water daily (roughly 160 million liters) — enough to supply a city with a population of 600,000. Qatar's population numbers just over half a million in all. ■





Partnership

# Airbus partnership on batteries cuts costs

Virgin Atlantic Airways was the launch customer of the latest Airbus member of the A340 family — and is already benefiting from lower maintenance costs, thanks to a new battery technology.



**Happy handover:** Airbus CEO Noel Forgeard (left) delivers the first Virgin Atlantic Airways A340-600 to the airline's chairman, Richard Branson (on Forgeard's left). The jet's ultra-low-maintenance battery technology, signed Saft, is already cutting Virgin's maintenance costs.

The first Airbus A340-600 made its inaugural commercial flight last August 1 under the Virgin flag between London Heathrow and New York. Since then, Virgin has been operating three A340-600s between Heathrow and Hong Kong and Tokyo as well as New York. The biggest of the Airbus range, the A340-600 typically flies 380 passengers over 7,500 nm (13,900 km).

Until the A340-600, Airbus aircraft were already all equipped with Saft Ni-Cd batteries, a range with both positive and negative sintered electrodes. On the new A340-600, Airbus decided to offer operators an opportunity to further reduce maintenance costs significantly by using Saft's new CVH cells based on the ULM® technology (Ultra Low Maintenance). This advance allows a full year of operation without maintenance.

The ULM® Ni-Cd solution features a negative plastic-bonded electrode along with the regular positive sintered electrode. (For full details, visit [www.saftbatteries.com](http://www.saftbatteries.com).) The solution results from a four-year partnership between Airbus and Saft. The same battery type also fits the longer-range sister aircraft, the A340-500. The ULM® technology will be progressively introduced on shorter-range Airbus aircraft, and the future A380 — typically

with 555 seats — will benefit from a further evolution of this technology. Additionally, Airbus has initiated with their supplier-partners a customer service policy of excellence. This requires immediate reactivity to any operator request. Saft and its worldwide distributors network are contributing actively to this effort. ■

[bernard.weber@saft.alcatel.fr](mailto:bernard.weber@saft.alcatel.fr)



# Hybrid military vehicles: the (stealth) way forward

Lithium-ion battery technology is driving hybrid military vehicles into the future... quietly. Saft is delivering its rechargeable Li-ion expertise in defense vehicle applications from its base in Cockeysville, Maryland, as well as its European R&D centers. The U.S. defense establishment is interested.



Lighter logistics: with hybrids, armed forces don't need to transport as much fuel.

Lighter, more mobile and a shorter logistics trail: that's the target of the U.S. Army's Future Combat System initiative. Hybrid electric-vehicles (or HEVs) contribute to this goal in every respect, especially when equipped with Saft's Li-ion batteries. Saft is also a partner in civilian electric drive programs, whether hybrid or not — and in both Europe and North America. It is a full member of the Partnership for Next-Generation Vehicles (PNGV) within USABC (the U.S. Advanced Battery Consortium) as well as participating in European programs such as Liberal and Lionheart.

Saft's EV expertise extends from its Bordeaux center to Europe and across the Atlantic to the US. For military applications, its U.S. Li-ion center of excellence is located in Maryland, with other Saft lithium production capability

in Valdese, North Carolina and Poitiers (in France).

## "Stealth-like" battlespace assets

When the U.S. deploys battlefield assets, it's essential that vehicles move fast — and yet leave as small a "trail" as possible, including thermal (or heat) signatures. Just as a Stealth aircraft is undetectable by radar, an HEV with Saft's Li-ion batteries can drive up a hillside and reconnoiter a valley beyond without leaving any "heat trace", thanks to its battery-powered drive shaft. HEV battery-powered drive trains deliver "silent" (from a thermal watch standpoint) capability and silent mobility, whilst increasing vehicle range. They are compatible with today's — and tomorrow's — main propulsion technologies. ■

[michael.saft@saftamerica.com](mailto:michael.saft@saftamerica.com)

## Electrical silence in the battlespace of the future

Quick! What do these three events have in common? An astronaut fixing the Hubble space telescope. A postman driving a delivery van. And a U.S. Marine barreling long in a silent, four-ton all-wheel-drive vehicle?

If you answered, "They all depend on Saft's lithium-ion batteries," then you're right. Because the same Saft Li-ion technology that helped repair the Hubble and drive the mail delivery van is now powering the next generation of military combat vehicles. Surprised? Well, just imagine a battlespace where U.S. and NATO adversaries will look up and suddenly see a silent mass of electric-drive armored vehicles and robots coming out of nowhere. And with such overwhelming force that battles will be over before they even begin.

Welcome to the world of 21st-century combat. Where massive, diesel-guzzling main battle tanks are replaced by smaller combat HEVs that strike with the quiet suddenness of a lethal viper. A world where remotely piloted electric-drive robots roam the countryside performing all types of scouting and combat missions that before put soldiers in harm's way. A battlespace where silence is not only the calling card of these new combat vehicles but is also the hallmark of a new type of weapon: powerful laser beams and electromagnetic waves that forever change the way battles are fought.

And the enabler powering this new era of combat: High-power Li-ion battery technology from Saft.

Science fiction? No. The future of combat is changing. And the debut for all these technologies happened last October at the show held by the Association of the U.S. Army (AUSA) in Washington, D.C. Actual prototype HEVs were shown by General Dynamics Land Systems and United Defense, while IDT-PEI showed a full-scale mock-up of a solid-state laser weapon system mounted on a U.S. Army HMMWV. What was especially significant is that each of these vehicles relied on high-power Li-ion batteries supplied by Saft's Cockeysville manufacturing center. ■





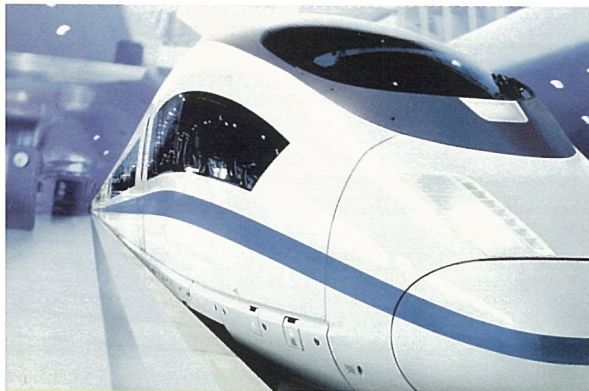
# Defense seminar draws great reviews



"Quite impressed." "A positive experience."  
"Glad to meet the face behind the name."  
"Eye-opening." "An ideal forum."  
"Very informative."

Some of the feedback, following a defense seminar that Saft hosted for 73 customers hailing from 17 countries on four continents and the Middle East. The 2002 edition, held at a chateau outside of Paris last September, followed two earlier ones. The aim — to present and discuss battery technologies used in defense applications — was amply met. As was a secondary aim, of fostering greater personal relationships between the customers and the nearly three dozen Saft representatives who attended and gave presentations. The emphasis was on new technologies, in particular lithium-ion batteries. The chateau's spacious facilities also enabled a number of side meetings to be held on more specific topics with smaller groups. Saft's Michel Broussely gave a talk on the outlook for portable rechargeable technologies over the next five to 10 years. He emphasized that, despite the promising attractiveness of fuel cells, they remain a more distant goal compared to Li-ion — and even more compared to Li-ion coupled with primary lithium for some applications. The participants also took in an impressive demonstration of a scale aircraft model — naturally powered by Saft's Li-ion batteries. ■

## Matrics knocks 700 kg off Spain's AVE



RENFE, Spain's operator of the high-speed train known as AVE, will benefit from the advantages of Saft's Matrics batteries that weigh 700 kg less than their lead-acid predecessors.

For RENFE, lower weight translates into lower maintenance costs on the track, and lower operating costs for the train service.

Saft's MRX rechargeable nickel-cadmium batteries will save both weight and space. The Matrics design (the initials stand for MAAss Transit Rail Integrated Compact battery System) enables Siemens, the trainsets' manufacturer, to adopt an integrated under-floor installation, thus maximizing interior passenger and service space — another plus for RENFE.

The Matrics technology also features a simple-to-use capability whereby all a car's battery cells can be topped up with electrolyte from a central part, thus reducing substantially the battery maintenance requirements. Siemens is building 16 eight-car trainsets for record-setting service that will run at up to 350 km/h (210 mph) between Madrid and the French border via Barcelona. ■

[ginette.kergoat@saft.alcatel.fr](mailto:ginette.kergoat@saft.alcatel.fr)

[richard.francois@saft.alcatel.fr](mailto:richard.francois@saft.alcatel.fr)