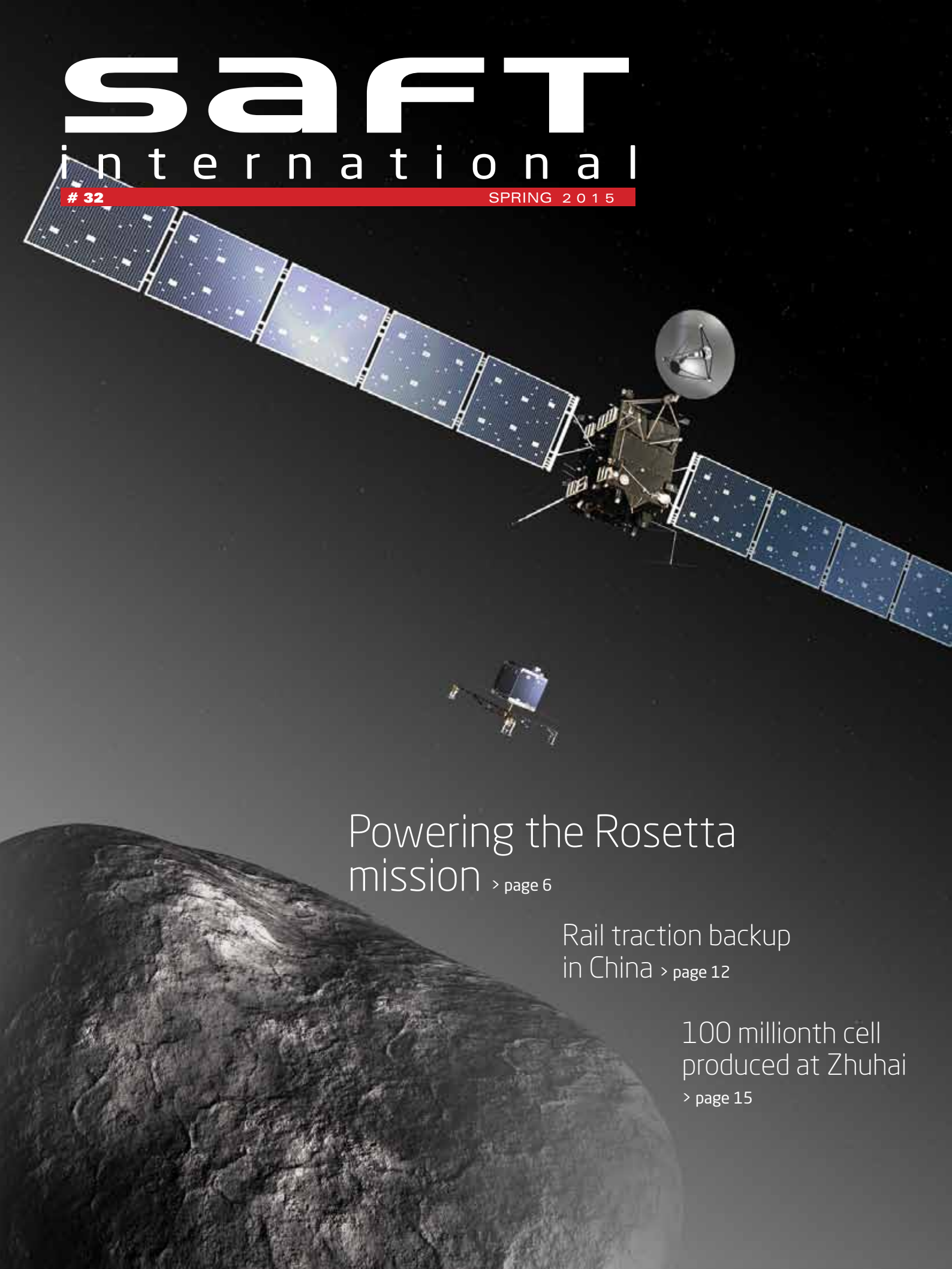
saft international

32 SPRING 2015



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Bruno Dathis
Acting Chairman of the
Management Board
Saft Groupe SA

This edition of Saft International illustrates how Saft is continuing to accompany its customers in their innovative and ambitious projects worldwide.

Saft's nickel-based batteries registered major successes in the rail and stationary back-up power markets in the Middle-East and Asia in particular, and are also on board the new H175 Airbus helicopter.

Primary lithium technologies also performed very well in the last few months, and two major milestones were achieved at the end of 2014 when our Zhuhai plant in China produced its 100 millionth cell for the metering and electronics markets, and when the Saft battery on board the Philae lander performed perfectly to contribute to the success of the European Rosetta mission, as the entire world watched on.

Our customers continued to progressively adopt our Li-ion technologies in markets such as energy storage, marine, regenerative braking in rail applications, military aircraft and hybrid power plants.

As a result our group grew well in 2014, gaining market share in many segments, and will continue to grow in 2015. Saft is an experienced and reliable partner for all your battery projects requiring failsafe performance and technical expertise. We are the world leader in our traditional technologies and markets and are positioned on exciting and growing markets with our Li-ion technologies.

All of Saft's teams are devoted to delivering to our customer's high-performance, cost-competitive advanced battery solutions in all our technologies and in all markets around the world.

You can continue to rely on Saft to bring you innovative solutions for your current and future energy storage needs.

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Li-ion cells working under new extremes

- 50 °C
low temperature achieved with xc model

- 40°C/+ 85 °C
world's widest temperature range of xtd Li-ion cell

6.4 Ah
capacity of MP Integration 176065 xc cell

Saft has extended the operating range of its MP Integration™ Li-ion cells. The MP (medium prismatic) series has been extended with wide temperature variants that can operate in extreme heat or cold.

Extended life & temperature range

The MP Integration™ xtd are the only Li-ion cells on the market that have the capability of providing high performance power from – 40 °C to + 85 °C. The xtd series has been developed to deliver reliable power and meet the long life expectancy of rugged industrial equipment, removing the need for maintenance or battery replacement.

Extreme cold

On the other hand, the MP Integration™ xc Li-ion cell has unrivalled low temperature performance from – 50 °C to + 60 °C. It has applications in defence, professional portable tools, oil and gas and aerospace.

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Primary lithium cells make pulses race

Saft has expanded its industry leading LM range of Li-MnO2 batteries for general industrial applications while boosting production capacity and consolidating the Friwo-M range into its core brand. The key feature of Li-MnO2 electrochemistry is its high pulse capability even after long dormant periods combined with an extremely low self-discharge rate. This makes it popular for smart metering, alarms & security and oil & gas installations in which the cells have a lifetime of up to 20 years.

Firstly, three new cells have been added to the LM range. These A, C and D-sized cells have extended the capacity of the range to suit a broader range of applications.

Secondly, to support growth in demand for the LM range, Saft has invested in its plant at Valdese, in North Carolina, USA, to create a high output automated manufacturing line that will ramp up production in mid 2015.

Finally, Saft has brought its Friwo M cells into its core brand. Now known as Saft M cells, the range is manufactured in Büdingen, Germany, and includes the world's only high-power primary lithium cells that are certified for use in potentially explosive atmospheres by an independent certification body.

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A key feature of Li-MnO2 cells is their high pulse capability

Jacksonville open day enhances reputation

Saft held an investor and media day in November 2014 at its Lithium-ion (Li-ion) plant in Jacksonville, Florida, USA, to explain Saft's position as the world leader in advanced batteries for high tech industrial applications.

Investors, analysts and the media were welcomed by Saft's senior management including acting Chairman Bruno Dathis and they enjoyed a tour of the high-volume manufacturing facility as well as presentations on Saft's markets, growth opportunities and future prospects.

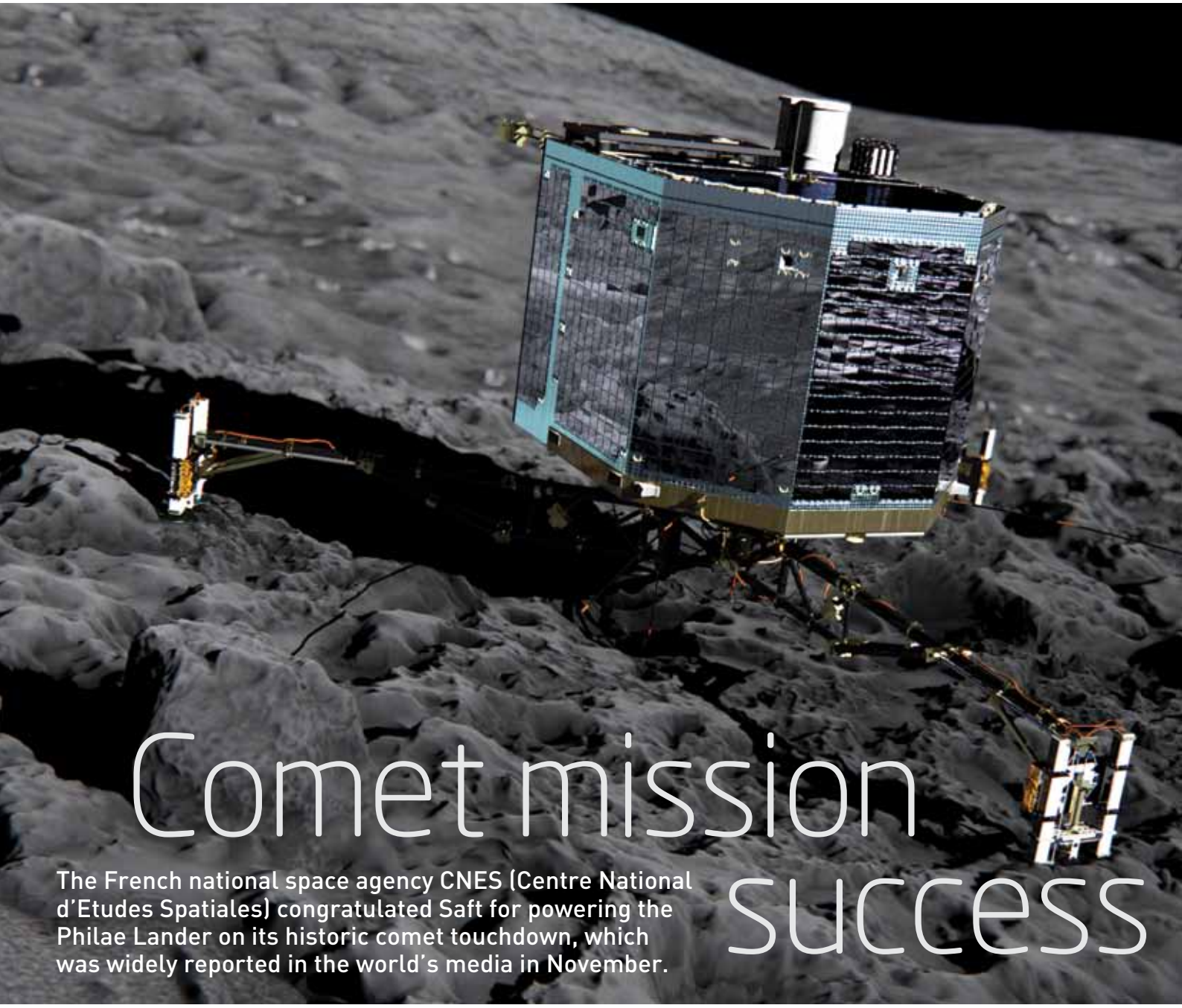
Bruno Dathis said: *"This open day gave Saft the opportunity to present our medium-term plans and answer questions about our technologies and business. It also enabled us to demonstrate the high volume production capability that underpins our advanced Li-ion battery strategy."*

300 employees
work at Saft Jacksonville

$300 million
annual sales capacity

2012
production started at Jacksonville

Markets served :
Energy Storage, Telecom Networks, Vehicles and Marine



Comet mission success

The French national space agency CNES (Centre National d'Etudes Spatiales) congratulated Saft for powering the Philae Lander on its historic comet touchdown, which was widely reported in the world's media in November.

The Philae Lander was the key payload of the European Space Agency's (ESA) Rosetta mission and during the craft's construction, Saft supplied a primary lithium battery to CNES on ESA's behalf.

Mr Lam-Trong Thien, Manager of the Electrical Power Department of CNES Toulouse, said: "Congratulations to Saft for the quality of the primary lithium battery that was essential for the success of the Rosetta mission."

After its 10-year journey covering more than 40 times Earth's distance to the Sun, the Saft LSH20 battery enabled the Philae Lander to wake up from its deep space hibernation. The battery was then the sole power source for the Lander's systems during its final descent to the comet and provided hours of power for its first sequence of scientific tests, overpassing Saft's 60 hour commitment and operating at a far lower temperature than foreseen.

The battery successfully completed all of its mission requirements and delivered more than its specified hours of autonomous power for 11 instruments, sample collection and analysis, photography and communication with Earth.

Benoit Lagattu, Saft's Project Manager for Satellite Batteries was responsible for delivering the battery to CNES in 2001 and said: *"We are extremely proud of the performance of the primary lithium battery on board the Philae Lander. It performed exactly as we envisaged, surviving extreme cold, shock, vibration and a decade-long flight to deliver power when it was needed most. Our success on the Rosetta mission is testament to Saft's 50-year experience in batteries for space."*

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Q&A with Yannick Borthomieu

Saft's Satellite and Launcher Battery Product Manager answers a few questions about Saft's space batteries.

What is Saft's experience of batteries for space?

Saft has more than 50 years' experience in space batteries and has powered almost 800 satellites, space vehicles like the Philae Lander, launchers, Moon Probes and Mars Rovers. Today Saft is involved in all kinds of space applications.

What are the challenges for space batteries?

Space batteries must perform in the harsh space environment and have low weight, very long life and high reliability. The consequences of failure are catastrophic for space missions and so it's important to demonstrate reliability with Saft's in-orbit track record and stringent ground testing.

What was the Saft battery on the Philae Lander?

The Philae Lander used a primary lithium Li-SOCl2 battery that powered the first 65 hours of the lander's life, allowing it to perform its planned program and 11 experiments successfully.

How have batteries changed since Rosetta was launched?

Since 2004 lithium primary systems have developed higher specific energy and higher power, whereas the energy density of rechargeable Li-ion batteries has increased from 130 Wh/kg to 180 Wh/kg and more.

Where does the future lie?

We are now working on the next generation of both primary and rechargeable lithium battery systems. The challenge is increasing the specific energy to reduce the weight further or give more power or energy for the same weight. We're also working on technical solutions to reduce the costs and stay competitive.

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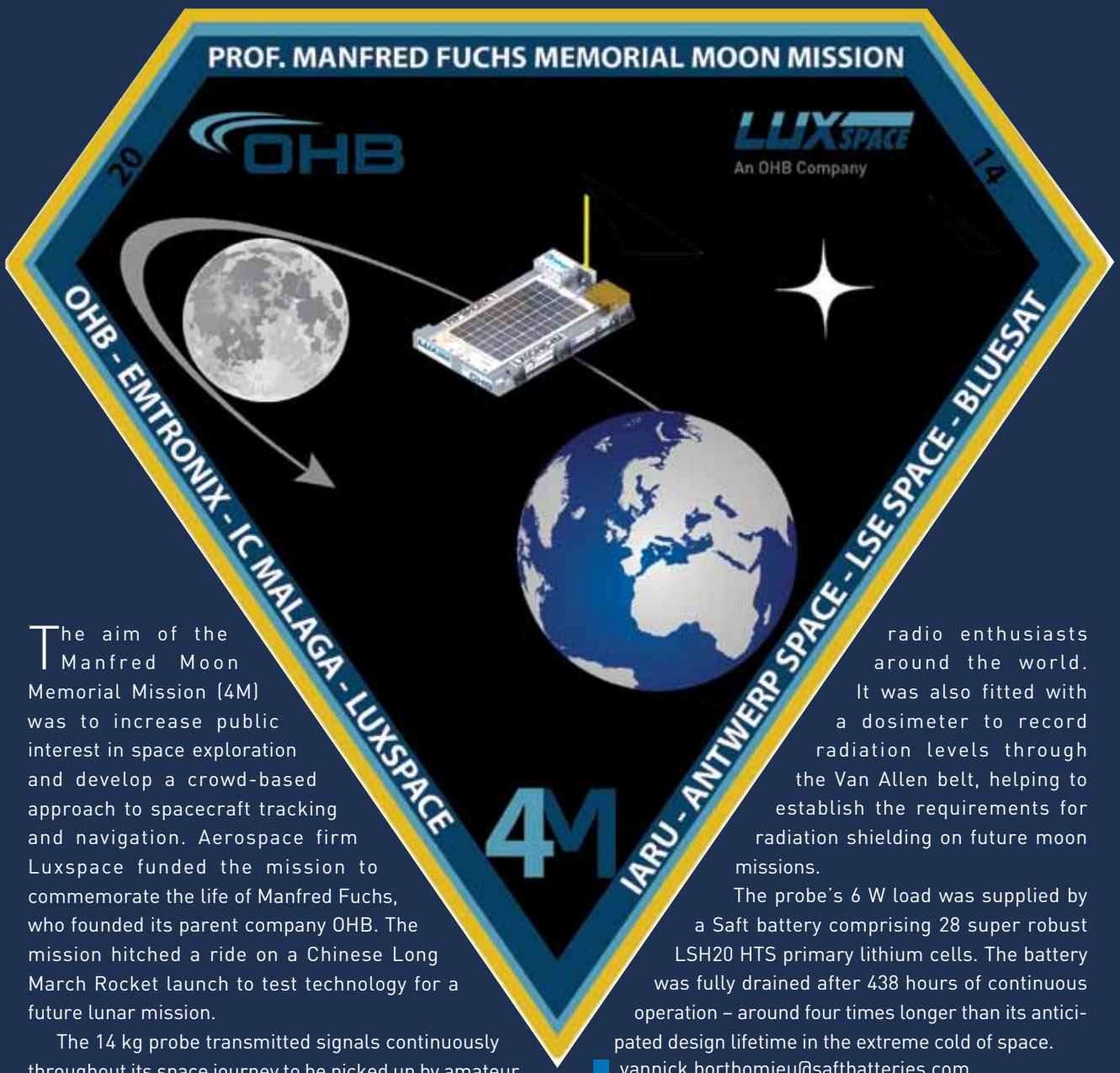
65 hours
battery-powered operation of Philae lander

31 months
time spent in deep space hibernation

11
scientific instruments were powered by the battery

Powering the first private moon mission

A microsatellite powered by a Saft primary lithium battery has enabled the first privately funded moon mission to further the sum of human knowledge.



The aim of the Manfred Moon Memorial Mission (4M) was to increase public interest in space exploration and develop a crowd-based approach to spacecraft tracking and navigation. Aerospace firm Luxspace funded the mission to commemorate the life of Manfred Fuchs, who founded its parent company OHB. The mission hitched a ride on a Chinese Long March Rocket launch to test technology for a future lunar mission.

The 14 kg probe transmitted signals continuously throughout its space journey to be picked up by amateur radio enthusiasts around the world. It was also fitted with a dosimeter to record radiation levels through the Van Allen belt, helping to establish the requirements for radiation shielding on future moon missions.

The probe's 6 W load was supplied by a Saft battery comprising 28 super robust LSH20 HTS primary lithium cells. The battery was fully drained after 438 hours of continuous operation – around four times longer than its anticipated design lifetime in the extreme cold of space.

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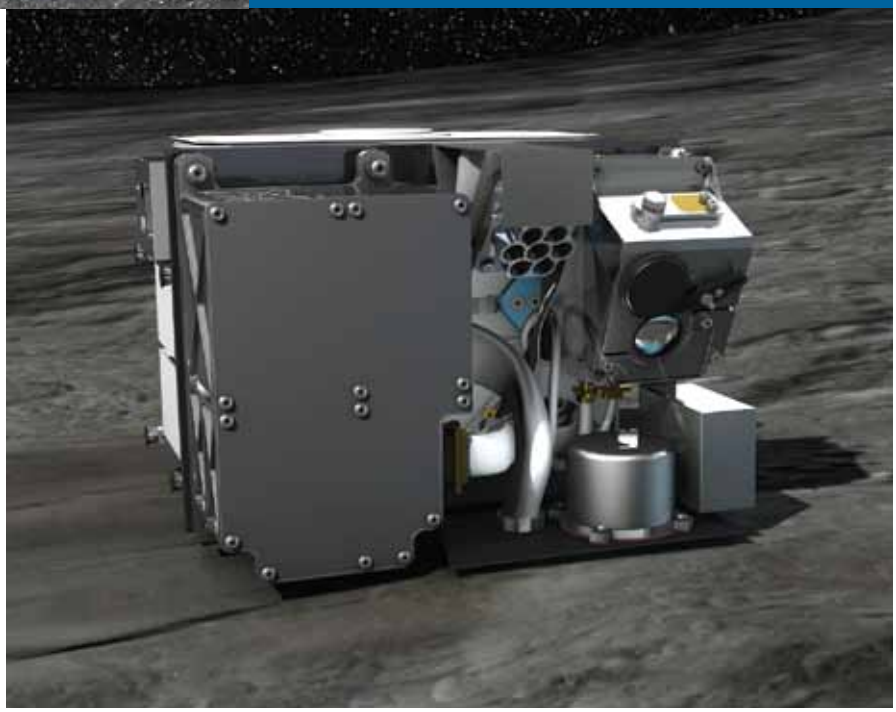
438 hours
duration of transmissions from the 4M probe

60
amateur radio enthusiasts tracked the mission

2003
SMART became the first probe equipped with a Saft Li-ion battery

Lift-off for asteroid sample mission



The Japanese Hayabusa 2 (Peregrine Falcon 2) mission launched successfully in December 2014 and is now heading for a near-Earth asteroid with the goal of capturing soil samples and returning them to Earth for analysis.

Named MASCOT, the landing craft that is central to the mission will be dropped to the surface of the asteroid, where it will move autonomously between up to three sites during a period of 12 hours before hopping back off the asteroid to re-join Hayabusa 2 and returning to Earth. MASCOT's ability to propel itself around the surface of an asteroid makes it a first for mankind.

The primary batteries on board MASCOT are critical to the mission as they are the only source of energy on board. The lithium thionyl chloride (Li-SOCl2) technology is well proven in space. It is extremely lightweight and has a low self-discharge rate, which is vital during the long flight from Earth.

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39 Ah capacity of LSH20 battery on board MASCOT

5 years the duration of the journey from Earth

13 kg the mass of the lander including its 3 kg sample payload

New Airbus helicopter

Airbus Helicopters made the first delivery of its new H175 twin-turbine helicopter in December 2014 to a customer in Belgium. On board the aircraft, backup power for the APU (Auxiliary Power Unit), starting and electrical systems is supplied by two Saft Ultra Low Maintenance® (ULM) rechargeable batteries.

The new helicopter model can carry 16 passengers at 140 knots and is primarily designed for three types of operation: offshore, search and rescue, and VIP transport.

Helicopter applications are particularly demanding on their on-board batteries due to harsh vibrations and extreme temperatures experienced during flight. Search and rescue missions can be particularly challenging as they can require the aircraft to fly in severe weather conditions.

From the outset of the project to develop the H175 Saft worked in close cooperation with Airbus Helicopters and custom-engineered a battery system for the prototype H175. Airbus selected Saft's nickel-based ULM® technology as it combines high performance, low weight and ultra-low maintenance requirements, which enable a low total cost of ownership (TCO) for helicopter operators.

enters service

Antoine Brenier, International Aviation Sales & Marketing Director for Saft, said: ***"The H175 program has strengthened the long-standing partnership between Saft and Airbus Helicopters that has previously seen our batteries deployed successfully on helicopters such as the AS350, the EC135 and EC145. It is also reinforcing ULM technology as the standard for nickel-based aviation batteries."***

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Innovative rail project wins award

Saft and its project partners have won an Energy Storage North America Innovation Award for a regenerative braking project in Pennsylvania. The Energy Optimization Project uses a Saft Li-ion battery installed in 2012 to capture braking energy from rail cars.

The installation for SEPTA (South Eastern Pennsylvania Transportation Authority) uses a hybrid energy storage system to capture, store and reuse regenerative energy created by the braking of thousands of daily trains.

At the heart of the system, a Saft Intensium® Max container stores the captured braking energy from services on Philadelphia's busy Market-Frankford line. The energy is then used to generate revenue through demand-side participation in power markets. The initiative marked the first time power from train braking has been employed to stabilize the grid and it led to $250,000 in new annual revenue for SEPTA in its first year.

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- **$250,000** annual revenue generated by SEPTA
- **800 kW** power
- **19** hours operation per day

Rail success in Asia

Asia's rail sector has been growing fast and Asia's rail OEMs are active in both their domestic and export markets. The past year has seen Saft become well established as a supplier to the rail sector, with a number of major contracts, as well as supplying batteries and cells for other industrial customers throughout the continent.

Emergency traction for Shanghai Metro

Saft has won a multi-million Euro contract from SATEE (Shanghai Alstom Transport Electrical Equipment) to supply the onboard battery systems for 35 new trainsets that will run on Lines 3 and 4 of the Shanghai Metro.

Space and weight savings are key features of the new trains, which are based on Alstom's Optonix concept, which enables high frequency and high-speed travel. SATEE therefore selected Saft's MSX nickel-based battery systems to supply onboard backup power for passenger comfort and emergency traction.

The batteries will overcome failure of the power grid or gaps in the overhead lines by powering the traction motor and enabling the train to reach the safety of a station or rescue exit in a tunnel, while also supporting ventilation, communications and lighting.

MSX batteries have already proved their capability to deliver traction power for a few hundred metres on Shanghai Metro Line 11. The batteries for Lines 3 and 4 will cover distances of up to 3 km.

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Major contracts for Tier 2 cities

CNR Changchun's metro trainset

Saft SRM+ batteries will power the onboard backup systems for metro fleets under construction for the two Tier 2 cities of Chengdu and Nanchang.

China's tiering system is a measure of the economic development of its cities and China is investing in light rail and metro projects for its fast-growing Tier 2 cities to reduce congestion and pollution. Saft has received the order from state-owned manufacturer CNR Changchun, which is building 51 new trainsets for Chengdu and 27 trainsets for Nanchang.

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Shanghai Metro

480 Ah storage capacity on board each Shanghai train

110 V voltage of the systems for SATEE

500 m maximum distance trains will run on battery power

Backup power in Nanjing

Saft's MRX battery systems have been selected to provide reliable emergency and traction backup power on China's Ningtian Intercity Rail Line, a metropolitan railway line in the country's important Tier 2 city of Nanjing.

The contract win builds on Saft's success in supplying batteries for previous projects in Nanjing as well as two major tramway projects in the city, which is served by China's fourth longest metropolitan rail service.

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All-weather reliability for Lanxin Bullet trains

Saft is supplying 320 MRX battery systems to CNR Corporation Ltd for its CRH5 high-speed bullet trains destined for the new Lanxin line, which is the longest high-speed railway to be built in a single project. The multi-million Euro contract is the latest in a series of contracts Saft has been awarded for the CRH5 EMUs (Electrical Multiple Units) and Saft fast-tracked deliveries to enable the line to open in late 2014.

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Back-up for oil and gas facilities across China

China National Offshore Oil Corporation (CNOOC) has taken delivery of several large battery systems from Saft for UPS (Uninterruptible Power Supply) systems at oil and gas installations across China.

Major CNOOC projects to rely on the Saft Uptimax batteries include offshore production sites Enping 24-2, Kenli 10-1, Jinzhou 25-1 and Huangyan, as well as the Shenzhen LNG (Liquified Natural Gas) receiving terminal in Guandong Province.

The Enping 24-2 offshore field's production facilities include one drilling and production platform, one Floating Production Storage and Offloading vessel and 17 producing wells. The field is ramping up from two wells producing 8,000 barrels per day and is expected to reach peak production of 40,00 barrels per day in 2017.

The Shenzhen LNG terminal is scheduled for completion in 2015 and will have the capacity to handle 4 million metric tonnes of LNG. The project is China's first LNG installation to use Saft nickel-based batteries as back-up for mission-critical systems.

The Uptimax systems provided by Saft will ensure up to 30 minutes of power autonomy to essential control and safety systems. The Uptimax systems have a maintenance-free design and 20-year life, reducing the maintenance workload for the offshore operators.

"These latest projects for CNOOC confirm Saft's growing presence in China's domestic oil and gas market," says Xavier Delacroix, General Manager of Saft's IBG Division. "The key to this success is the outstanding performance and reliability demonstrated by Saft's market-leading stationary battery products such as the Uptimax."

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Zhuhai reaches 100 million cells milestone

Saft's advanced technology facility in Zhuhai, China, achieved a major milestone in December 2014 when it produced its 100 millionth primary lithium battery for the metering and electronic toll collection markets.

Hong Kong press conference

December's press conference in Hong Kong gave Saft the opportunity to promote the Group in Asia and communicate a number of major contract wins and manufacturing success in China.

A total of 18 journalists attended from publications in Hong Kong, China, and France. Bruno Dathis gave a presentation and welcomed Lilas Bernheim, French Deputy Consul General, who spoke in support of French businesses in Hong Kong and China.

Saft intends to keep reinforcing its commercial efforts to support its Asian customers.

Since it opened its doors in 2006, the facility in Guangdong Province has become established as a major manufacturing site for lithium-thionyl chloride (Li-SOCl2) cells and nickel-based batteries for railway applications.

Zhuhai is one of Saft's 16 manufacturing sites worldwide and has already had capacity extensions to meet customer demand. The facility manufactures four types of LS series Li-SOCl2 bobbin cells, which are sized at A, AA or half AA with normal and widely fluctuating temperature variants, which can operate in environments up to 95 °C.

The primary lithium batteries manufactured in Zhuhai are specially engineered to meet the technical specifications and difficult environmental conditions experienced by metering and electronic toll installations in China, where failsafe use and long lifetimes are required.

To mark the occasion of achieving the milestone in production, some of Saft's senior management visited the plant and joined employees, their customers and partners in celebrations.

Tom Alcide, General Manager of Saft's Specialty Battery Group commented: *"Saft is delighted to have passed this major milestone in Zhuhai and is happy to continue to support our customers' increasing requirements in these demanding markets."*

5-20 years
lifetime from LS cells

3.6 V
nominal voltage of LS series

3.6 Ah
capacity of A sized cell

Hawkei adopts Li-ion batteries

Up to 1,300
Hawkei vehicles will potentially be equipped with Saft batteries

7 tonnes
the weight of a Hawkei vehicle

26 Volt
rating of the Hawkei's Li-ion battery

Saft has started deliveries of Li-ion battery systems to Thales Australia under an order for the firm's Hawkei tactical vehicle. The order signals the growing adoption of Li-ion technology in high-power military vehicles. Upon successful delivery, Thales has the option to extend to a follow-on contract later in 2015.

Named after a species of snake, the Hawkei represents the next generation in protected mobility for defence forces that are challenged by Improvised Explosive Devices, mines or small arms ambushes. Deployable by helicopter, it is highly mobile, armed and light and fulfills a number of operational roles.

The Hawkei's small size and low weight give it the ability to move stealthily, remain hidden and provide safe transport and situational awareness for its occupants. On board the Hawkei, the Saft Li-ion battery is a compact and lightweight system that provides power for starting, lights, ignition and silent watch. The Li-ion battery provides greater power and energy efficiency than a conventional lead-acid battery and requires fewer battery replacements, therefore demanding lower lifecycle costs.

"The Hawkei project signals the growing use of Li-ion technologies to power military and defence applications throughout the world," said Thomas Alcide, President of Saft America, Inc. and General Manager of Saft's Specialty Battery Group. *"Saft's longevity and system design expertise uniquely positions our company to partner in the development of next-generation technologies and applications, and we are honored to be part of this program."*

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Saft Supercapacitor starting module built by KBI and installed in place of 2 batteries on New Flyer transit bus.

Super savings from supercapacitors

Road transport organisations are saving fuel with a 'no idling' strategy thanks to Saft's Nickel Supercapacitors. One of the largest costs in the road transit sector is fuel and so it's no surprise that operators are turning to 'no idle' policies, where drivers switch off engines while they wait at bus stations, bus stops or in traffic. A no-idle strategy can save up to 10 percent of fuel and save carbon emissions.

This comes at a cost for buses fitted with conventional lead-acid batteries, which are not suited to starting operations up to 100 times a day. Typical lead-acid batteries are designed to support starting operations just a few times a day and need a good recharge between starts so a no-idle policy will quickly impact their life – and the Total Cost of Ownership of the battery.

One solution is to replace the lead-acid battery with a system made up of a Saft Supercapacitor for engine starting along with a smaller lead-acid battery to support hotel loads. Supercapacitors charge in less than 30 seconds and have a life of 1 million starting cycles, exceeding the life of the buses themselves. Over 1,500 supercapacitors have been sold since 2011.

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10%
fuel saving possible from no-idle strategy

50% faster
engine starting time with a supercapacitor

2,000
Saft Supercapacitors are in operation with bus transit agencies

30 kg *the weight of a single Evolion® module*

4 to 10 times *lighter than conventional batteries*

1,200 kg *weight saving achieved with Evolion® by Airwave*

Lightweight Evolion®

Airwave, the leading UK provider of mission critical voice and data communications, has installed Saft's lightweight and compact Evolion® battery modules at six of its rooftop base stations across London.

The battery systems were installed during a project to upgrade the base stations by increasing their transmission capacity. The addition of extra equipment, including new cooling systems, meant that Airwave was presented with the choice of either reducing the weight of the sites' backup batteries or reinforcing the structure of the buildings to support the extra weight.

By selecting Saft's Li-ion Evolion® modules, Airwave was able to reduce the weight of the backup battery by some 1,200 kg, equivalent to a medium-sized car, and maintain the autonomy of the base stations without having to carry out any modifications to the buildings.

goes 'up on the roof'

"It is imperative that we take into consideration the autonomy of the Airwave Network when increasing capacity, as this ensures continuity of service in the event of a disruption in the mains supply," says Martin Benké, Network Operations Director at Airwave. "The use of the batteries also paved the way for a new direct current (DC) cooling system, designed by our Airwave engineers to further ensure that the base stations operate at safe temperatures during mains outages."

Li-ion Evolion® modules have extremely high energy density that lead to both low volume and weight. This made it possible to replace the existing site batteries with up to 16 Evolion® modules connected in parallel to create a 48 V battery system capable of providing around 62 kWh of backup but weighing just 480 kg.

"The batteries are compatible with existing telecom equipment, so installation and commissioning was very straightforward. Being lightweight was an added benefit as they could be carried by hand to the roof, with no need for heavy lifting equipment." adds Martin Benké.

In addition to their size, weight, temperature range and efficiency advantages, the Evolion® modules provide a long service life and fast and easy installation, while also being totally maintenance-free with smart communications that contribute to an optimised Total Cost of Ownership (TCO).

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Safety approval for Seanergy® modules

Saft's Seanergy® marine Li-ion modules have undergone successful assessment by Bureau Veritas. The Independent Saety Assessor (ISA) delivered the highest level of safety approval for the modules according to the applicable marine standards and specifications.

20 year
design life of Seanergy® modules

750 V
maximum voltage capability of system

From 4 kWh to multi-MWh
of energy

By achieving the certification, Saft has demonstrated that the Seanergy® design conforms to recognised industry quality standards and certification rules through an independent design review, sample testing and verification of production controls.

Saft launched the Seanergy® modules in mid 2014 for civil marine propulsion applications such as work boats, ferries, offshore vessels, cruise-liners, yachts and cargo ships. They are based on Saft's patented Super-Iron Phosphate® (SLFP), which is a type of Li-ion technology which provide high levels of safety, performance and reliability.

The range offers the flexibility and adaptability to create efficient and cost-effective systems to power full-electric and hybrid electric propulsion systems. Modules can be built up to deliver the appropriate levels of energy (MWh) and power (MW) for every application.

"Safety is at the heart of all Saft's marine activities and this certification will inspire confidence in customers, investors and suppliers that the Seanergy® modules comply with best practice, especially as the standards have been written specifically to include Li-ion batteries in civil marine applications," said Didier Jouffroy, Saft's Marine Products and Applications Manager.

"This certification is effectively mandatory for the use of Li-ion batteries in the marine industry and is an important step in the commercialisation of our Seanergy® solution."

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The Cold Temperature Package will form part of a hybrid micro-grid

Storing solar energy in the Arctic Circle

Northwest Territories Power Corporation (NTPC) has ordered a low temperature ESS from Saft to use as part of a hybrid micro-grid in Colville Lake, 50 miles north of the Arctic Circle in Canada. The grid-connected ESS is due to be installed at the Colville Lake Power Station in June and will provide residents with consistent renewable solar power and reduced fuel consumption from diesel generators.

Saft has developed a 'Cold Temperature Package' for the site, where temperatures can drop to -50 °C in winter. The turnkey contract includes one Intensium® Max 20 M unit with 232 kWh energy storage and a 200 kW power conditioning system from ABB in a 20-foot container that can withstand the arctic climate.

The 150-strong community is only accessible by road when the northern ice-roads are in use. Saft delivered the system within a strict timeframe to Edmonton, ready for delivery during the six-week ice-road window in February and March 2015.

"This is NTPC's first project of this nature, and the first solar installation that has the capacity to generate about 30 percent of the community's demand," said Emanuel DaRosa, President and CEO of NTPC. *"It was imperative to find a partner that could provide a long-term energy storage system capable of withstanding the Territories' extreme rugged environment."*

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Intensium® Max now upgraded to 3000 A

Saft's containerised Intensium® Max ESS is now available with a 3000 A current capability that delivers an industry-leading 1.8 MW power for several minutes.

The upgraded ESS is ideal for solar PV installations, where high power battery storage can mitigate against steep ramp rates. Cloud cover can cause a 70 to 80 percent fall in output in only one minute and the ESS can help PV operators to meet the minimal technical requirements for grid connection and avoid curtailment, which prevents them from contributing their full output capacity to the grid.

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Third ESS for Californian utility

A major Californian utility has placed an order for its third Li-ion ESS from Saft, bringing its total combined energy storage capacity to 7.5 MWh over 12 containers. All three ESS solutions are being used to support solar power generation and the third delivery will be used at an urban education facility to buffer energy during periods of intermittent sunlight.

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Bolivian hybrid power plant

The remote Bolivian province of Pando is benefiting from an energy storage system (ESS) supplied by Saft at a hybrid power plant that combines a 5 MW solar photovoltaic (PV) array with a 16 MW diesel generator, the largest plant of its type in the world.

Cobija, Pando's capital. Pando is not connected to the country's national grid, resulting in electricity coverage of just 65%

The remote Bolivian province of Pando is benefiting from an energy storage system (ESS) supplied by Saft at a hybrid power plant that combines a 5 MW solar photovoltaic (PV) array with a 16 MW diesel generator, the largest plant of its type in the world.

Pando is in the remote tropical northern area of Bolivia in the Amazonian rainforest near the border with Brazil and Peru. It is not connected to the country's national grid, resulting in electricity coverage of just 65 percent, with the annual 37 GWh demand previously being met exclusively by diesel generation.

In a bid to reduce diesel consumption and increase electricity coverage, the Bolivian government announced funding for the PV plant and energy storage facility, which was constructed by Isotron SAU, a subsidiary of Spain's Isastur Group. The hybrid power plant will coordinate PV and diesel generation to maximise the use of clean solar power to meet around half the energy demand in Pando's capital city Cobija and nearby towns.

Two of Saft's Intensium® Max 20 M Medium Power containers, each with 580 kWh storage and 1.1 MW peak power output, have been installed in Pando.

Significant fuel savings

Effective energy storage will play a critical role in the plant by ensuring system stability and smoothing out short-term variations in output from the PV array, both of which are essential to achieve the highest possible contribution of PV to the energy mix. Integration of PV with energy storage and diesel generation are reducing annual fuel consumption by an estimated 20 million litres, saving the utility millions of dollars and reducing CO2 emissions.

'Saft is delighted to be working with Isastur on this prestigious project that provides an important breakthrough for our Li-ion battery technology in the South American sector, where PV is becoming an essential element within the overall energy mix,' said Ignacio Quiles, Saft Sales Manager & Managing Director Saft Baterias, Spain and South America. *'The Pando hybrid scheme provides an excellent reference of how large scale PV and conventional generation can be integrated with energy storage to deliver continuous and reliable electricity supplies for remote communities where grid connections are unreliable or non-existent.'*

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The hybrid power plant will coordinate PV and diesel generation to maximise the use of clean solar power to meet around half the energy demand in Pando's capital city Cobija and nearby towns.

slashes fuel consumption

2010
opening of Saft's Brazil sales and technical support office

20 million litres
the volume of fuel saved by the PV plant and ESS annually

2 Intensium® Max containers are installed in Pando

First Intensium® Max for Japan

Saft has received its first order for an energy storage system (ESS) from Japan to integrate renewable energy on the remote Pacific island of Nii-jima. The Intensium® Max 20 M Medium Power Li-ion battery system will form part of a microgrid project conducted by Takaoka Toko Company Ltd, a subsidiary of Tokyo Electric Power Company (TEPCO). The project has the goal of optimising renewable energy and will combine diesel generators, solar panels and wind power installations. The ESS will have a storage capacity of 520 kWh and 1 MW peak output.

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2015 events

Saft will be exhibiting at a wide range of exhibitions, conferences and trade shows. Here are just a few of the events where you can meet and discuss with our experts in the coming months.

1 Hybrid Energy Innovations
April 8-9; New York, NY, USA

2 Hannover Messe
April 13-17; Hannover, Germany

3 Medtec Europe
April 21-23; Stuttgart, Germany

4 Battcon
May 12-14; Orlando, FL, USA

5 Railtex
May 12-15; Birmingham, UK

6 ESA
May 19-20; Dallas, TX, USA

7 Communic'Asia
June 2-5; Singapore

8 Sensors Expo
June 9-11; Long Beach, CA, USA

9 Intersolar
June 10-12; Munich, Germany

10 Paris Air Show
June 15-21; Paris, France

11 Electric & Hybrid Marine World Expo, June 23-25; Amsterdam, Netherlands

12 OSP
September 2-3; Denver, CO, USA

13 DSEI
September 15-18; London, UK

14 Battery Show
September 15-18; Novi, MI, USA

15 ESNA
October 13-15; San Diego, CA, USA

SAFT