

What's New in the World of Superconductivity (August & September)

Power

American Superconductor Corporation (August 2, 2006)

The Long Island Power Authority (LIPA) held a groundbreaking ceremony in Holbrook, NY, to announce the start of the construction phase of a 138-kV HTS electric transmission cable. The cable will be the first superconductor cable to be installed in a live grid and to be operated at transmission voltages. The project is the result of a government-industry partnership that includes the U.S. Department of Energy, American Superconductor Corporation (AMSC), Nexans, and Air Liquide. The HTS cable will be installed in early 2007. Kevin Kolevar, Director of the Office of Electricity Delivery and Energy Reliability at the US Department of Energy, commented, "At a time when power grids across the nation are being severely stressed, superconductor technology is being examined by US utilities as a new tool to increase capacity and reliability on their systems. This project is one of three being co-funded by DOE ... The LIPA project will be the first use of superconductors at electricity grid transmission level voltages. We continue to view superconductivity as a powerful enabler of the next-generation energy delivery system." After performance and economic reviews of the operational cable have been completed, LIPA plans to retain the HTS cable as a permanent part of its grid. LIPA and AMSC have also discussed plans to install high capacity, low-environmental-impact HTS cables elsewhere in the LIPA grid.

Source:

"LIPA and American Superconductor Bring the Largest Superconducting Transmission Cable to Long Island"

American Superconductor Corporation press release (August 2, 2006)

http://phx.corporate-ir.net/phoenix.zhtml?c=86422&p=irol-newsArticle_Print&ID=891106&highlight

American Superconductor Corporation (August 8, 2006)

American Superconductor Corporation (AMSC) has reported its first quarter financial results for the period ending June 30, 2006. Revenues for the first quarter totaled US \$14.0 million, compared with \$12.2 million for the same period in the previous fiscal year. The net loss totaled \$6.7 million – including \$800,000 in stock-based compensation expenses – compared with \$5.6 million for the same period in the previous fiscal year. The company ended the quarter with no debt and \$55.4 million in cash, cash equivalents, and short-term investments, compared with \$65.7 million at the end of the same period in the previous fiscal year. AMSC expects its cash burn to decrease in the second half of fiscal 2007 and remains on track to end fiscal 2007 with at least \$38 million in cash, cash equivalents, and short-term investments.

AMSC booked \$28.2 million in new orders and contracts during the first quarter, compared with \$2.4 million for the same period in the previous fiscal year. This brings the company's total backlog of orders and contracts to \$37.1 million, as of June 30, 2006. Specifically, the Power Electronic Systems business unit generated \$12.1 million in new orders – a record for this unit. Additional orders received in July have enabled the company to revise

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their forecasted revenues upwards from 35% to a 50% year-over-year revenue growth target for this business unit. Power electronic solutions for wind farms have been a key contributor to this growth. Meanwhile, the Wires business unit has obtained orders for 9,960 meters of 344 superconductors, to be shipped in fiscal 2007.

Source:

“American Superconductor Reports First Quarter Fiscal 2007 Financial Results”

American Superconductor Corporation press release (August 8, 2006)

http://phx.corporate-ir.net/phoenix.zhtml?c=86422&p=irol-newsArticle_Print&ID=893264&highlight

Trithor GmbH (August 16, 2006)

Zenergy Power plc has acquired and consolidated three leading providers of HTS materials and applications: Australian Superconductors Ltd., SC Power Systems Inc., and Trithor GmbH. Zenergy Power will pursue the sale of commercially ready first-generation HTS products (with existing sales) as well as the ongoing development of second-generation HTS wires. The group's new low-cost production processes for second-generation products are expected to realize cost and scalability advantages over alternative methods that have been adopted by other industry participants. Zenergy Power expects to provide superconductivity products to the renewable energy, national power, and industrial sectors on a global basis. Dr. Jens Müller, Managing Director of Trithor, commented, “Our technology utilizing HTS materials will target potential billion dollar markets and is supported by a portfolio of more than 60 patents and patent applications in the Group as well as an experienced management team with over 75 years of combined industry experience related to superconductivity.” Products under development include superconducting power generation components for wind, wave, and hydropower; fault current limiters for electricity grids; and induction heaters and linear motor devices for industrial applications.

Source:

“3 Global Pioneers in Superconductivity Join Forces to Accelerate Product Commercialization”
Trithor GmbH press release (August 16, 2006)

http://www.trithor.com/pdf/press-en/Zenergyformed_Trithor.pdf

American Superconductor Corporation (August 29, 2006)

American Superconductor Corporation (AMSC) has achieved the magnetic, electrical, thermal, and mechanical performance levels required for the commercialization of electromagnetic coils utilizing its proprietary second-generation HTS wire. Multiple tests confirmed that the new coils met or exceeded the strength, durability, and electrical current capabilities of commercial first-generation HTS wire. The commercial performance levels were obtained using a three-ply, 4.8-mm wide wire that the company has named “348 superconductor.” This achievement will pave the way for more cost-effective HTS motors and generators, SuperVAR® grid reliability solutions, and many other coil-based electric power products that will be comparable or less expensive than traditional, copper-based solutions. Even at today's performance levels, the 348 superconductors could already be used to produce a 36.5 MW HTS ship propulsion motor capable of operating at 38 K, which is 8 K higher than the operating temperature of the first-generation HTS motor that AMSC is shipping to the U.S.

Navy this year. Alex Malozemoff, AMSC's chief technical officer, explained: "The increase in operating temperature expected to be enabled by switching from 1G HTS wire to 348 superconductors means that a 36.5-MW motor can use the same size cryogenic refrigeration system as a 5-MW motor - yielding substantial operating and capital equipment savings. Our objective is to increase the operating temperature of large-scale electrical equipment, such as motors and SuperVAR synchronous condensers, much further - to about 55 degrees Kelvin - which will increase these savings further." 348 superconductors will be available for purchase in 2007. The wires can be tailored to meet specific customer demands.

Source:

"American Superconductor Achieves Performance Levels Required for Commercial Electromagnetic Coils Utilizing New 348 Superconductors"

American Superconductor Corporation press release (August 29, 2006)

http://phx.corporate-ir.net/phoenix.zhtml?c=86422&p=irol-newsArticle_Print&ID=899963&highlight

American Superconductor Corporation (September 12, 2006)

American Superconductor Corporation (AMSC) has received US \$4.6 million in new orders for D-VAR® systems to be installed in wind farms in Australia, Canada, New Zealand and the United Kingdom, bringing the amount of wind-generated electricity served by AMSC's power electronics solutions to more than 1,800 MW. The orders should enable the company's Power Electronic Systems business unit to achieve a 50% growth in revenues for the current fiscal year, amounting to more than \$22 million. This should enable the business unit to become profitable in fiscal 2007. Greg Yurek, chief executive office of American Superconductor, commented, "Our PowerModule™ and D-VAR technologies are proving to be 'must-have' solutions for wind farms around the globe, enabling operators to regulate voltage to optimize the operation and output of individual wind turbines while also allowing owners to meet the increasingly stringent standards for interconnection of wind farms to power grids."

Source:

"American Superconductor's Power Electronic Systems Division Books \$4.6 Million in New D-VAR(R) Orders for Wind Farms"

American Superconductor Corporation press release (September 12, 2006)

http://phx.corporate-ir.net/phoenix.zhtml?c=86422&p=irol-newsArticle_Print&ID=904255&highlight

American Superconductor Corporation (September 18, 2006)

Southwire Company and its partners (American Electric Power, Praxair, American Superconductor Corporation, and the Oak Ridge National Laboratory) have announced the energization of the second-generation HTS cable installed at the Bixby substation near Columbus, Ohio. The US \$9 million project will deliver electricity through a 200-m cable segment to approximately 8,600 homes and businesses in the region. The Triax cable design that is being utilized promises to dramatically reduce the cost of superconducting systems, bringing the technology one step closer to commercial viability.

Source:

"Superconductivity Project Addresses Urban Power Challenges"

American Superconductor Corporation press release (September 18, 2006)

http://phx.corporate-ir.net/phoenix.zhtml?c=86422&p=irol-newsArticle_Print&ID=906421&highlight

American Superconductor Corporation (September 25, 2006)

American Superconductor Corporation (AMSC) has received the 2006 Enabling Technology Award for the transmission and distribution market from Frost & Sullivan. The annual award recognizes AMSC's contributions to the development of HTS wire and applications. Subramanian Jayaraman, a research analyst at Frost & Sullivan, praised the company: "AMSC's innovative technologies and product development efforts along with its market leadership have blazed a trail in the expanding global HTS market. This award, which was made after considering all of the key HTS wire competitors worldwide, recognizes AMSC's market leadership and its continual technical innovation and excellence." AMSC has sold its HTS wire to over 90 customers in 20 countries, and their products have been used to develop a wide range of applications.

Source:

"Frost & Sullivan Selects American Superconductor as Recipient of 2006 Enabling Technology Award"

American Superconductor Corporation press release (September 25, 2006)

http://phx.corporate-ir.net/phoenix.zhtml?c=86422&p=irol-newsArticle_Print&ID=908657&highlight

Intermagnetics General Corporation (September 26, 2006)

Intermagnetics General Corporation has announced that its shareholders have approved the company's acquisition by Philips Holding USA, Inc., a subsidiary of Royal Philips Electronics, N.V. The merger was originally announced on June 15, 2006. The completion of the transaction remains subject to approval by the European Commission; the merger is expected to close during the final quarter of calendar 2006.

Source:

"Intermagnetics' Shareholders Approve Acquisition by Philips"

Intermagnetics General Corporation press release (September 26, 2006)

<http://phx.corporate-ir.net/phoenix.zhtml?c=88261&p=irol-newsArticle&ID=909281&highlight>

Material

Superconductive Components, Inc. (August 1, 2006)

Superconductive Components, Inc. announced their financial results for their second quarter, ending June 30, 2006. Total revenue increased by 62% to US \$1,158,434 from \$713,535 for the same period in the previous fiscal year. The gross profit also increased to \$280,540 from \$207,234 for the same period in the previous fiscal year. The company had a backlog of \$2 million in orders at the end of the quarter. The company anticipates an even better performance in the third quarter of fiscal 2006.

Source:

“Superconductive Components, Inc. Reports Second Quarter Results”

Superconductive Components, Inc. press release (August 1, 2006)

<http://www.sciengineeredmaterials.com/ne/earnings/scci26.htm>

Medical

CardioMag Imaging (September 11, 2006)

CardioMag Imaging has been selected as the first runner-up in the Medical Devices category of the Wall Street Journal's prestigious annual Technology Innovation Awards Contest. The award is given for the development of a novel technology that represents a breakthrough from conventional methods, rather than an incremental improvement. Coverage of the award appeared in the September 11, 2006, online edition of the Wall Street Journal.

Source:

“CardioMag Selected in Wall Street Journal Contest”

CardioMag Imaging press release (September 11, 2006)

<http://www.cardiomag.com/about/news.shtml>

Magnet

Florida State University (September 26, 2006)

The National High Magnetic Field Laboratory has received a US \$11.7 million grant from the National Science Foundation for the construction of an innovative magnet with the potential to revolutionize nuclear magnetic resonance (NMR) imaging. The magnet, dubbed the Series Connected Hybrid, will be a hybrid of resistive and superconducting magnets that will enable experiments to be performed at lower operating cost and for longer time frames than that possible using conventional all-resistive magnets. The high field magnet (36 Tesla) will produce a highly stable and homogenous field – characteristics that are critical for NMR science.

Source:

“Magnet lab wins \$11.7-million grant to build next-generation magnet”

Florida State University press release (September 26, 2006)

<http://www.fsu.edu/news/2006/09/26/magnet.grant/>

Electronics

HYPRES, Inc. (September 12, 2006)

HYPRES, Inc. has received a nine-month US \$100,000 contract from the U.S. Department of Energy to develop a low-noise SQUID-based amplifier chip for high-speed applications. HYPRES will develop a SQUID array that can be integrated into multi-channel digital electronics. The resulting amplifier chip will have a bandwidth of 1 GHz; the chip will also be compact and cost-effective, will require minimal support electronics, and should be capable of supporting switching speeds in excess of 20 GHz. The amplifier chip will have applications in

wireless communications, non-invasive medical diagnostic instrumentation, and cryogenic detector arrays.

To qualify for the DOE award, HYPRES developed and produced a SQUID array amplifier system that was fully integrated with conventional “room temperature” electronics. The system had a sensitivity of better than 2 pA/root Hz at bandwidths in excess of 10 MHz.

Source:

“HYPRES Awarded \$100,000 By Department Of Energy To Develop High Speed SQUID Array Amplifier”

HYPRES, Inc. press release (September 12, 2006)

http://www.hypres.com/pages/new/bnew_files/pr_HYPRES_DOE_Award_%209-12-06.pdf

Communication

ISCO International, Inc. (September 8, 2006)

ISCO International, Inc. has provided an update for its third fiscal quarter. The company entered the quarter with a backlog of US \$1.8 million in orders and has since received more than \$3 million in new orders during the third quarter thus far. The company expects a strong third quarter fiscal performance that will exceed the company's previous expectations. The company also anticipates that a new, fully digital product presently under development will further expand their addressable market.

Source:

“ISCO INTERNATIONAL ANNOUNCES QUARTER UPDATE”

ISCO International, Inc. press release (September 8, 2006)

<http://www.b2i.us/profiles/investor/ResLibrary.asp?BzID=826&ResLibraryID=17027&GoTopage=1&Category=135>

Basic

Cornell University (August 2, 2006)

Cornell researchers have found surprising evidence suggesting that, at the scale of single atoms, the mechanism in high-temperature superconductors is more similar to that in low-temperature superconductors than previously thought. The researchers utilized scanning tunneling microscopy to search for the “magnetic glue” that is thought to be responsible for the electron pairing that occurs in cuprates. Instead, the researchers found that the distributions of both paired electrons and phonons exhibited similar patterns of “disorder”. Similar results were also seen using variously doped cuprates. Since low-temperature superconductivity theory states that electrons pair with phonons and travel through the conductor without being scattered by atoms, the present results suggest that a similar mechanism may be at least partly responsible for high-temperature superconductivity. While the findings do not prove that electron-phonon pairing is involved in the mechanism of high-temperature superconductivity, they suggest that electron-phonon interactions cannot be ignored. The group's findings were reported in the August 3, 2006, issue of Nature.

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Source:

"Imaging challenges theory of high-temperature superconductivity"

Cornell Chronicle (August 2, 2006)

<http://www.news.cornell.edu/stories/Aug06/Davis.highTC.ws.html>

(Akihiko Tsutai, Director, International Affairs Department, ISTECC)

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