



News Release

Freescale MRAM rockets into space

Japanese satellite to carry MRAM into orbit; MRAM licensing momentum continues

NURemberg, Germany (Embedded World) – Feb. 26, 2008 – Freescale Semiconductor, the leading provider of magnetoresistive random access memory (MRAM) products, is providing MRAM non-volatile memory technology for environmentally harsh applications, such as military, aerospace, industrial and automotive systems. Angstrom Aerospace recently announced the use of Freescale's extended temperature range 4Mbit MRAM in its magnetometer subsystem, which will be launched into space on board a Japanese research satellite.

Angstrom Aerospace is using Freescale's MRAM in its Tohoku-AAC MEMS Unit (TAMU), a magnetometer subsystem for the Japanese research satellite called SpriteSat. In developing the Satellite subsystem, Angstrom Aerospace worked closely with Dr. Johan Akerman, a renowned Swedish professor of material physics and applied spintronics at the Royal Institute of Technology.

"I've worked with MRAM for years, and when it comes to reliability and endurance for data storage, there is no comparison to Freescale's MRAM products," said Dr. Johan Akerman. "Freescale's 4Mbit MRAM device replaces both flash and battery-backed SRAM in Angstrom's module for the SpriteSat. The ability to reconfigure critical programs and route definitions during various stages of a satellite mission is a significant benefit."

TAMU plans to provide SpriteSat with magnetometer data of the Earth's magnetic field. SpriteSat is built by the Tohoku University located in Sendai, Japan, under the supervision of Professor Kazuya Yoshida. Scheduled to be launched in late 2008, SpriteSat's mission is to monitor "sprite" phenomenon (lightning effects) in Earth's upper atmosphere.

Angstrom Aerospace selected Freescale's 4Mbit MRAM device because it combines non-volatile memory with extended temperature operation, unlimited endurance and long-term data retention even when the power fails. The MRAM stores program data and FPGA configuration data on a single memory, allowing Angstrom Aerospace to reduce all storage requirements to one chip, reducing board area. At the same time, the flexibility of MRAM storage allows the system to be reconfigured significantly in space.

"Our extended temperature MRAM provides unique high temperature and high reliability capabilities for rugged system designs, such as the TAMU," said David Bondurant, MRAM product manager at Freescale. "MRAM benefits also extend to the transportation and industrial markets, where Freescale is working with developers who require growing amounts of fast but cost-effective memories that are ideally non-volatile and capable of large numbers of read and write cycles."

Gaining traction in the non-volatile RAM market

In addition to Angstrom Aerospace's MRAM deployment, e2v, a leading designer, developer and manufacturer of specialized components for some of the world's leading OEMs in aerospace and defense, has announced licensing of Freescale's MR2A16A product. The company has released an extended-reliability version with full-performance operations across the entire military temperature range, ideally fulfilling avionics, defense and aerospace application requirements.

In 2003, Freescale demonstrated the 4Mbit MRAM chip to select customers. That same year, Honeywell signed an agreement to license the MRAM technology for military and aerospace applications and they continue to build products with this technology today.

In 2006, Freescale announced the MR2A16A 4Mbit product, the world's first commercially available MRAM device. With many customers looking for an alternative that could replace flash, SRAM and EEPROM with a single chip and eliminate battery-backup for SRAM, Freescale's MRAM products have quickly become the preferred solution. They offer the endurance, speed and reliability required to accomplish this feat in harsh environments.

For more information about Freescale's MRAM products and technology, visit www.freescale.com/files/pr/mram.html.

About Freescale MRAM

MRAM uses magnetic materials combined with conventional silicon circuitry to deliver the speed of SRAM with the non-volatility of flash in a single, unlimited-endurance device. Freescale's MRAM devices are designed to combine the best features of non-volatile memory and RAM to enable "instant-on" capability and power loss protection in new classes of intelligent electronic devices. MRAM devices are well-suited for a variety of applications, such as networking, security, data storage, gaming and printers. The extended temperature version is suitable for use in rugged application environments, such as military, aerospace and automotive designs.

Freescale's MR2A16A 4Mbit product has been awarded a 2007 *Design News* Golden MouseTrap Product of the Year award, 2007 R&D 100 Award, *Electronic Products'* 2006 Product of the Year, *EE Times China's* 2007 Memory Product of the Year, LSI's 2007 Excellence Award in conjunction with ESEC Japan and the 2007 In-Stat/*Microprocessor Report's* Product of the Year Award in innovation. Additionally, Freescale's MRAM device was selected as a finalist in *EDN's* 2006 Innovation Awards, *EE Times'* 2006 ACE Awards and the 2007 European Electronics Industry Awards (Elektra).

About Angstrom Aerospace

Angstrom Aerospace Corporation is an SME company focusing on 3D-System-in-Package (3D-SiP) packaging based on micro- and nanotechnologies. The company designs, develops, and manufactures products and services based on 3D-SiP, with the core business in space, defense, and specialty applications. Angstrom Aerospace Corporation is a member of the business incubator Uppsala Innovation Centre (UIC) and partly owned by Uppsala University Holding AB, UUAB. www.aerospace.com

About Royal Institute of Technology – School of ICT

The Royal Institute of Technology (KTH) is Sweden's largest technical university with over 17,000 students. The Department of Microelectronics at the KTH School of ICT in Kista, focuses on research in nanoelectronics, photonics, and spintronics. The Applied Spintronics Group, headed by Dr. Johan Akerman focuses on novel uses for MRAM and spintronic technology derived from MRAM. www.ict.kth.se

About Freescale Semiconductor

Freescale Semiconductor is a global leader in the design and manufacture of embedded semiconductors for the automotive, consumer, industrial, networking and wireless markets. The privately held company is based in Austin, Texas, and has design, research and development, manufacturing or sales operations in more than 30 countries. Freescale is one of the world's largest semiconductor companies with 2007 sales of \$5.7 billion (USD). www.freescale.com

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