



Celoxica Design is Ultra-Precise for Space and Time

Celoxica DK Design Suite Used to Control a New Generation of Space Based Atomic Clocks.

Abingdon, Oxfordshire, UK - July 5th, 2005 - Celoxica Ltd., the leading provider of C-based electronic system level (ESL) design and synthesis solutions, today announced the successful completion of critical design work for the Atomic Clock Ensemble in Space (ACES) program. Working to stringent deadlines and design criteria, scientists and engineers at Kayser Threde and Steinbeis Transferzentrum Raumfahrt (Transfer Centre Spaceflight, TZR) used Celoxica's DK Design Suite and C-based hardware design methodology to implement in FPGA a state-of-the-art frequency control and distribution package (FCDP) to connect next generation atomic clocks.

Kayser Threde built a qualification model as part of the FCDP verification process using special radiation hardened FPGA devices mounted onto a board. The code generated from the DK Design Suite was directly synthesized to the board and the system proved itself to be first-time correct.

"ACES's severe restrictions on power consumption and weight moved us away from microprocessor-only technology," said Felix Huber, Scientific Director at TZR. "Using the DK tool we were able to balance automation at the C-level of design abstraction with complete designer control over critical areas of the design. In days, not weeks, we took software algorithms and descriptions and turned them into very efficient hardware designs that were high performance but also low in power. The productivity gain was enormous"

Sponsored by the European Space Agency (ESA) the ACES program tests the performance of a new type of atomic clock that exploits and depends upon microgravity conditions. Approved to fly on the International Space Station, the program supports fundamental physics experimentation, new experiments testing general relativity within the solar system and will provide an ultra-high performance global time-scale.

The global time-scale supports much wider applications that depend upon the absolute accuracy of atomic clocks. Telecommunication networks rely upon atomic clocks to ensure that time stamped voice, data and VoIP packets are re-assembled in the correct order. Atomic clocks glue together the world's financial markets through accurate time stamping of electronic transactions. Global navigation satellite systems (GNSS) are heavily dependent upon atomic clocks to provide accurate positioning information.

Commenting on the project Phil Bishop president and CEO of Celoxica said, "This project clearly demonstrates the very advanced features and predictable quality of results that make our C-synthesis technology the worlds most proven and widely used. Enormous demands were placed on the design and every criteria was met."

About TZR

Founded in 1989, Steinbeis Transferzentrum Raumfahrt has specialised in the transfer of know-how from and into aerospace engineering for non space-related SMEs. As part of the Steinbeis Foundation, TZR offers comprehensive solutions up to prototyping for industrial customers and research institutions. TZR has successfully built and operated the hardware for various space born experiments and is currently operating its own ground station to control a time dissemination experiment in the International Space Station ISS. TZR has a broad area of research fields using state of the art technology for plasma technologies, digital signal processing, satellite and RF engineering and FPGA programming. For more information, visit www.tz-raumfahrt.de.

About Kayser Threde

It was in 1967 in Munich that Axel Schmalz began to put his entrepreneurial ideas into practice; this was the beginning of the success story of Kayser-Threde. Not long thereafter, Reiner Klett joined him and the two began a partnership which has proven itself until this very day. They combined their special know-how and enthusiasm with the talents of their many excellent colleagues to create a formidable team. Today Kayser-Threde is a renowned specialist for the development and production of complex systems for aerospace engineering, for scientific research and for numerous applications on earth. With subsidiaries and offices in Germany and abroad, Kayser-Threde's services range from studies and analyses, over product development and manufacture to test series and the implementation of missions. For more information, visit www.kayser-threde.com.

About the Atomic Clock

Celebrating its 50th anniversary, the principle of an atomic clock is to lock an oscillator to the atomic resonance frequency ν_0 . Two key points determine the ultimate performance of an atomic clock: a narrow resonance and a high signal-to-noise ratio. Heisenberg's uncertainty principle shows that the greater the interaction time of the atoms with the radiation

emitted by the oscillator, the narrower the resonance. The new system uses laser cooling to increase the interaction time 100 to 1000 times greater than a conventional cesium clock. It is expected that the new clock will have an accuracy of one to two orders of magnitude better than what can be achieved with the most advanced clocks on the ground.

About Celoxica

An innovator in Electronic System Level (ESL) design, Celoxica supplies the design tools, boards, IP and services that enable the next generation of advanced electronic product design. Celoxica technology raises design abstraction to the algorithm level, accelerating productivity and lowering risk and costs by generating semiconductor hardware directly from C-based software descriptions. Adding to a growing installed base, Celoxica provides the world's most widely used C-based behavioral design and synthesis solutions to companies developing semiconductor products in markets such as consumer electronics, defense and aerospace, automotive, industrial and security.

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