

# MilCAN matters

The deterministic protocol for CAN

Issue 10

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## 28th MilCAN Meeting @ VRC, Sussex

The 28<sup>th</sup> MilCAN working group meeting this May was hosted by Vetronics Research Centre based at Sussex University. Again, a high level of support and contribution continues from all members. The meeting focused this time on a number of topical presentations, future working group strategy, publicity and maintenance of MilCAN standards.



Following on from the last meeting in September 2008, VRC presented their development of fault tolerant MilCAN and provided a useful practical demonstration in their laboratories showing the seamless switching from primary to secondary bus if a fault were to occur. The group also reviewed the ongoing actions required to add this new feature to the standard.

The VRC also presented an overview of network requirements for Safety Critical Systems and Technologies. This reviewed some of the other protocols that are developing to meet the growing market demand, particularly in the automotive sector, for electrical rather than direct mechanical actuation of safety critical functions.

Iain Woolley gave a very informative presentation on how DYTECNA are using MilCAN and in particular, incorporation of MilCAN into applications for HUMS (Health and Usage Monitoring Systems).

Inevitably the demand from primes for HUMS is increasing for new and existing platform retrofit, from commercial to battlespace applications, and the volume of data and information collecting nodes is potentially huge. Dytechna's strategy to process this data on-board the vehicle rather than data-capture only, provides instant user feedback and drastically reduces data storage requirements. Iain presented his views of future system architecture for Force Protection, Power distribution and HUMS which advocate simplifying bus structure and increasing the amount of multi-application shared data over a network.

The latter part of the meeting focused on the maintenance of the MilCAN standards. For users of the standards they can now be reassured that the protocol definition is fixed and the group are focusing on primarily on enhanced usability and additions of supplementary non-mandatory features such as fault tolerance.

The continued requests received by the group for access to the MilCAN website show an encouraging trend and the group discussed plans to update the site with the latest contact platform and product information.

The next MilCAN meeting will be held at Dytechna System Engineering, Welshpool, Powys, on 11<sup>th</sup> & 12<sup>th</sup> May 2010.

Any comments, questions and suggestions for our newsletter or website content would be gratefully received and can be sent to [rmconner@qinetiq.com](mailto:rmconner@qinetiq.com)

Gary Bannister  
Deutsch Ltd.

### MilCAN Certification

The conformance facility at Vetronics Research Centre, Sussex University is now available for use by any subsystem manufacturer claiming MilCAN compatibility. Visit [www.vetronics.org](http://www.vetronics.org) or send an email to [info@vetronics.org](mailto:info@vetronics.org) for further information.

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*ESTABLISH, MAINTAIN AND BROADEN THE USE OF MILCAN AS THE DEFINITIVE INTEGRATION STANDARD FOR MILITARY LAND VEHICLE SUBSYSTEM COMMUNICATIONS*

The Vetronics Research Centre (VRC) was formed to promote basic and applied research integrating advanced electronics, communications and networking for future military and civilian vehicular systems.

The VRC is currently hosted at the University of Sussex, where it was founded in 2004 by Dr Elias Stipidis (senior lecturer in Electronics), Peter King (Group Director RAO GM, retired), Colin Newel (Scientific Officer, Cap GM) and in collaboration with QinetiQ.

This unique Academic Centre of Excellence, is currently managed by a steering committee from the MOD (DTIC Land and Cap GM), Sussex, and QinetiQ that offer industrial input into the work.

The VRC is a member of the VSI Steering Committee and MiICAN Working Group.

Over the past years the VRC has developed expertise in networking, wireless mobile communications, Ad-hoc networks, and embedded systems. The research work involves aspects from theoretical studies, requirements capture, design, to development and implementation of integrated systems with advanced digital hardware and software. Current research centered on Network Enabling Capabilities involves Verification and Validation of Vetronics Systems including Architecture, Crew Station and Management, Deterministic Protocols and Fault Tolerance, Distributed Processing and Adaptive and Reconfigurable Systems. Applications and technology demonstrators of these include Integrated Survivability, Local Situation Awareness, Health and Usage Management Systems, and X-by-Wire.

The VRC has been actively involved in FRES, in particular the EA TDP, VTID, and very importantly provides support to procurement programmes through its MiICAN Certification facility, as commissioned by the MOD.

The centre has a pool of unique expertise and testbeds that, within its scope, offers them as knowledge transfer between its collaborators and furthermore, as specialized training to meet the current and future needs within the subject area. Knowledge and understanding on systems integration as well as technology training (MiICAN/CAN, TTP, FlexRay, etc) can be tailored according to the individual's requirements.

Elias Stipidis  
VRC, University of Sussex

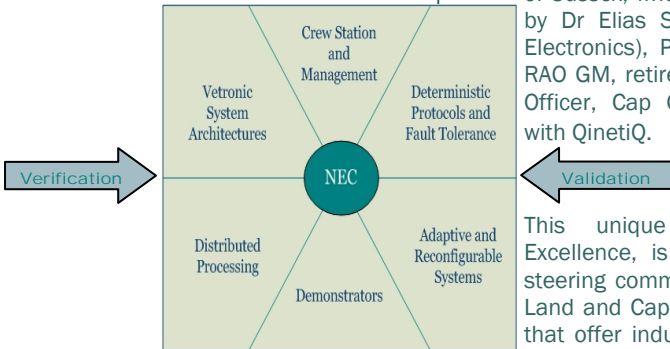
MiICAN A specification was raised to Revision 3 following the meeting held @ the Vetronics Research Centre, Sussex University in May 2009. The new version of the specification has been designed to aid usability and clarity, with mandatory requirements shown in normal font and optional or system specific requirements represented in greyed out font. It is expected that the MiICAN B specification will now mirror the MiICAN A specification and be raised to Revision 3.

The MiICAN working group has now transitioned to a maintenance phase whereby the aim of the group will be to sanction any changes that may be required of the now stable specifications. No further development of MiICAN will be undertaken. Initially, the group will meet once per year to perform this maintenance task.

The next MiICAN meeting will be held at Dytechna System Engineering, Welshpool, Powys, on 11<sup>th</sup> & 12th May 2010.

Bob Connor  
VSI Technical Leader  
QinetiQ Ltd

VRC areas of research



VRC staff (L-t-R): Peri, Elias, Chris, Greg, Obi, Ian, John, Matt, George, David, Dan, Panos



**“Buggy”, the VRC mobile technology demonstrator testbed with fully integrated, fully reconfigurable modular vetronics architecture, deploying LSA, HUMS, X-by-Wire (Throttle, Brake, Steering), Adhoc Wireless Communications, using technologies such as MiICAN, TTP, Ethernet, MPEG4, Middleware, and IEEE 802.11 standards.**



In the late 1990s the UK MOD initiated the Vehicle Systems Integration (VSI) applied research programme to encourage the move towards Open Standards within the military vehicle Vetronics domain. A prime objective was to gain domestic and international agreement by fostering collaboration within UK and overseas industry and inter-government agencies. The MilCAN Working Group (MWG) was originally conceived as a sub group of the International High Speed Data Bus Users Group (now MILVA) with the aim of standardising an application protocol by exploiting the highly successful commercial Controller Area Network (CAN) automotive technology. The foundation of this Working Group has undoubtedly met the fundamental requirements of the UK MOD when it initiated the VSI programme.

The MWG has, throughout its existence,

### PMC Card with MilCAN offloading

Curtiss-Wright Controls Embedded Computing's new SPMC/DPMC-214, high performance, rugged PMC card offloads host processor cards from CANbus, MilCAN-A, and Utility Bus processing tasks. The SPMC/DPMC-214, available in both air- and conduction-cooled versions, speeds and eases the integration of the CANbus and MilCAN-A data communications protocols into embedded aerospace and defense systems deployed in harsh environments.

The SPMC/DPMC-214 enables aerospace and defense system designers to quickly add high performance CANbus and MilCAN-A interconnects to their rugged deployed systems. This highly capable card off loads the system's host card from detailed protocol handling, to deliver more overall processing power to the entire system. It helps speed the deployment of MilCAN-A based embedded systems.

This fully compliant PMC mezzanine card provides 4 CANbus ports or 4 MilCAN-A ports along with the US Army standard Utility Bus (optional), and TTL I/O functionality.

#### SPMC/DPMC-214 Performance Features

- Dual ColdFire MCF5485 processors with built-in FlexCAN modules
- Can be configured as 4 independent CANbus interfaces compliant to:

been predominately supported by UK companies and academia with strong representation primarily from both Sweden and Canada. The resulting specifications reflect the needs of the participants with MilCAN A being specified in the main by the UK while MilCAN B is predominantly specified in Sweden.

The MWG can be regarded as another successful example of the UK MOD VSI policy to encourage collaboration and open systems. The MilCAN specifications are truly open and free to download from the website ([www.milcan.org](http://www.milcan.org)) and this is in turn reflected by the many examples of take-up in military vehicle applications.

Colin Newell  
Science desk officer for the Equipment Programme in Capability Ground Manoeuvre



- CAN Specification 2.0, Part B protocol (standard and extended message formats)
- ISO 11898
- 1993 CAN High-Speed physical interface levels
- Or 4 independent MilCAN A interfaces (MWG-MILA-001)

- Galvanic isolation of the CANbus physical interfaces and the SPMC/DPMC-214 power and ground planes

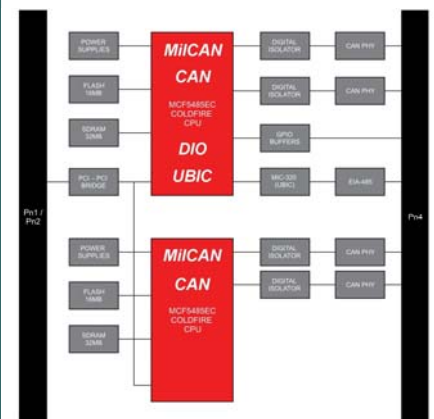
Software support includes BSPs for popular operating systems such as VxWorks 5.5.x/ Tornado 2.2.1, VxWorks 6.3/6.5 Workbench 2.x, Linux and Windows.

The SPMC/DPMC-214 is available in both air-cooled and conduction cooled versions.

Mike Slonosky, Product Marketing Manager, Single Board Computers, Curtiss-Wright Controls Embedded Computing

**“The MWG can be regarded as another successful example of the UK MOD VSI policy to encourage collaboration and open systems.”**

### SPMC/DPMC-214 with MilCAN A standard interfaces



**SPMC/DPMC-214 Architecture**

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