IEEE

14th-16th June 2017

CAN IN SPACE
WORKSHOP

esa

CHANGING FROM HIGHLY CENTRALIZED INTELLIGENCE TO DISTRIBUTED AUTONOMOUS FUNCTIONS

EVENT HOSTED IN SITAEL S.p.A. HQ MOLA DI BARI, 14-16th of June 2017

Workshop Outline

Space avionics systems are witnessing a change from highly centralized intelligence to distributed autonomous functions, thanks to the availability of high capacity FPGAs and microcontrollers that offload tasks alternatively concentrated in the on-board computer.
The glue of this change are the command and control buses, and a similar process led in the late 80s to the development and successive adoption of CAN as an automotive and industrial automation bus.

The CAN workshop will include tutorials, exhibits together with presentations on CAN bus physical and protocol layers.
With the arrival of the QML-V qualified radiation tolerant CAN bus transceivers, and the impending qualification of several CAN-able rad hard microcontrollers, the availability of larger and larger Rad-Tolerant FPGAs, space communications engineers are now able to implement a CAN bus network for spacecraft on-board communications and controls of the same level of complexity than a terrestrial CAN-based embedded system.

A CAN bus system will allow engineers to replace older, more complex wiring communications architectures, with a CAN two-wire bus network. Reducing the number of wires and weight along with lower power consumption and easier testability will result in major cost savings for spacecraft manufacturers.

The planned modifications for of ECSS-E-ST-50-15C will be given, as well as an update on flying and about-to-fly CAN applications, in established space industry as well as in nanosats and academia.
Additionally an overview of modern design tools and method commonly used by automotive industry in design, development, production and maintenance of CAN bus networks for safety critical applications will be discussed.

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To have a detailed view of industry needs <u>we</u> <u>are</u> <u>calling</u> <u>for</u> <u>abstracts</u>. Notable papers will be proposed for publication on special issue of IEEE Transaction on Emerging Topics in Computing (TETC).

Topics include (but are not limited to and the term CAN includes CAN FD and classical CAN):

CAN implementations	CAN device design	CAN system design
CAN diagnostic and tools	CAN-related research studies	CAN applications in space or ground support equipments
CAN higher-layer protocols	CAN applications in space industry	

The conference language is English. The papers will be published in the conference proceedings.

Objectives

The objectives of this workshop are the following:
- ➢ To establish dialogue between those at the forefront of this technology and the Space Agencies who wish to benefit from the progress being made.
- ➢ To identify the main achievements and challenges posed by this technology.
- ➢ Learn of new and emerging applications such as low end satellites (cubesats, LEO supercostellations).
- ➢ To promote fruitful exchange of ideas within the community itself.
- ➢ To see how best the Agency can harness the expertise here in Europe to achieve advances in specific targeted space applications.
- ➢ To learn from other harsh environments where this technology is being employed.

The workshop will be a three day workshop, starting 9:00 on Wednesday 14 June and finishing 16:00 on Friday 16th of June.

Workshop will be split into a number of sessions, each one addressing different elements, covering:
- ➢ Application needs and expected performances across the domains of Telecom, Earth Observation and Scientific satellites, as well as Cubesat and minisatellites.
- ➢ Evaluation of proposed protocol standard, role of CANOpen and alternatives for specific applications.
- ➢ Results from ESA and other European hardware and software activities, starting from components development, followed by feasibility demonstrators and finishing with flight experience.
- ➢ Standardisation and product assurance processes.

Ample Q&A time will be kept to to open the workshop for discussion.

PRELIMINARY WORKSHOP AGENDA

Wednesday – 14th June : Sitael 100 Room

- Welcome and Introduction (Nicola Zaccheo CEO SITAEL)

- Keynote Speech: Gianluca Furano (ESA) - CAN in space standardization and future activities @ ESA.

CAN in Space Heritage

Track responsible: Luca Bolognino (ESA)

CAN and CANOpen IPs

Track responsible: Maurizio Caramia (THALES)

Thursday – 15th June : Sitael 100 Room

- Keynote Speech: Guido Castellini (CNR-IFAC)

CAN for Payloads and Platform Control
Track responsible: Jean Dalenq (AIRBUS)

CAN and CAN FD Physical layer
Track responsible: Gianluca Furano (ESA)

Friday – 16th June : Sitael 100 Room
- Keynote Speech: Roberto Formaro (ASI)

CAN and Microcontrollers
Track responsible: Marco Rovatti (ESA)

CAN for Small Satellites
Track responsible: Pietro Tosi (SITAEL)

During all the three days participants will have the possibility to showcase products in a dedicated area, please contact the local organizer at the contacts below.

Registration for this workshop is required through the indico web site, please register in advance since total number of participants may be limited. Please visit http://bit.ly/canspace

In order to gain access to SITAEL premises you will need to bring with you a valid id (passport or driver's license). This will need to be presented at the conference registration, where you will be issued a badge to allow you access.

Two social events are foreseen, please confirm your interest by selecting the options in the registration form.

Contact Points:

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