



14th-16th
June 2017

CAN IN SPACE WORKSHOP

*CHANGING FROM HIGHLY
CENTRALIZED INTELLIGENCE TO
DISTRIBUTED AUTONOMOUS FUNCTIONS*



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 superconstellations).
- 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 hardware and software activities, starting from components development, followed by feasibility demonstrators and finishing with flight experience.
- Standardisation and product assurance processes.

Contact Points:

Mr Gianluca Furano - ESA

Email: gianluca.furano@esa.int

Tel: +31 (0)71 5656631

Mr Agostino De Angelis - SITAEL - Local Organizer

Email: canspace@sitael.com

Tel: +39 080 5321796

Mr Marco Rovatti - ESA

Email: marco.rovatti@esa.int

Tel: +31 (0)71 5656847

The TEC-EDD organized conference "CAN in Space" was hosted from 14th to 16th of June 2017 in SITAEL premises, in Bari, Italy. Although focusing on what may seem a niche topic, it drew a sizeable participation (~70 delegates, 6 industrial exhibitors, up to 20 webex connections) and intense debate about future CAN-powered distributed intelligence spacecraft. Industry showcased the innovation, in very diverse applications like Telecom and New Space, brought by use of CAN-connected systems.

Among the most important discussion topics:

It has been highlighted that certification/qualification of HW+SW implementations at interface level is only one side of the coin. The other side is that those components need to be certified for interoperability. An interoperability standard test plan is needed.

Industry (wrongly) got the message that a SW implementation of CANOpen protocol can be very complex. But it has been clarified that this is not true, ,

Availability for use in space projects of a CAN FD controller IP is extremely important. We see already several projects baselining CAN-FD (in motor control, for more efficient data transfer) and CAN FD can run also using existing CAN transceiver, providing better protocol support.

There is a sustained trend in US market to use CAN based products.

There is a compelling necessity to make available in shortest possible time a 'CAN in space cookbook' as well as a thorough update of the ECSS standard.

Start commenting from here:

Both TAS and Airbus have tested and demonstrated that CAN runs on simple, unshielded twisted pair, removing need for specific RS and RE tests.

Both ThalesAleniaSpace and ADS express the wish to update ECSS CAN to integrate the standard with input from their internal applicable document (common NEOSAT Applicable Document AD919 issue03).

OHB has expressed need for update of ECSS CAN standard and provided a detailed list of topics in their presentation.

TAS-I (Turin) presented the return of experience of CANOpen SW implementation in Exomars 2016/20 with several items that need to urgently be inserted in the ECSS standard to prevent (especially) endianness problems.

Discussion on CANOpen SW implementations:

It has been highlighted that certification/qualification of SW implementations at interface level is only one side of the coin.

The other side is that those components need to be certified for interoperability.

An interoperability standard test plan is needed.

Offline discussion:

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FROM MDA PRESENTATION

There are trends in US market to use CAN based products.

SW implementation of CAN protocol is usually more expensive than implementations based on HW (cit. MDA).