

# CANopen on track – IEC 61375-3-3 voted positively

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In 2014, Stadler will deliver its Flirt trains to the Gysev local train operator in West Hungary

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It is a long time ago that CiA members requested to standardize internationally CANopen for the use in rolling stock. The very first IEC meeting on this topic went back to February 2005 in Verona (Italy). The ad-hoc task force "Train communication Network" had invited me to present the status of CAN applications onboard of rail vehicles. In the following years, CiA experts especially Reiner Zitzmann represented CiA in the Working Group 43 of the IEC Technical Committee 9. He was appointed as editor of the IEC 61375-3-3 document named "Electronic railway equipment – Train Communication System (TCN) – Part 3-3: CANopen Consist Network". The standard was finally approved unanimously by April 2012. After seven years, CANopen became an internationally ac-

cepted network in rail vehicles.

But already in the mid of the 90ties Vossloh Kiepe (Germany) introduced CANopen technology in its trams followed by their colleagues developing diesel locomotives. There are other CiA members supporting CANopen

in devices designed for usage in rail vehicles. Selectron offers since many years control systems based on CANopen as well as MEN, Luetze Transportation, Sys Tec, etc. Other CiA members provide CANopen compatible diesel control systems, e.g. MTU and Voith. CANopen ▷



The DE 18 four-axle diesel-hydraulic locomotives by Vossloh provide an automatic start-stop eco drive system, slip protection, and driver assistance

### Content of IEC 61375-3-3

The international standard is part of the Train Communication Network series. It specifies the CAN physical layer in more details in order to meet the specific requirements of rail vehicle applications. It also specifies a recommended practice for CANopen communication data objects to improve the interoperability of CANopen devices dedicated for rolling stock. There are also some recommendations added for the CANopen network management. In many cases, there are just references to CiA documents.

The clause describing the gateway to the train backbone network is completely new and not available in any CiA specification. It specifies the services and protocols to access the CANopen device from a device connected to the backbone network.

The protocol is based on ASCII syntax for the commands and the responses. This approach is similar to the CiA 309 gateway specification.

## Luetze Transportation outsourced

Beginning of this year, Luetze has established the Luetze Transportation GmbH, which is now responsible for the development and production of devices dedicated for any kind of transportation including rolling stock. The daughter company is managed by André Kengerter.



has been mainly used in light train vehicles (trams, undergrounds, commuter trains, etc.) and diesel locomotives. In some rail vehicles, CANopen is deeply embedded, for example in door control systems and in brake systems.

The Flirt train by Stadler (Switzerland) is one of the first CANopen references for rail vehicle applications. Some 758 of these trains have been sold so far. Windhoff was another early bird of CANopen users in rail vehicles. The German company made and makes modular trains for construction and maintenance of rail nets and overhead catenary systems as well as freight forwarding, fire-fighting, and rescue services. Alstom Transport (Germany) uses also CANopen networks in its Citadis and Coradia trains. Recently the company signed a contract with the Deutsche Bahn (DB) of 38 additional Coradia regional train sets. CANopen is also used in some Chi-

nese metros and commuter trains, for example in many of the rail vehicles produced by CSR (China). Kangni (China) manufactures rail vehicle doors with CANopen interfaces.

In Europe, the Knorr-Bremse IFE division has developed the first CANopen connectable rail vehicle doors end of the 90ties. The company initiated the first CANopen profile for rail vehicle equipment. This CiA 409 device profile was discontinued and substituted by the CiA 424 series. CiA has developed a huge range of device profiles for rail vehicle equipment. Many of them make references to UIC (International Union of Railways) leaflets. The organization has developed the data format of process data for many units such as brakes, doors, etc. The CANopen SIG (Special Interest Group) "Rail vehicles" has mapped those data objects to the CANopen object dictionary and specified additional necessary

data objects. Unfortunately, the SIG is not more active. But that does not mean nobody is using these profiles. In my experience, the companies supplying to rail vehicle manufacturers as well as the train makers are quit closed. This means, some of them use "secretly" the CiA profiles dedicated for rail vehicle applications. I know that in some East European countries, these profiles have been partly implemented.

Of course, it would be better, when CiA submits its profiles for international standardization. But this is politically not that easy. Some parties wanted that IEC standardizes the UIC leaflets. But the UIC objected, because the both organizations could not agree on copyright and business model issues. ◀