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The Power of IoT

Kontron Transportation

MCx as a Service Solution

The Future of GSM-R Train Radio Functionalities

5G | MCx | 24/7 Continuous Operation | Long-Term Availability

MCx as a Service

Communication Without Own Infrastructure

Based on the future FRMCS standardization (3GPP, ETSI), the Kontron Transportation MCx solution extends obsolete analog radio communication means with modern "state of the art" train radio functionalities, without the need to develop an own infrastructure.

Kontron Transportation has developed the MCx OTT (Over The Top) solution.

Here, the networks of the public providers are used as transport medium for the own MCx application with GSM-R features such as point-to-point call, group call and train emergency call.

Future-Proof Railway Communications

Kontron provides a future-proof solution that enables voice communication for railway operators without their own GSM-R infrastructure — offering a cost-effective, fully hosted alternative. IP-68 industrial-grade smartphones with an MCx client, IP-enabled Dispatchers with several modern user interfaces, and cab radios that follow the FRMCS standard, serve as end devices. Complies with FRMCS architecture based on 3GPP Rel. 17/18 and aligned with UIC FIS 2.0.

Since public networks do not always offer full network coverage, the MCx OTT solution has been further developed in terms of transmission security, in cooperation with the Sauschwänzlebahn and the Ministry of Transport Baden Württemberg, and enhanced with the following features:

Heart-Beat Function

In addition to the use of two SIM cards from different providers in the end devices, a unique so-called heartbeat function was developed, which allows the client software to be in constant contact with the application.

This has the advantage that, for example, the user in the train cabin or on the locomotive can see at a glance whether he is connected to the MCx application on the server or whether he is in a zone without coverage. Optionally or on request, it is thus possible to switch automatically between the network providers. If no data connection is available in both networks, an emergency call via GSM is possible.

This functionality goes beyond the current FRMCS standard and offers further security in train-to-land communication.

Status Display

The train driver can use the status display on the terminal to see whether the train manager at the dispatcher or other participants are busy or reachable. Likewise, the train manager at the dispatcher can see whether the train driver is currently speaking or is available to accept a call. This real-time visibility of availability between driver and dispatcher represents a significant enhancement compared to current GSM-R capabilities, enabling more efficient and informed communication. As a result, the status display saves controllers valuable time, allowing them to focus on the track or attend to other callers more effectively.

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Messenger Service

Another feature is the own messenger service, which extends the MCx solution with preset or freely selectable messages.

With this service, important messages can be transmitted between the dispatcher and the user on the train or in the locomotive/traction unit even with minimal available bandwidth. As standardization continues, video application, file transfer and functional train number entry will also be possible.

Dispatcher

The IP-enabled Dispatcher is another important component in the Kontron Transportation MCx solution. In addition to the existing functionalities such as individual call, group call or train emergency call, the Dispatcher also provides further intelligent innovations. For example, a geographical map is provided, which makes it possible to detect the individual trains based on their GPS coordinates and display them on the map.

In conjunction with the “user status” function, this helps the Dispatcher to detect possible radio gaps on the track at an early stage and to initiate appropriate measures. Additional call lists, mails and predefined messages help to send recurring news quickly and effectively. The Dispatcher’s key display is freely programmable and assignable, ensuring an individual configuration adapted to operational requirements.

Voice Recorder

As required for a train-to-land communications solution, Kontron Transportation also provides voice recording in the MCx solution.

Kontron Transportation works here with the same manufacturer as in many GSM-R projects with major railroad companies. This enables the greatest possible security to comply with all GSM-R specifications and features.

Lone Worker Protection

The Lone Worker Protection feature provides the best safety for staff who works alone and out of sight. It reports incidents such as falls and slips together with the geographical location of the user to the dispatcher or selected colleagues and safeguards the lone worker in real-time.

The smart safeguarding feature detects false alarms and helps to minimise false-positive alerts. The alerted dispatcher can dispose of emergency services to the user’s location or use the remote ambient listening call to acoustically monitor surrounding of the user which might be immobilized and calling for help.

No external sensor device is required to be worn.

FA (Functional Alias)

The KT MCx solution does not require interaction with the existing GSM-R SCP to retrieve FNs, but has an implementation that converts FRMCS FAs into GSM-R FNs and vice versa. This functionality allows the reformulation of FAs (in the form of alphanumeric SIP URIs) into GSM-R FNs (in the form of EIRENE SIP-R URIs or simple strings of digits). It can be flexibly configured in the IWF core. This ‘stateless mapping’ is based on the requirements of UIC FRMCS FRS and SRS.

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MCx Projects

In October 2020, Kontron Transportation demonstrated the functions of MCx over the top (over the public network) in a two-week test at the Sauschwänzlebahn in Baden Württemberg, locally and on the moving train. The "hosted" solution was used, as this did not require any technical effort in terms of infrastructure on the part of the Sauschwänzlebahn.

The MCx application was provided in a Kontron Transportation data center. At the time, this was the first solution of its kind to be tested in an operational railroad environment. Kontron Transportation, together with the Sauschwänzlebahn and the Ministry of Transportation of Baden Württemberg, successfully executed a test catalog in which all functionalities could be flawlessly demonstrated. In December 2021 Kontron Transportation won the order to realize MCx at the Sauschwänzlebahn and is currently in the implementation phase.

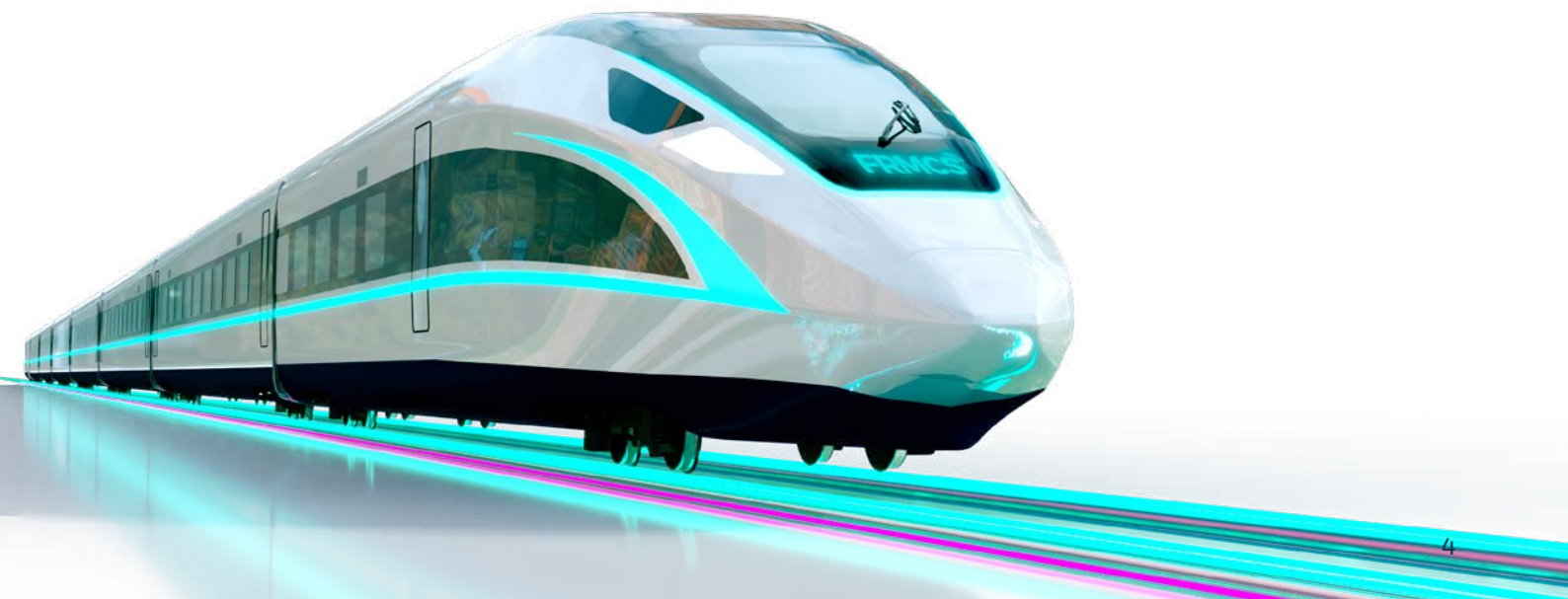
In December 2020, Kontron Transportation received the first order for a MCx solution from Westfälische Landes-Eisenbahn. With this first important step on the way to a FRMCS-based future, the MCx solution replaces the old analog radio system without any additional investment in infrastructure. The Westfälische Landes-Eisenbahn also opted for a hosted solution in order to benefit from the reliability of a data center and to keep the costs of its own hardware and services as low as possible. The solution with MCx application, Dispatcher and voice recorder was successfully implemented in October 2021. In May 2022 the operating permit of the regional railway board was given.

Main lines (private 5G / FRMCS positioning):

- Société du Grand Paris: MCx over private LTE
- Research / validation: Digitale Schiene Deutschland (first FRMCS E2E call), Morane 2 (EU-funded FRMCS V2 validation), 5G-RACOM, 5GRail, Shift2Rail
- Erzgebirgsbahn (DB), DB GeFo

Secondary Lines (OTT / hosted positioning):

- Westfälische Landes-Eisenbahn
- Sauschwänzlebahn
- evb and SinON
- Südwestdeutsche Schienenwege



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About Kontron Transportation

Kontron Transportation is a leading global supplier of end-to-end communication solutions for mission-critical networks. With a longstanding focus on the railway sector, the company specializes in systems that produce, transport, and process voice, data, and video — reliably, securely, sustainably, and efficiently.

Its portfolio includes GSM-R, FRMCS (Future Railway Mobile Communication System), MCx (mission-critical services, including MCx OTT) with IWF (interworking functions), as well as enhanced radio solutions, private 4G/5G mobile networks, transmission networks, and cybersecurity solutions. Kontron Transportation also serves other mission-critical industries with tailored communication solutions and offers mobility products such as validators and fare collection systems for public transport operators.

For more than 30 years, the company has helped shape railway communications and continues to drive the evolution of broadband communication solutions for mission-critical networks, for instance as an associated member of Europe's Rail Joint Undertaking (EU-Rail), making it the perfect partner for FRMCS.

The company has more than 700 employees, operates 11 sites across Europe, and is headquartered in Vienna.

Kontron Transportation is part of the Kontron Group.

Kontron Transportation GmbH

Lehrbachgasse 11
1120 Vienna, Austria
Tel.: + 43 1 25 33 700
kta_office@kontron.com

www.kontron.com/kontron-transportation

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