

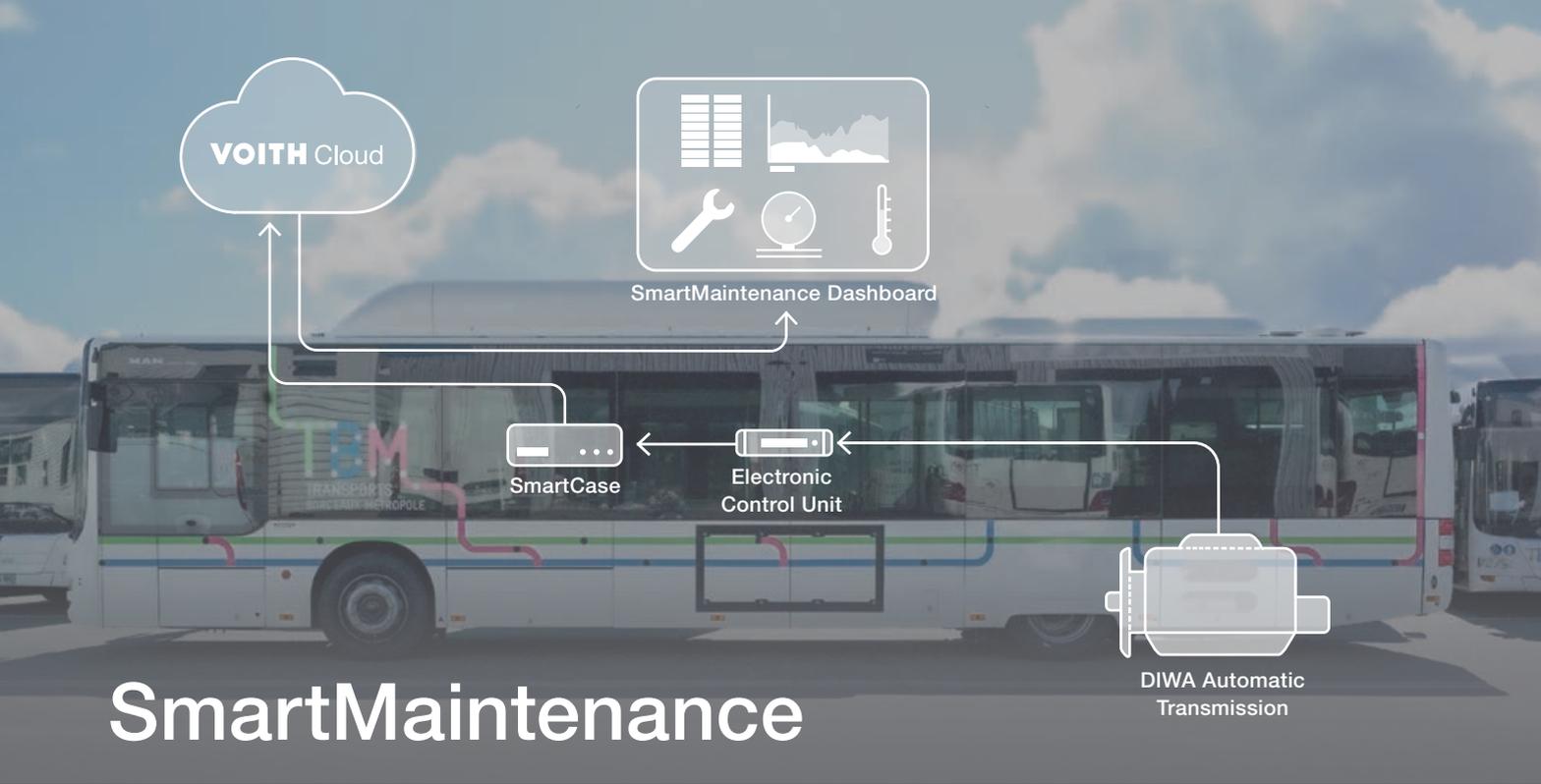
Intelligent systems for higher efficiency

Smart Services





Permanent transmission monitoring increases vehicle availability



SmartMaintenance

SmartMaintenance enables fleet management to permanently monitor the DIWA transmission. The system identifies critical parameters and thus creates the conditions for predictive and optimal maintenance and repair of the transmission, matched to the relevant conditions.

Predictive monitoring of the driveline

At the highest level, SmartMaintenance also uses the traffic light logic with green, yellow and red color-coding in order to combine information on factors such as the condition and the temperature of oil and transmission across the entire fleet. For more in-depth information, the dashboard also provides detailed analyses at all times.

SmartMaintenance provides automated recommendations to support operators in regard to predictive maintenance and repair of their transmissions. Costs due to downtimes, towing, providing replacement vehicles, and contractual penalties can easily add up to several thousand euros per incident. Not to mention the loss of image.

SmartMaintenance – Benefits

- + High vehicle availability
 - + No unscheduled service
 - + Minimize time in workshops
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Since SmartMaintenance was introduced to monitor the transmissions there have been no transmission-based vehicle breakdowns on the road.

“In the past few years, none of the Keolis buses in Bordeaux equipped with SmartMaintenance have been out of service due to transmission problems,” said Hervé Robin. For Robin, who is responsible for customer service at Voith in France, this proves that permanent transmission monitoring via SmartMaintenance is highly effective. The data forms the basis for predictive maintenance of the driveline, which in turn leads to the aforementioned reductions in standstill times.

Keolis has been using the transmission technology from Voith in Bordeaux’s inner city traffic for many years. Around 90 per cent of the 398 buses in the fleet are equipped with drive components from the company. “The rest of the fleet consists of hybrid or electric vehicles,” added Georges Nave, Maintenance Director at Keolis in Bordeaux, who has been responsible for procurement and development of the bus fleet for 25 years. 180 of these buses are equipped with SmartMaintenance.

Tailor-made maintenance schedules

SmartMaintenance permanently monitors the condition of all important components of the transmission. Hereunto the vehicle data is transmitted to Voith servers in Heidenheim (Germany) where it is evaluated with state-of-the-art technology. This forms the basis for tailor-made maintenance recommendations for the Keolis buses.

**Statement of Hervé Robin,
Customer service at Voith in France**

“Predictive maintenance prolongs the operating times of the buses and reduces operating costs.”



**Statement of Georges Nave,
Maintenance Director at Keolis in Bordeaux**

“The close cooperation with Voith is a key factor for the effective utilization of the system when it comes to evaluating the data collected by SmartMaintenance.”



Longer operating times, fewer breakdowns

“A core element of predictive maintenance is to detect even small problems and to remedy them promptly,” Hervé Robin said. An overhaul of the driveline is only carried out when SmartMaintenance indicates that the transmission is reaching the end of its service life. However, these maintenance intervals adjusted to the current state of the vehicle do more than increase the operating times of the buses. “By minimizing breakdowns in flowing traffic, the operating company saves a significant amount of costs,” said Robin.

The cooperation with Voith includes regular training of the Keolis maintenance team. “At least once a year our team is trained on the latest technology,” said Georges Nave.

Keolis – Facts

- **Location: Paris, France**
 - **Site: Bordeaux, France**
 - **Founded: 1908**
(since 2009 operating in Bordeaux)
 - **Employees: 58 300 in ten European countries**
(Bordeaux: 2 538 employees)
 - **Fleet: approx. 23 500 buses**
(Bordeaux: 398 buses)
 - **141 million passengers per year in Bordeaux**
 - **The served transit area of Bordeaux covers 580 square kilometers with 740 000 residents**
 - **In France Keolis operates 88 city transit networks and is the biggest supplier in public transportation**
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