

## Success Story



# China: the metro dynasty

## SIGNALLING SOLUTIONS FOR A BOOMING URBAN RAIL MARKET

Certainly, the People's Republic of China is currently the country with the fastest-growing urban rail network. By June 2017, 31 Chinese cities had existing metro systems with a total of 4400 km. 53 cities have metro projects under construction, and there are even more cities either planning or having new metros under approval.

In its 13th Five Year Plan, China intends a more sustainable, high-capacity public transit sector. Every city with over 3 million residents will start to develop or expand its urban rail network. Therefore China plans to spend round about 600 billion euros on transport infrastructure in the next 3 years.

One of China's key players in this booming signalling market is Thales SAIC Transportation System Limited (TST), which is a high-tech joint venture between Shanghai Electric and Thales. TST's core business is providing CBTC technology for the China metro market as well as signalling solutions for tram, monorail and intercity railways. Headquartered in Shanghai with project offices and branches throughout the whole of China, TST is currently safeguarding 29 metro lines in Shanghai, Beijing, Guangzhou, Shenzhen, Wuhan, Nanjing, Nanchang, Hefei, Ningbo, Jinan, Qingdao, Shijiazhuang, a total of 1082 km with 627 km in revenue and a total installation of more than 5000 Thales Az LM Detection Points! These achievements, benefiting 8 million passengers on a daily basis, have been only possible based on localisation.

**Thales' SelTrac® CBTC System, with a 30-year zero-incident safety record,** is a radio communication-based moving-block automatic train control system, which controls the movement of trains through continuous two-way digital communication. Each train



Wuhan Line 1

transmits its identity, location, direction and speed to the respective Zone Controller (ZC). The ZC calculates safe distance between two trains, braking distance and authorised train speed with automatic application of brakes in case of overspeeding.

**The Thales Az LM Axle Counter System is the train detection device in the CBTC System.** In normal operation, the status of a section is not influencing the CBTC, but, as a fall-back system, Az LM detects the trains in case of failures. It grants, together with the interlocking, a safe operation and the protection of the train. Based on the importance of the fall-back mode in the Chinese market, the Az LM became a well appreciated vital part of the CBTC System and is now used in almost all CBTC projects. In fact, Thales is not only supplying its Axle Counters to projects executed by TST, but also lines implemented by other signalling providers.

In order to meet the high reliability requirement, TST was the first company which introduced a 2-out-of-3 (2oo3) Axle Counter solution to the Chinese market for Shanghai Line 5. This project includes the signalling of the south extension of Shanghai Line 5

and the refurbishment of the existing part. Upon completion, the line will feature Fully Automated Operation (FAO). One of the challenges is that the implementation shall not impact the daily 16.5 hours of operation.

The metro network in Shanghai carries 11 million passengers on a daily basis, which demands highly robust system performance. In this context and based on the 2oo3 Az LM System, TST also developed an Ethernet interface which directly connects the Az LM to the ATP/IXL system in order to reduce discrete I/O hardware on both Axle Counter and ATP/IXL side and ensure safety. Thanks to the 2oo3 safe and redundant architecture, a much higher availability can be achieved, which is a common request of mega cities with overwhelming passenger flow. The innovation is geared to meet growing demand for FAO in China. The simplified and highly reliable solution will benefit the system as well as operation and maintenance.

### THALES SAIC TRANSPORTATION SYSTEM LIMITED (TST)

To develop its activity in China, Thales, and Shanghai Electric Corporation (SEC) formed a joint venture in 2010: with the expertise and experience of both partners, TST is ideally fitted to respond to growing urbanisation and fast transport modernisation needs in China. 2017 is the most challenging year in the history with more than 10 revenue dates and 8 new lines going into operations. Shijiazhuang Line 1, with only two years for signalling delivery, went into revenue in June 2017, following Nanjing Line 4 early this year.