

Communication Based Train Control system (CBTC)

Information Technology - Automatic Train Protection system (IT-ATP)

Radio based ATP system with realizing downsize facilities and power-saving significantly.

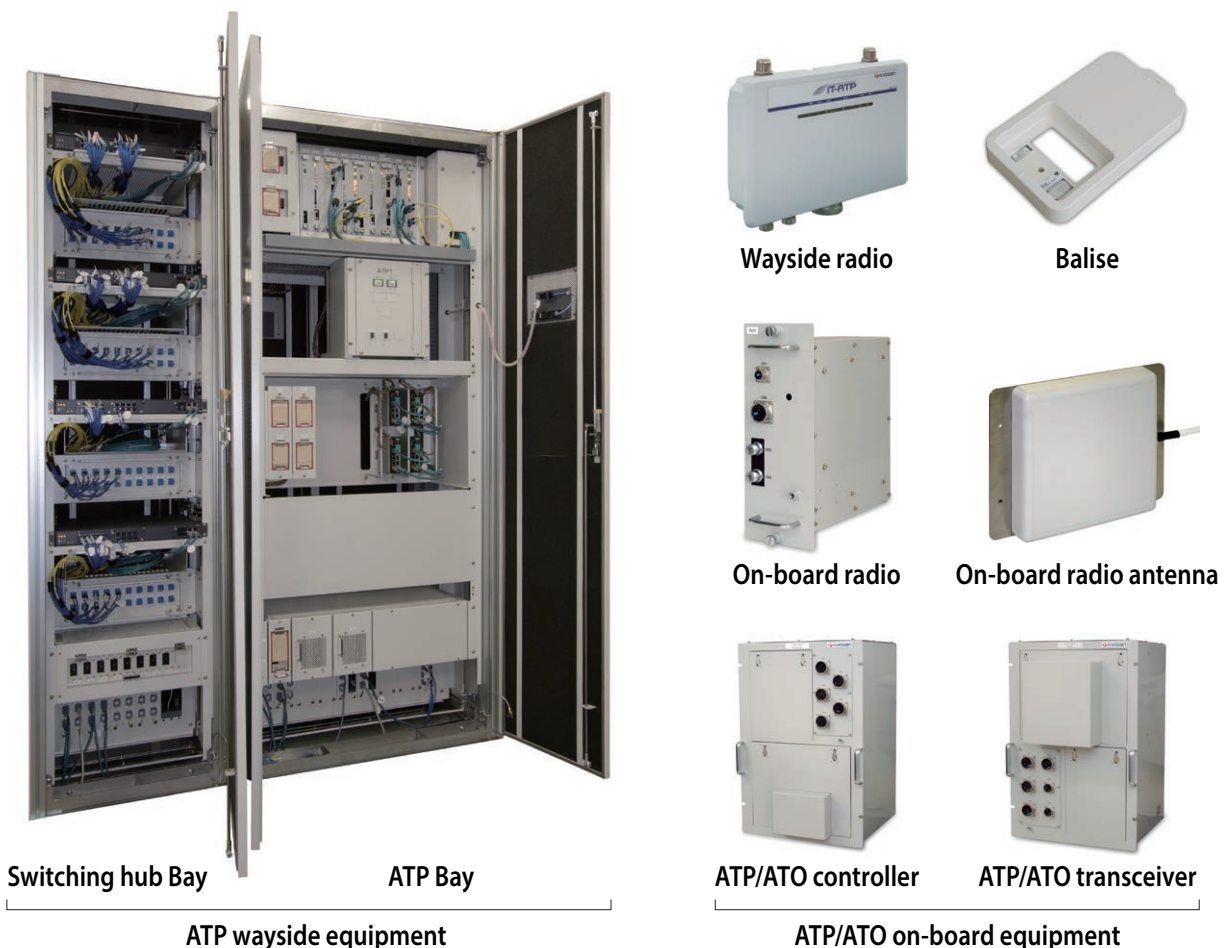
IT-ATP, a train control system, meets the following requirements of CBTC which is defined in standard of Institute of Electrical and Electronics Engineers (IEEE Std. 1474.1TM - 2004)

- High-resolution train location determination, independent of track circuits
- Continuous, high capacity, bidirectional train-to-wayside data communications
- Train-borne and wayside processors performing vital functions

Features of IT-ATP

- IT-ATP on-board equipment adopts train control by optimization of speed profile which has proven to be used for a long time.
- Radio communication frequency band adopts 2.4 GHz ISM band, and thus no application for radio station license is required.
- IT-ATP wayside system can be connected to existing Electronic Interlocking system and Automatic Train Supervision system.
- As for radio communication, the following two options are available: either LCX (Leaky Coaxial) Cable, which is strong against radio-frequency interference by proximity communication, or Space Wave with antenna.

Components



Advantages

- Significant equipment reduction and power-saving can be realized because ATC/TD signal transceiver, an essential equipment for ATC/TD-type train control system, is not required.
- Adoption of radio communication and optical network provides flexibility for the layout of equipment in equipment room.
- This system doesn't need track circuit adjustment works and can significantly save maintenance works because of adoption of radio-based system.

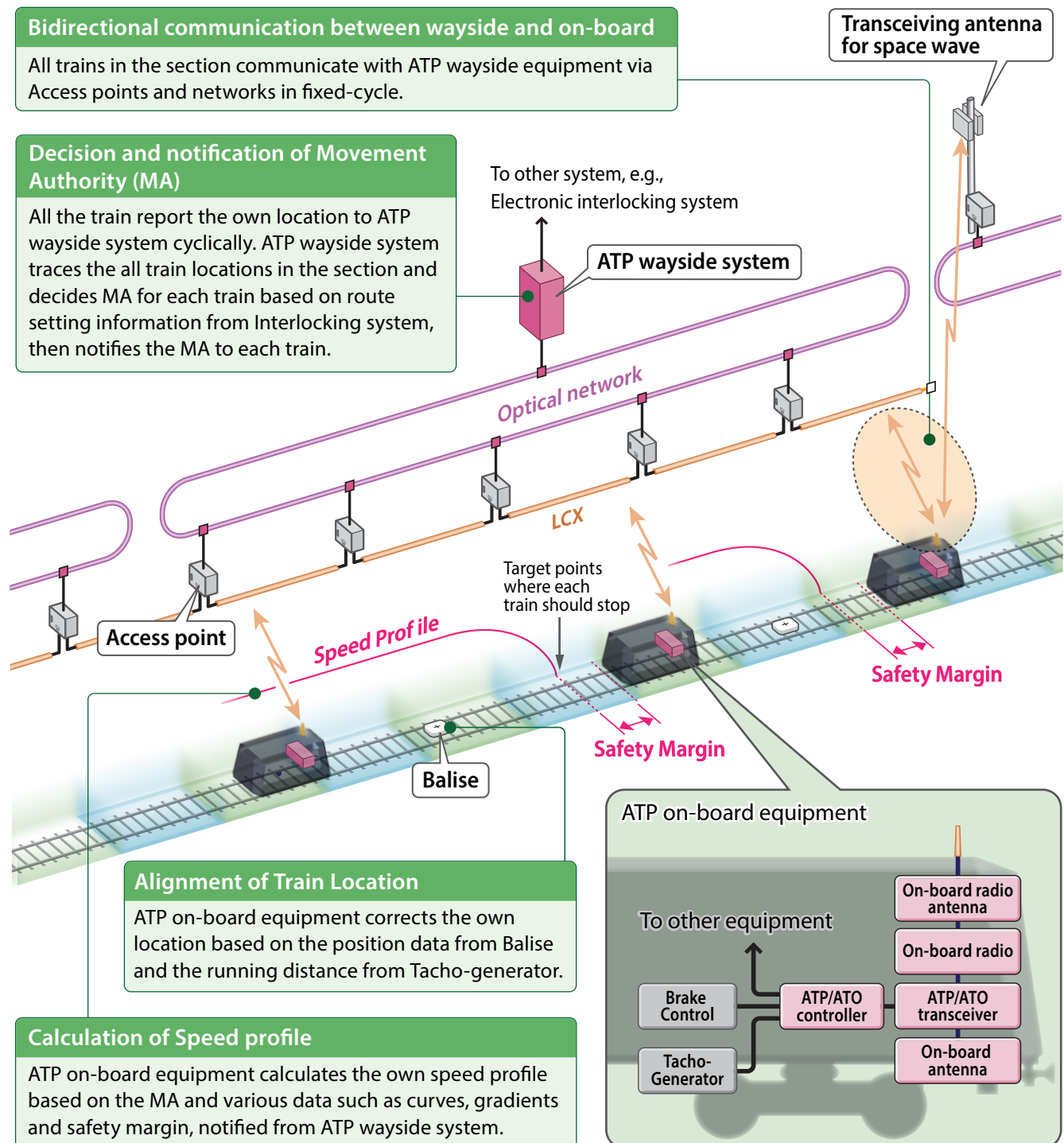
Functions and configurations of IT-ATP

Bidirectional communication between wayside and on-board

All trains in the section communicate with ATP wayside equipment via Access points and networks in fixed-cycle.

Decision and notification of Movement Authority (MA)

All the train report the own location to ATP wayside system cyclically. ATP wayside system traces the all train locations in the section and decides MA for each train based on route setting information from Interlocking system, then notifies the MA to each train.



Alignment of Train Location

ATP on-board equipment corrects the own location based on the position data from Balise and the running distance from Tacho-generator.

Calculation of Speed profile

ATP on-board equipment calculates the own speed profile based on the MA and various data such as curves, gradients and safety margin, notified from ATP wayside system.