

New Train Tracking System on CP

by Luis Robredo

CP (the Portuguese passenger and freight operator) awarded a contract to the Telematics department of Portuguese company EFACEC Sistemas de Electrónica, for an innovative system for Train Tracking, called Train Office. The turnkey project involves development, installation and initial operation of the equipment in conjunction with CP's technicians. At present, 52 locomotives (these include electric and diesel), 3,000 wagons and 30 passenger coaches (regional and intercity services) are tracked and controlled by nine Operating Control Centres.

Train Office was designed for the train operators with the aim of improving:

- Service to the customers;
- Train tracking and traffic analysis;
- Operational management of trains;
- Crew management;
- Rolling stock tracking and management.

Independent from railway infrastructure and in real time, the Train Office periodically records and exchanges information between the trains and the Operating Control Centres.

Onboard computers, fitted in the locomotive cab of each train, equipped with a GPS automatic location module and a GSM radio communicator, inform the Operating Control Centres about train location,

consist, service, rolling stock and crew.

The crew identify themselves to the onboard system by contact-less ID electronic cards. In this way, the system allows crew management



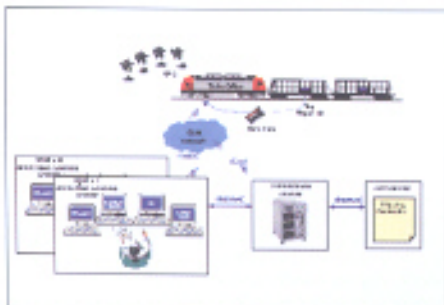
(driving hours, services operated, etc) parameters to be available.

Electronic memory Tags, read and written by contact of hand held devices, are fitted to the rolling stock. The Tags carry all of a vehicle's specification data, such as ID (serial

number), vehicle model, maximum speed allowed, empty braking capacity, full braking capacity, dimensions, etc.

Before departure of the train from a station, the train driver reads all the tags that make up the train consist. The collected data is then downloaded to the onboard computer and communicated, in real time, to the Operating Control Centre. At the same time the train schedule is received. The onboard computer then calculates the braking parameters for the speed control of the ATP system which is used on those lines that are equipped (in Portugal, the Ebicab 700 ATP is used).

The data communication between the locomotives and the Control Management and Supervision Centres is made by a public radio GSM operators network, using TCP/IP protocol. Additionally voice calls can be handled between the driver and the





control room command centre. The voice calls are automatically allocated to the respective Operating Control Centre according to geographic location and then digitally recorded.

The Train Office tracking system is available on the entire rail network. The tracking information is processed on the Supervision Centre server, being then made available to the Operating Control Centres clients using the IP protocol and the CP corporate Intranet.

Web technologies are used to enable the visualisation of train locations on GIS (Geographic Information System) maps, showing the position of each train, on both the network and on a map of the country, together with special points, such as stations, tunnels, level crossings, etc. A space-time graphic software application allows train tracking against timetable, displaying the graphical information for the planned schedule against the real schedule occurring within the Train Office system.

Integration with the ATP system allows information in real time about alarms and emergency braking to be sent to the Control Management Centres.

Other features of Train Office are available, including the individual location of any vehicle, on any part of the rail network, service freight status, freight history, crew service reports, etc.

