

TRAFFIC Simulator

ERSA



ERSA Traffic Simulator

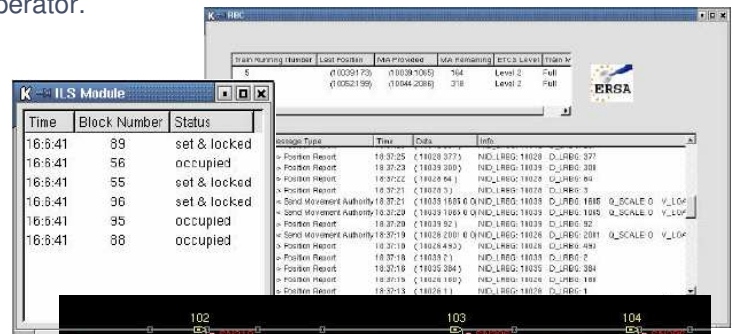
The ERTMS/ETCS Traffic Simulator from ERSAs is an advanced real time system including multiple trains, interlocking, route map, RBC simulation and regulation. Its independent modules are designed to interact with each other as in a real railway network. A Traffic Evaluation Tool is provided to analyse real time data gathered during the simulation.

Examples of use are: assisting line capacity evaluation, validating RBCs, assessing conflict detection/resolution systems...

The ERTMS/ETCS SIMULATION SYSTEM



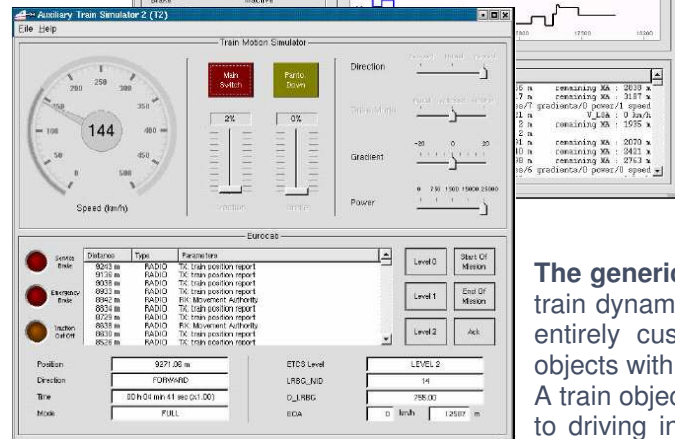
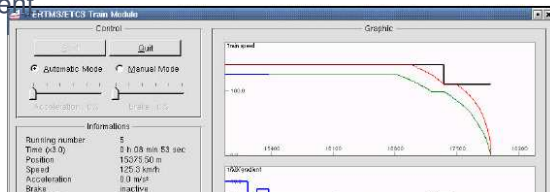
The **Route Map Manager** shows the track topology and all train movements on the track. Various elements of a railway line such as balises, track circuits and signals can be shown or hidden by the operator.



The **Interlocking** allows the operator to set and lock routes.

The Interlocking interface shows the list of occupied, set and locked blocks. This information is requested by the RBC Module in order to send movement authorities to the trains.

An automatic route setting system is currently under development.



The **Radio Block Centre** uses the mandatory format from the SRS (telegrams, packets, variables). It manages trains (connection, disconnection), issues movement authorities, receives position reports, sends and revokes emergency stops.

It displays the new position of trains as soon as a report is received.

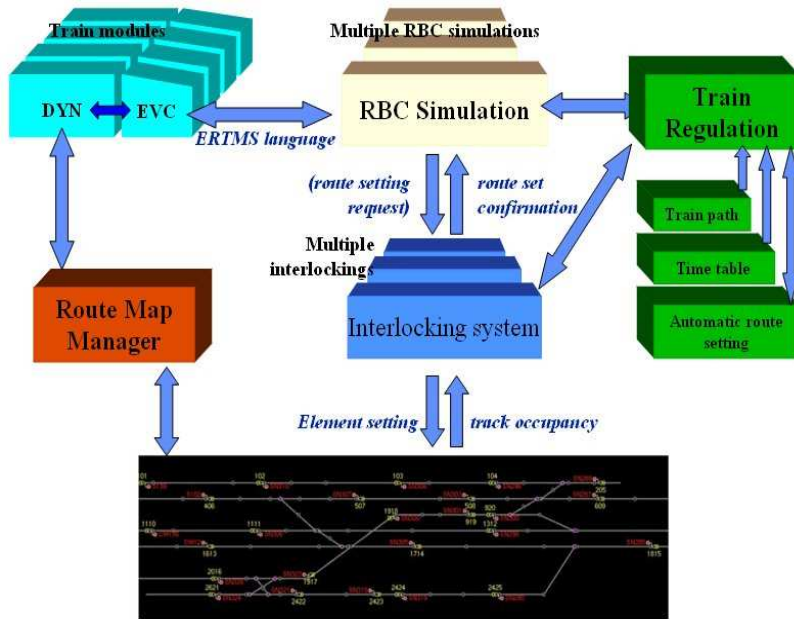
The RBC communicates with the interlocking simulator to know the routes which are set.

A Time-Distance diagram showing actual and predicted positions of all trains is also generated.

The generic **TRAIN module** supports all ERTMS/ETCS levels. It simulates train dynamics and SRS 2.2.2 EVC (ERTMS onboard), with all parameters entirely customisable. It allows creation of separate, independent train objects with automatic or manual control.

A train object can start from any location on the track, and will run according to driving information and data received over balise and radio interfaces. The user can also drive directly when the module runs in manual mode. The display includes train information (Running number, running time, speed, driving mode ...), messages exchanged with the other modules, distance-speed and track gradient diagrams.

Traffic Simulator Architecture



ERSA Traffic Simulator have several functions:

- a test environment for conflict detector & conflict solver
- a tool for ERTMS line capacity assessment
- a tool for train regulation improvement (automatic route setting)
- a validation environment for RBC

Traffic Evaluation Tool

This module helps to analyse the various data collected in real time during the simulation:

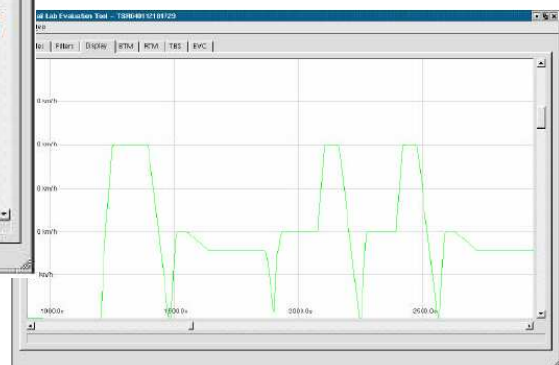
Train dynamics information

Exchanged messages and a detailed view of the datagrams

Time	Time Offset	Distance	Speed	Cal. CR	SR	SB	Message	Comment
18:44:52.62	1506	+1524.95	-013.3				Observer data 13754 97011 m, 50.281357 km/h, -0.071227	
18:44:55.23	1506	+1525.31	-012.0				Observer data 13905 972576 m, 50.271814 km/h, -0.071433	
18:44:58.71	1508	+1527.33	-051.3				Observer data 13923 722287 m, 50.265107 km/h, -0.083541	
18:44:58.52	1532	+1482.83	+019.3				Observer data 14618 188398 m, 50.267744 km/h, -0.083122	
18:45:09.02	1557	+1431.51	+019.2				Observer data 14311 086743 m, 50.249822 km/h, -0.083017	
18:45:12.17	1601	+1422.93	+019.2				Observer data 14223 588566 m, 50.246458 km/h, -0.083015	
18:45:17.23	1605	+1423.74	+017.2				Observer data 14321 783302 m, 50.234458 km/h, -0.084037	
18:45:21.32	1609	+1424.82	+016.2				Observer data 14444 878386 m, 50.232245 km/h, -0.084049	
18:45:25.41	1613	+1425.21	+015.2				Observer data 14520 242946 m, 50.227958 km/h, -0.084051	
18:45:28.57	1617	+1424.98	+014.2				Observer data 14614 082795 m, 48.222372 km/h, -0.084037	
18:45:33.07	1621	+1425.01	+014.2				Observer data 14620 346420 m, 48.221713 km/h, -0.084044	
18:45:37.57	1636	+1420.53	+012.2				Observer data 14508 528792 m, 48.214451 km/h, -0.084473	
18:45:41.88	1636	+1420.81	+011.2				Observer data 14491 198119 m, 48.210181 km/h, -0.084447	
18:45:46.07	1634	+1420.31	+010.2				Observer data 14505 524391 m, 48.213932 km/h, -0.085312	
18:45:50.05	1633	+1420.23	+010.0				Observer data 15004 287395 m, 48.162434 km/h, -0.094737	
18:45:53.54	1631						TV: data location offset(1), service broadcast emergency brake	
18:45:55.00	1643	+1516.21	+019.0	OK	OK	OFF	Observer data 15116 324556 m, 70.627971 km/h, -0.072210	
18:45:59.04	1644			OFF	OFF	OFF	TV: data location offset(0), service broadcast emergency brake	
18:46:02.57	1646	+1520.71	+019.0				Observer data 15221 653392 m, 70.654971 km/h, 0.041258	
18:46:04.81	1652	+1520.81	+019.0				Observer data 15219 882371 m, 70.598385 km/h, 0.031258	
18:46:09.06	1657	+1521.38	+019.0				Observer data 15474 058389 m, 70.595991 km/h, 0.020101	
18:46:14.20	1662	+1521.93	+019.0				Observer data 15551 978717 m, 50.608000 km/h, 0.020101	
18:46:18.67	1667	+1522.22	+019.0				Observer data 15462 396162 m, 50.608000 km/h, 0.020101	
18:46:23.86	1671	+1522.22	+019.0				Observer data 15462 396162 m, 50.608000 km/h, 0.020101	
18:46:29.06	1676	+1523.31	+019.0				Observer data 15503 364051 m, 50.608000 km/h, 0.020101	
18:46:32.76	1681	+1523.93	+019.0				Observer data 15508 528273 m, 50.608000 km/h, 0.020101	
18:46:37.49	1686	+1524.24	+019.0				Observer data 16019 328498 m, 50.608000 km/h, 0.020101	
18:46:42.78	1690	+1524.86	+019.0				Observer data 16116 875162 m, 50.608000 km/h, 0.020101	
18:46:48.08	1695	+1525.04	+019.0				Observer data 16203 421384 m, 50.608000 km/h, 0.020101	
18:46:51.576	1699	+1642.21	+019.0				Observer data 16423 241828 m, 50.608000 km/h, 0.020101	
18:46:53.17	1700						Observer data 16423 241828 m, 50.608000 km/h, 0.020101	

Header	Value
1. NO_PACKET	0
2. L_PACKET	123
3. D_PACKET	100C8015B16074000000010096400B3
4. NO_LIRBS	6757181
5. D_LIRBS	11
6. U_DLIRBS	00040003000E9000942007
7. O_DLIRBS	100C801000
8. L_PACKET	100C800000
9. L_PACKET	100C800000E0000002017
10. L_PACKET	600CA1000
11. L_PACKET	FFFFFF
12. V_TRAIN	101
13. V_TRAIN	-48
14. M_MODE	1
15. M_LEVEL	1

Actual speed profile for each train



Minimum Requirements

Minimum recommended configuration :

Pentium IV 2GHz, 256MB RAM, 300 MB HD, under RedHat Enterprise Linux 3.



ERSA 5 rue Maurice Blin – 67500 HAGUENAU - FRANCE
 ☎ +33 (0)3 88 07 15 50 📠 +33 (0)3 88 07 15 51
 www.ersa-france.com Email : inforequest@ersa-france.com

