

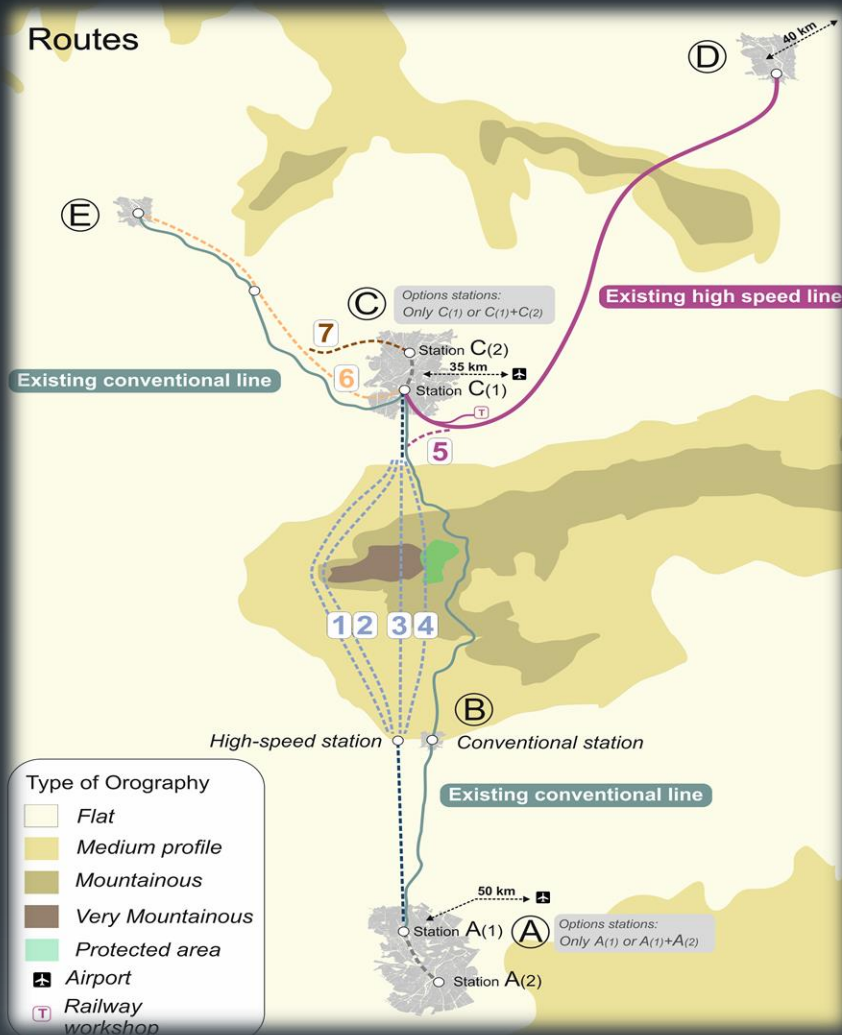
High Speed Planner

Designed by
UIC -International Union of Railways-
FFE -Fundación de Ferrocarriles Españoles-

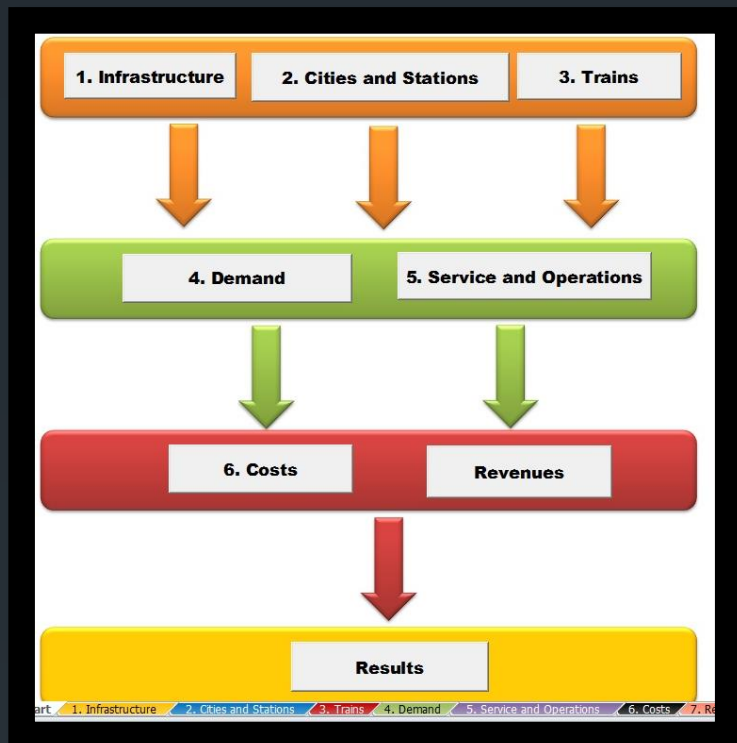


What is the High Speed Planner?

The High Speed Planner is a didactic tool especially designed as a complement to be used during the **Training on High Speed Systems**.



HSS main issues

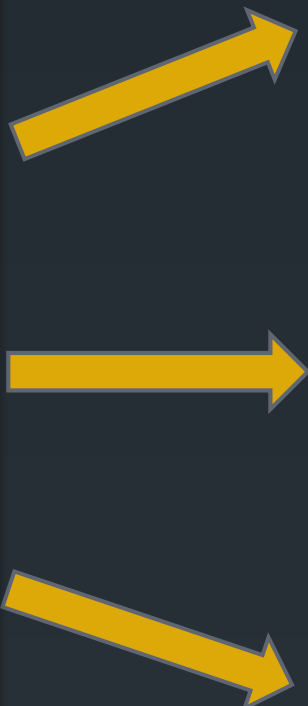
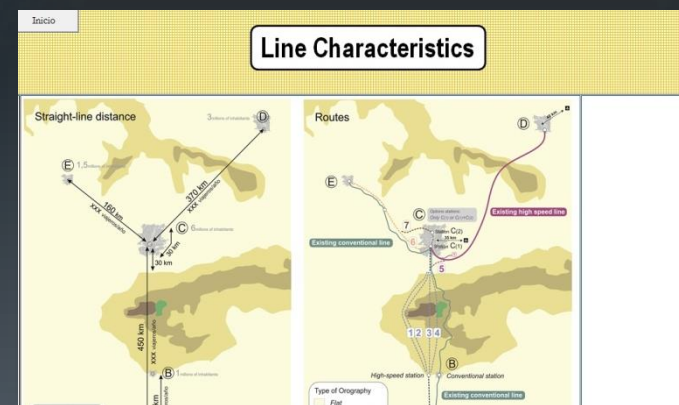
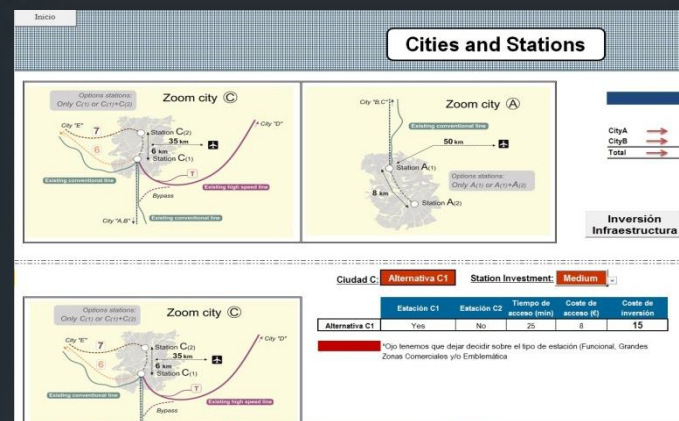


The High Speed Planner allows the user to develop hypotheses taking into account the main parameters to be implemented in every **High Speed System** project.

Train Characteristics

Characteristic	Value
Maximum speed	160
Minimum speed	Not defined
Power Voltage (kV plus 1.5kV)	250
AC Power Voltage (25kV)	Yes
Overhead	No
Regenerative brake	Yes
Articulated Coach	Not defined
Coach density	Normal density (2 stations)
Single or double-decker	Double-decker
Body width	Wide-body (2.55m)
Number of coach doors per side	2
Reporting format	ASPANEXCEL 2

Summary				
Number of middle-coach	1	2	3	2
Número de coches exhubas	2	2	2	2
Number of axle	52	16	26	26
Number of single-axle	0	0	0	0
Number of bogies	0	10	10	10
Length (mm)	209	279	363	363
Coach weight (tons)	276	295	365	365
Platform clearance (mm)	15.4	19.2	24.0	24.0
Adhesion mass (tons)	136	136	136	136
Coaches	158	276	414	414
Infrastructure				
Width (Average) (mm)	3.400	3.400	3.400	3.400
Width (mm)	4.300	4.300	4.300	4.300
Height (mm)	4.190	4.390	4.390	4.390
Total weight (ton)	18	186	124	124
Function				
Power output (kW)	0.942	0.648	0.150	0.150
Coefficient A (km/h)	138	185	231	231
Coefficient B (km/h ²)	1.123	1.654	2.184	2.184
Coefficient C (km/h ³)	0.03395	0.03965	0.04574	0.04574
Schedule Coefficient	0.4	0.4	0.4	0.4
Value				
Investment cost (M€)	13.87	17.92	21.97	21.97
Operation Cost (M€)	0.566	0.717	0.870	0.870
Cost of capital (M€/year)	0.415	0.539	0.659	0.659
Insurance cost (M€/year)	0.042	0.054	0.066	0.066
Costs operational / characteristic				
Cost per km	2.61	2.61	2.61	2.61
Investment and operating costs				
Fixed Maintenance Cost (M€/km_year)	170.837	220.765	270.693	270.693
Variable maintenance cost (M€/km_year)	1.03	1.35	1.64	1.64



The participants of the **Training on High Speed Systems** will have the opportunity to use this special tool as a part of the training to simulate a real HSS project.

Line AC: **Trazado 2**

	km. of line (straight line)	Type of Orography	Line Maximum Speed (km/h)	km of line (km)	Minimal Time (h)
Section 1	180	Flat	400	183,60	0,459
Section 2	235	Medium	350	244,87	0,700
Section 3	40	Mountanous	400	40,80	0,102

Kilómetros of civil works				
	Total	Tunnel	Bridges	Earthworks
Present Line length (km)	469,27	45,25	19,69	404,34
Total lenght-no curve radii*	455			
Straight line distance	450			
Time of the journey (h)	1,26			

*Without considering curve radii

Investment cost			
Trackbed			
Civil Engineering works (Eathwoks and Structures) (M€)	1.945,9	(M€/km)	4,15
Drainage (M€)	20,33	(M€/km)	0,04
Permanent Layer (M€)	37,85	(M€/km)	0,08
Track and Electrification			
Track (M€)	508	(M€/km)	1,08
Electrification (M€)	277,53	(M€/km)	0,59
Signalling and Telecommunications			
Signalling (M€)	428,4	(M€/km)	0,91
Communication (fixed and mobile) (M€)	117,3	(M€/km)	0,25
Land and rights (Expropriations) (M€)	262,4	(M€/km)	0,55
Total Investment Cost (M€)	4.143,0	(M€/km)	8,82
Total Maintenance Cost (M€/año)	42,23	(M€/km)	0,09
Rail Traffic Management Cost (M€/año)	0,19	(M€/km)	0,00

Line CD: **Trazado 5**

	km. of line (straight line)	Type of Orography	Line Maximum Speed (km/h)	km of line (km)	Minimal Time (h)
Section1	30	Flat	350	31,26	0,089

Kilómetros of civil works				
	Total	Tunnel	Bridges	Earthworks
Present Line length (km)	31,26	0,25	0,24	30,77
Total lenght-no curve radii*	30			
Straight line distance	370			
Time of the journey (h)	0,09			

*Without considering curve radii

Investment cost			
Trackbed			
Civil Engineering works (Eathwoks and Structures) (M€)	31,1	(M€/km)	0,99
Drainage (M€)	1,35	(M€/km)	0,04
Permanent Layer (M€)	2,46	(M€/km)	0,07
Track and Electrification			
Track (M€)	26	(M€/km)	0,83
Electrification (M€)	18,22	(M€/km)	0,58
Signalling and Telecommunications			
Signalling (M€)	28,5	(M€/km)	0,91
Communication (fixed and mobile) (M€)	7,8	(M€/km)	0,25
Land and rights (Expropriations) (M€)	17,0	(M€/km)	0,54
Total Investment Cost (M€)	168,8	(M€/km)	5,39
Total Maintenance Cost (M€/año)	2,72	(M€/km)	0,08
Rail Traffic Management Cost (M€/año)	0,15	(M€/km)	0,00

All the main elements (social, economic and environmental) will be analyzed in order to take decisions and see the resulting outcomes.