



# INVESTMENT PLAN

## MODIFICATIONS AND UPDATINGS

Evolution Index	Date	Modification / comments	Written by
1	11. 3. 2013	Draft v.1	Jan Křemen, SŽDC
2	15. 4. 2013	Draft v.2	Jan Křemen, SŽDC
3	26. 4. 2013	Version v.3 (added text into chapters 1, 6, 7)	Jan Křemen, SŽDC
4	9. 5. 2013	Version v.4	Jan Křemen, SŽDC
5	31.10.2013.	Version v.5	Zsuzsanna Ring, MÁV

## READING AND APPROVAL

Company	Infra Dev WG member	Date of approval	Management Board member	Date of approval
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### ANNEX

1. Financial sources

### ABBREVIATIONS

<b>CZ</b>	Czech Republic
<b>SŽDC</b>	Správa železniční dopravní cesty, státní organizace
<b>A</b>	Austria
<b>ÖBB-I</b>	ÖBB-Infrastruktur AG
<b>SK</b>	Slovakia
<b>ŽSR</b>	Železnice Slovenskej republiky
<b>H</b>	Hungary
<b>MÁV</b>	MÁV Hungarian State Railways Private Company Limited by Shares
<b>GYSEV</b>	Győr-Sopron-Ebenfurti Vasút Zrt.
<b>VPE</b>	Hungarian Rail Capacity Allocation Office
<b>RO</b>	Romania
<b>CFR</b>	Compania Națională de Căi Ferate CN "CFR" - SA
<b>BG</b>	Bulgaria
<b>NRIC</b>	National Railway Infrastructure Company, State Enterprise
<b>GR</b>	Greece
<b>OSE</b>	Hellenic Railways

## 1. Description of the present state of the corridor

### Total length

- main line: 3 856,770 km
- alternative lines: 1 997,890 km
- connecting lines: 477,700 km

### Number of tracks

- main lines:
  - 3 tracks: 33,000 km ( 0,9 %)
  - 2 tracks: 2 563,298 km (66,5 %)
  - 1 track: 1 260,472 km (32,7 %)
  -
- alternative lines:
  - 2 tracks: 1 110,360 km (55,6 %)
  - 1 track: 887,530 km (44,4 %)
- connecting lines:
  - 2 tracks: 306,100 km (64,0 %)
  - 1 track: 171,600 km (36,0 %)

### Traction:

- main line:
  - 3 kV DC 175,000 km ( 0,5 %)
  - 15 kV AC 156,000 km ( 4,1 %)
  - 25 kV AC 2 992,120 km (77,6 %)
  - diesel 533,650 km (13,8 %)
- alternative lines:
  - 3 kV DC 11,000 km ( 0,5 %)
  - 15 kV AC 149,400 km ( 7,5 %)
  - 25 kV AC 1 378,960 km (69,0 %)
  - Diesel 458,530 km (23,0 %)
- connecting lines:
  - 3 kV DC 290,000 km (60,7 %)
  - 25 kV AC 12,400 km ( 2,6 %)
  - Diesel 175,300 km (36,7 %)

### Axle load:

- main line:
  - 22,5 t (or more) 2 279,500 km (59,1 %)
  - 20 t 1 577,270 km (40,9 %)
- alternative lines:
  - 22,5 t (or more) 964,400 km (48,3 %)
  - 20 t 1 033,490 km (51,7 %)
- connecting lines:
  - 22,5 t (or more) 407,700 km (85,3 %)
  - 20 t 70,000 km (14,7 %)

# RAIL FREIGHT CORRIDOR 7 - ORIENT CORRIDOR: INVESTMENT PLAN

## Bottlenecks - most limiting points

- low capacity
- speed limit
- limited length of trains
- limited axle load
- not electrified sections
- safety equipment (signalling track circuits with frequency of 25 Hz , ETCS, GSM-R, etc.)

## Necessary developments

- increasing capacity
- increasing axle load
- electrification
- increasing speed
- ensuring interoperability

## CZ – SŽDC

### Praha – Kolín – Česká Třebová – Brno – Břeclav – Lanžhot border CZ/SK

- total length: 321 km
- number of tracks: 2 (section Praha – Poříčany 3 tracks, 33 km)
- traction: Praha – Svitavy 3 kV DC (175 km)  
Svitavy – border CZ/SK 25 kV AC (146 km)
- max. length of train: 600 m (section Brno – border CZ/SK 700 m)
- axle load: Praha – Břeclav D4/22,5 t (309 km)  
Břeclav – border CZ/SK D3/22,5 t (12 km)
- max. speed: 160 km/h
- radio communication system: GSM-R

### Kolín – Havlíčkův Brod – Brno (alternative line)

- total length: 195 km
- number of tracks: 2
- traction: Kolín – Kutná Hora 3 kV DC (11 km)  
Kutná Hora – Brno 25 kV AC (184 km)
- max. length of train: 700 m
- axle load: D4/22,5 t
- max. speed: 120 km/h
- radio communication system: TRS (GSM-R in plan)

### Děčín – Lovosice – Praha (connecting line)

- total length: 130 km
- number of tracks: 2
- traction: 3 kV DC
- max. length of train: 600 m
- axle load: D4/22,5 t
- max. speed: 160 km/h
- radio communication system: GSM-R

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### Děčín – Nymburk – Kolín (connecting line)

- total length: 160 km
- number of tracks: 2
- traction: 3 kV DC
- max. length of train: 600 m
- axle load: D4, D3/22,5 t
- max. speed: 120 km/h
- radio communication system: GSM-R under construction

## A – ÖBB-I-GySEV

### border CZ/A – Gänsendorf – Wien Zvbf – border A/H

- total length: 156 km
- number of tracks: 2
- traction: 15 kV AC
- max. length of train: 650 m
- axle load: D4/22,5 t
- max. speed: 140 km/h
- ERTMS equipment: border CZ/A – Wien Zvbf until 12/2013  
Wien Zvbf – border A/H yes

### Gänsendorf – Marchegg – border A/SK (alternative line)

- total length: 21 km
- number of tracks: 1
- traction: diesel
- max. length of train: 650 m
- axle load: D4/22,5 t
- max. speed: 100 km/h
- radio communication system: GSM-R

### Wien Zvbf – Achau – Ebenfurt (alternative line)

- total length: 41 km
- number of tracks: 1/2
- traction: 15 kV AC
- max. length of train: 650 m
- axle load: D4/22,5 t
- max. speed: 140 km/h
- ERTMS equipment: no

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### Wien Zvbf – Baden – Wiener Neustadt – border A/H (alternative line)

- total length: 84 km
- number of tracks: Wien Zvbf – Wiener Neustadt 2  
Wiener Neustadt – border A/H 1
- traction: Wien Zvbf – Wiener Neustadt 15 kV AC  
Wiener Neustadt – border A/H diesel
- max. length of train: Wien Zvbf – Wiener Neustadt 650 m  
Wiener Neustadt – border A/H 300 m
- axle load: D4/22,5 t
- max. speed: Wien Zvbf – Wiener Neustadt 160 km/h  
Wiener Neustadt – border A/H 120 km/h
- ERTMS equipment: Wien Zvbf – Wiener Neustadt GSM-R  
Wiener Neustadt – border A/H no

### Gramatneusiedl – Wampersdorf (alternative line)

- total length: 14 km
- number of tracks: 1
- traction: 15 kV AC
- max. length of train: 650 m
- axle load: D4/22,5 t
- max. speed: 120 km/h
- ERTMS equipment: GSM-R

### Parndorf – Kittsee – border A/SK (alternative line)

- total length: 22 km
- number of tracks: 1
- traction: 15 kV AC
- max. length of train: 650 m
- axle load: D4/22,5 t
- max. speed: 160 km/h
- ERTMS equipment: GSM-R

### Wiener Neustadt – Ebenfurt (alternative line)

- total length: 13 km
- number of tracks: 2
- traction: 15 kV AC
- max. length of train: 650 m
- axle load: D4/22,5 t
- max. speed: 140 km/h
- ERTMS equipment: yes

### Ebenfurt – border A/H (alternative line), GySEV

- total length: 27 km
- number of tracks: 1
- traction: 25 kV AC

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- max. length of train: 650 m
- axle load: D4/22,5 t
- max. speed: 120 km/h
- ERTMS equipment: no

### SK – ŽSR

#### border CZ/SK – Kúty – Devínská Nová Ves – Bratislava – Rusovce – border SK/H

- total length: 103 km
- number of tracks: 2 (section Bratislava – border SK/H only 1)
- traction: 25 kV AC
- max. length of train: 690 m
- axle load: border CZ/SK – Kúty D3/22,7 t  
Kúty – border SK/H D4/22,7 t
- max. speed: 140 km/h
- ERTMS equipment: GSM-R Devínska Nová Ves – Bratislava - Rusovce

#### Bratislava – Nové Zámky – Štúrovo – border SK/H

- total length: 145 km
- number of tracks: 2
- traction: 25 kV AC
- max. length of train: 700 m
- axle load: D4/22,7 t
- max. speed: 140 km/h
- ERTMS equipment: GSM-R Bratislava – Sládkovičovo – Nové Zámky

#### Nové Zámky – Komárno – border SK/H

- total length: 26 km
- number of tracks: 1
- traction: 25 kV AC
- max. length of train: 620 m
- axle load: D3/22,7 t
- max. speed: 100 km/h
- ERTMS equipment: no

#### Bratislava – Dunajská Streda – Komárno (connecting line)

- total length: 100 km
- number of tracks: 1
- traction: diesel
- max. length of train: Bratislava – Dunajská Streda 625 m  
Dunajská Streda – Komárno 240 m
- axle load: Bratislava – Dunajská Streda C4/D4/22,7 t  
Dunajská Streda – Komárno D4/22,7 t
- max. speed: 80 km/h
- ERTMS equipment: no

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### Devínská Nová Ves – border SK/A (alternative line)

- total length: 3,6 km
- number of tracks: 1
- traction: diesel
- max. length of train: 700 m
- axle load: D4/22,7 t
- max. speed: 80 km/h
- ERTMS equipment: no

### Bratislava-Petrželka – border SK/A (alternative line)

- total length: 2,4 km
- number of tracks: 1
- traction: 15 kV AC
- max. length of train: 540 m electric loco/ 690 m diesel loco
- axle load: D4/22,7 t
- max. speed: 140 km/h
- ERTMS equipment: no

### Kúty – Trnava (alternative line)

- total length: 69 km
- number of tracks: 1
- traction: 25 kV AC
- max. length of train: 720 m
- axle load: D4/22,7 t
- max. speed: 80 km/h
- ERTMS equipment: no

### Trnava – Bratislava východ (alternative line)

- total length: 40,7 km
- number of tracks: 2
- traction: 25 kV AC
- max. length of train: 650 m
- axle load: D4/22,7 t
- max. speed: 160 km/h
- ERTMS equipment: ETCS

### Trnava – Galanta (alternative line)

- total length: 26,7 km
- number of tracks:

Trnava – Sered'	1
Sered' – Galanta	2
- traction: 25 kV AC
- max. length of train: 670 m
- axle load: D4/22,7 t



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- max. speed: 80 km/h
- ERTMS equipment: no

### H – MÁV, GySEV

#### Border SK/H – Hegyeshalom

- total length: 17,2 km
- number of tracks: 1
- traction: 25 kV AC
- max. length of train: 650 m
- axle load: C2
- max. speed: 100 km/h
- ERTMS equipment: no

#### border A/H – Győr – Komárom – Budapest – Szolnok – Gyoma – Békéscsaba – Lökösháza – border H/RO

- total length: 411,3 km
- number of tracks: 2 (Murony – border H/RO 42 km only 1 track)
- traction: 25 kV AC
- max. length of train: 750 m
- axle load:

border A/H – Budapest	C3
Budapest – border H/RO	C2
- max. speed:

border A/H – Budapest	160 km/h
Budapest – Békéscsaba	120 km/h
Békéscsaba – border H/RO	100 km/h
- ERTMS equipment:

border A/H – Budapest	ETCS L1
Budapest – border H/RO	no

#### Budapest – Cegléd – Szolnok (main line)

- total length: 95,7 km
- number of tracks: 2
- traction: 25 kV AC
- max. length of train: 750 m
- axle load: C3
- max. speed: 120 km/h
- ERTMS equipment: no

#### border A/H – Sopron (alternative line)

- total length: 6 km
- number of tracks: 1
- traction: 25 kV AC
- max. length of train: 650 m
- axle load: D4/22,5 t
- max. speed: 120 km/h
- ERTMS equipment: no

## RAIL FREIGHT CORRIDOR 7 - ORIENT CORRIDOR: INVESTMENT PLAN

### Sopron – Győr (alternative line)

- total length: 83,7 km
- number of tracks: 1
- traction: 25 kV AC
- max. length of train: 600 m
- axle load: C4/D4/22,5 t
- max. speed: 120 km/h
- ERTMS equipment: no

### border SK/H – Komárom

- total length: 3 km
- number of tracks: 1
- traction: 25 kV AC
- max. length of train: 750 m
- axle load: C2
- max. speed: 60 km/h
- ERTMS equipment: no

### border SK/H – Vác – Budapest

- total length: 68,4 km
- number of tracks: 2 (only 1 track Vác – Verőce, cause landslide)
- traction: 25 kV AC
- max. length of train: 750 m
- axle load: C2/C3
- max. speed: 120 km/h (border SK/H – Vác 100 km/h)
- ERTMS equipment: no

### Szajol – Püspökladány – Biharkeresztes – border H/RO (alternative line)

- total length: 123,5 km
- number of tracks: 2 (section Püspökladány – Biharkeresztes – border H/RO 57 km only 1)
- traction: 25 kV AC (section Püspökladány – Biharkeresztes – border H/RO diesel)
- max. length of train: 750 m
- axle load: Szajol – Püspökladány C3  
Püspökladány – border H/RO C2
- max. speed: Szajol – Püspökladány 120 km/h  
Püspökladány – border H/RO 100 km/h
- ERTMS equipment: no

### Vác – Aszód – Hatvan – Újszász (alternative line)

- total length: 102 km
- number of tracks: 1 (section Aszód – Hatvan; 15,9 km, 2 tracks)
- traction: 25 kV AC
- max. length of train: 700 m

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- axle load: C2
- max. speed: 80 km/h (Hatvan – Újszász 100 km/h)
- ERTMS equipment: no

### Ferencváros – Soroksári út – Soroksár Terminál (connecting line)

- total length: 12,4 km
- number of tracks: Ferencváros – Soroksári út 2  
Soroksári út – Soroksár Terminál 1
- traction: 25 kV AC
- max. length of train: 750 m
- axle load: Ferencváros – Soroksár D3  
Soroksár – Soroksár Terminál C3
- max. speed: Ferencváros – Soroksári út 80 km/h  
Soroksári út – Soroksár 100 km/h  
Soroksár – Soroksár Terminál 40 km/h
- ERTMS equipment: no

## RO – CFR

### Curtici – Arad – Deva – Simeria – Blaj – Brasov – Ploiesti – Bucuresti – Constanta

- total length: 873,74 km
- number of tracks: 2 (section border H/RO – Curtici only 1)
- traction: 25 kV AC
- max. length of train: border H/RO – Curtici 750 m  
Curtici – Simeria 720 m  
Simeria – Coslariu 675 m  
Coslaria – Brasov 600 m  
Brasov – Predeal 650 m  
Predeal – Brazi 640 m  
Brazi – Constanta 720 m
- axle load: border H/RO – Brazi C3  
Brazi – Constanta D4
- max. speed: border H/RO – Predeal 120 km/h  
Predeal – Brazi 85 km/h  
Brazi – Constanta 160 km/h
- ERTMS equipment: Predeal – Constanta ETCS L1

### Arad – Timisoara – Lugoj – Craiova

- total length: 381,59 km
- number of tracks: Arad – Filiasi 1  
Filiasi – Craiova 2
- traction: 25 kV AC
- max. length of train: Arad – Filiasi 720 m  
Filiasi – Craiova 750 m
- axle load: C3
- max. speed: Arad – Timisoara 120 km/h  
Timisoara – Orsova 140 km/h  
Orsova – Craiova 120 km/h
- ERTMS equipment: no

## RAIL FREIGHT CORRIDOR 7 - ORIENT CORRIDOR: INVESTMENT PLAN

### Craiova – Bucuresti (alternative line)

- total length: 213 km
- number of tracks: 2
- traction: 25 kV AC
- max. length of train: 750 m
- axle load: C3
- max. speed: 120 km/h
- ERTMS equipment: no

### Craiova – Calafat – border RO/BG

- total length: 108,35 km
- number of tracks: 1
- traction: diesel
- max. length of train: 600 m
- axle load: C3
- max. speed: 100 km/h
- ERTMS equipment: no

### Simeria – Gura Motrului (alternative line)

- total length: 206,46 km
- number of tracks: 1 (section Simeria – Petrosani and Rogojei – Gura Motru 2 tracks)
- traction: 25 kV AC
- max. length of train: 550 m
- axle load: C3
- max. speed: 95 km/h
- ERTMS equipment: no

### Videle – Giurgiu (alternative line)

- total length: 61,4 km
- number of tracks: 1
- traction: diesel
- max. length of train: 600 m
- axle load: C3
- max. speed: 100 km/h
- ERTMS equipment: no

### Bucuresti – Giurgiu – border RO/BG (alternative line)

- total length: 68,75 km
- number of tracks: 1/2
- traction: diesel
- max. length of train: Bucuresti – Giurgiu 740 m  
Giurgiu – border RO/BG 600 m
- axle load: C3

## RAIL FREIGHT CORRIDOR 7 - ORIENT CORRIDOR: INVESTMENT PLAN

- max. speed: Bucuresti – Giurgiu 100 km/h  
Giurgiu – border RO/BG 80 km/h
- ERTMS equipment: no

### border H/RO – Episcopia Bihor – Coslariu (alternative line)

- total length: 274,28 km
- number of tracks: 1/2
- traction: diesel (Baciu Triaj – Coslariu 25 kV AC)
- max. length of train: border H/RO – Episcopia Bihor 750 m  
Episcopia Bihor – Coslariu 600 m
- axle load: C3
- max. speed: 120 km/h
- ERTMS equipment: no

## BG – NRIC

### border RO/BG – Vidin – Brusarci – Mezdra – Sofia – Radomir – Kulata

- total length: 488,19 km
- number of tracks: 1/2
- traction: Vidin – Sofia – Kulata 25 kV AC  
Kulata – Border BG/GR diesel
- max. length of train: 530 m
- axle load: D4/23 t
- max. speed: 70 – 80 km/h
- ERTMS equipment: no

### Sofia – Septemvri – Plovdiv – Dimitrovgrad – Svilengrad (alternative line)

- total length: 299,4 km
- number of tracks: Sofia – Plovdiv – Skutare 2  
Skutare – Svilengrad 1
- traction: Sofia – Plovdiv – Dimitrovgrad 25 kV AC  
Dimitrovgrad – Svilengrad diesel
- max. length of train: 568 – 700 m
- axle load: D4/23 t
- max. speed: Sofia – Plovdiv 130 km/h  
Plovdiv – Dimitrovgrad 160 km/h  
Dimitrovgrad – Svilengrad 85 km/h
- ERTMS equipment: Plovdiv – Dimitrovgrad ETCS L1 tested

## RAIL FREIGHT CORRIDOR 7 - ORIENT CORRIDOR: INVESTMENT PLAN

### GR – OSE

#### border BG/GR – Promahonas – Thessaloniki – Domokos – Tithorea – Inoi – SKA – Athina – Piraeus

- total length: 658,3 km
- number of tracks: 2 (section border BG/GR – Thessaloniki, Domokos – Lianokladi – Tithorea only 1)
- traction: diesel (section Thessaloniki – Domokos and SKA – Thriassio 25 kV AC)
- max. length of train:

border BG/GR – Thessaloniki	641 – 738 m
Thessaloniki – Larissa	653 – 737 m
Larissa – Tithorea	710 – 750 km/h
Tithorea – Inoi	488 – 710 m
Inoi – SKA	700 m
SKA – Athens	500 m
- axle load: C4/20 – 22,5 t
- max. speed (for freight) :

border BG/GR – Thessaloniki	80 km/h
Thessaloniki – Domokos	100 km/h
Domokos – Tithorea	80 – 100 km/h
Tithorea – Inoi	80 – 100 km/h
Inoi – SKA – Athens	80 – 100 km/h
- ERTMS equipment: no

#### Thessaloniki (rail way yard) – Thessaloniki Port (connecting line)

- total length: 5,5
- number of tracks: 2
- traction: diesel
- axle load: C4
- max. speed: 80 km/h
- ERTMS equipment: no

#### Larisa – Volos (connecting line)

- total length: 61
- number of tracks: 1
- traction: diesel
- max. length of train: 500 m
- axle load: C4/20 t
- max. speed: 80 – 100 km/h
- ERTMS equipment: no

#### Athina RS – Piraeus (connecting line)

- total length: 8,8
- number of tracks: 2
- traction: diesel
- max. length of train: 700 m
- axle load: C4/22,5 t
- max. speed: 80 km/h
- ERTMS equipment: ETCS L1, GSM-R under testing

## 2. List of bottlenecks

### CZ – SŽDC

- **section Praha – Česká Třebová:** low capacity
- **section Lanžhot – Kúty:** lowered axle load
- **Kutná Hora:** signalling track circuits with frequency of 25 Hz
- **junction Brno:** low capacity, slow speed

### A – ÖBB-I

- **section Wiener Neustadt – Sopron:** not electrified, a loco change is necessary, short passing tracks in stations

### SK – ŽSR

- **section border CZ/SK – Bratislava:** bridges in section Veľké Leváre – Zohor (reduced speed – only 80 km/h)
- **station Devínská Nová Ves:** lack of station tracks
- **junction Bratislava:** slow speed, signalling track circuits with frequency of 25 Hz, tunnels in section Bratislava-Lamač – Bratislava hl.st. (often maintenance, mostly only 1 line track available, lack of capacity);
- **section Bratislava – Komárno** not electrified one track line, lack of capacity
- **section Štúrovo – border SK/H** reduced speed in Kamenica n. Hronom (40 km/h)

### H – MÁV, GySEV

- **section Sopron – Wiener Neustadt:** not electrified, a loco change is necessary
- **section Murony – border H/RO:** only 1 track
- **section border SK/H – Hegyeshalom:** lowered axle load
- **section Budapest – Lököshaza:** lowered axle load
- **section Budapest - Cegléd - Szolnok:** lowered axle load
- **section border SK/H – Vác** only 1 track in section Szob – Vác, second track is out of order due to a landslide
- **section Vác – Ferencváros:** manual switching in station Rákospalota-Újpest
- **sections border SK/H - Hegyeshalom, border SK/H – Komárom, and Budapest – Lököshaza:** without ERTMS
- **section Vác – Hatvan – Újszász:** moderate ramp, only 1 700 tons possible with standard locos (1116). Very old safety installation on line between Vác – Hatvan, there must be 2 persons on the loco all the time! Using alternative route Vác – Budapest – Cegléd – Szolnok instead of the main line.

### RO – CFR

- **section border H/RO – Curtici:** only 1 track
- **sections Videle – border RO/BG:** not electrified, a loco change is necessary
- **Craiova – Calafat:** only 1 track, not electrified, a loco change is necessary
- **section Calafat (CFR) – Vidin (NRIC):** only 1 track, connection of stations on Romanian and Bulgarian side is provided to be put in operation in 2013

## RAIL FREIGHT CORRIDOR 7 - ORIENT CORRIDOR: INVESTMENT PLAN

### BG – NRIC

- **section border RO/BG – Vraca:** only 1 track
- **section Calafat (CFR) – Vidin (NRIC):** connection of stations on Romanian and Bulgarian side through the bridge over Danube - only 1 track
- **section Dimovo-Oreshec and Dimovo-Sracimir (line section Vidin–Brusartsi):** slow speed parameters (max gradients 29‰ / 28‰)
- **section Brusartsi-Medkovec and Mezdra-Vraca (line section Brusartsi – Mezdra):** slow speed parameters (max gradients 24‰ / 18‰)
- **section Zverino-Lakatnik and Iliyanci-Kurilo (line section Mezdra - Sofia):** slow speed parameters (max gradients 12 ‰/ 3‰)
- **Sofia – border BG/GR:** only 1 track (except section Sofia-Zaharna fabrika)
- **section Hrabursko-Razmenna and Batanovci-Razmenna (railway section Sofia - Radomir):** slow speed parameters (max gradients 13‰ / 16‰)
- **section Gulubnik-Delyan and Dyakovo-Delyan (line section Radomir - Kulata):** slow speed parameters (max gradients 15‰ / 22‰)

### GR – OSE

- **sect. border BG/GR – Thessaloniki:** not electrified, partially upgraded from Thessaloniki to Strimonas, poor geometric technical characteristics at the section Strimonas – Promahonas
- **section Domokos – Tithorea:** only 1 track, not electrified, low capacity, slow speed
- **section SKA – Inoi:** low capacity



### 3. Volume of effect of each bottleneck

There are critical effects at the majority bottlenecks from the corridor competitiveness viewpoint:

#### CZ – SŽDC

- **section Praha – Česká Třebová:** low capacity makes impossible to allocate good-quality paths
- **section Lanžhot – Kúty:** lowered axle load has critical effect from the competitiveness viewpoint, it is a key parameter for the combined transport
- **Kutná Hora:** signalling track circuits with frequency of 25 Hz – it has a critical effect for modern rolling-stock operation
- **junction Brno:** slow speed, low capacity has critical effect for suburban transport

#### A – ÖBB-I

- **section Wiener Neustadt – Sopron:** not electrified, a loco change is necessary

#### SK – ŽSR

- **junction Bratislava:** slow speed, signalling track circuits with frequency of 25 Hz - it has a critical effect for modern rolling-stock operation, it reduces competitiveness for container trains

#### H – MÁV, GYSEV

- **section Sopron – Wiener Neustadt:** not electrified, a loco change is necessary, it has not critical effect, it is an alternative route only
- **section Murony – border H/RO:** only 1 track – according to the TEN-T Core studies in preparation the corridor should have 2 tracks, it could have critical effect on capacity in the case of further growth of the freight transport (speed 30 km per hour)
- **section border SK/H - Hegyeshalom:** lowered axle load
- **section Budapest – Lököshaza:** lowered axle load
- **sections border SK/H - Hegyeshalom, border SK/H – Komárom, and Budapest – Lököshaza:** without ERTMS

#### RO – CFR

- **section border H/RO – Curtici:** only 1 track – according to the TEN-T Core studies in preparation the corridor should have 2 tracks, it could have critical effect on capacity in the case of further growth of the freight transport (speed 30 km per hour)
- **sections Videle – border RO/BG:** only 1 track, not electrified, a loco change is necessary
- **Craiova – Calafat:** only 1 track, not electrified, a loco change is necessary

## RAIL FREIGHT CORRIDOR 7 - ORIENT CORRIDOR: INVESTMENT PLAN

- **section Calafat (CFR) – Vidin (NRIC):** connection of stations on Romanian and Bulgarian side is provided to be put in operation in 2013 , only one track
- **general issue in Romania:** slow speed parameters that reduce the competitiveness of the corridor

### BG – NRIC

- **section border RO/BG – Vraca:** only 1 track, – according to the TEN-T Core studies in preparation the corridor should have 2 tracks, it could have critical effect on capacity in the case of further growth of the freight transport
- **section Calafat (CFR) – Vidin (NRIC):** connection of stations on Romanian and Bulgarian side through bridge over Danube - only 1 track - it reduces the competitiveness of the corridor
- **section Dimovo-Oreshec and Dimovo-Sracimir (line section Vidin–Brusartsi):** slow speed parameters (max gradients 29‰ / 28‰)  
- it reduces the competitiveness of the corridor
- **section Brusartsi-Medkovec and Mezdra-Vraca (line section Brusartsi – Mezdra):** slow speed parameters (max gradients 24‰ / 18‰)  
- it reduces the competitiveness of the corridor
- **section Zverino-Lakatnik and Iliyanci-Kurilo (line section Mezdra - Sofia):** slow speed parameters (max gradients 12‰ / 3‰)  
- it reduces the competitiveness of the corridor
- **Sofia – border BG/GR:** only 1 track (excepting section Sofia-Zaharna fabrika),  
- should have 2 tracks – also critical effect
- **section Hrabursko-Razmenna and Batanovci-Razmenna (line section Sofia - Radomir):** slow speed parameters (max gradients 13‰ / 16‰)  
- it reduces the competitiveness of the corridor
- **section Gulubnik-Delyan and Dyakovo-Delyan (line section Radomir - Kulata):** slow speed parameters (max gradients 15‰ / 22‰)  
- it reduces the competitiveness of the corridor
- **section Kulata – border BG/GR:** not electrified, a loco change is necessary

### GR – OSE

- **sect. border BG/GR – Thessaloniki:** not electrified, partially upgraded from Thessaloniki to Strimonas, poor geometric technical characteristics at the section Strimonas – Promahonas - it reduces the competitiveness of the corridor
- **section Domokos – Tithorea:** only 1 track, not electrified, low capacity, slow speed - it reduces the competitiveness of the corridor
- **section SKA – Inoi:** low capacity - it reduces the competitiveness of the corridor

## 4. List of necessary developments

### CZ – SŽDC

- section Praha – Česká Třebová: increasing capacity
- section Lanžhot – Kúty: increasing allowed axle load
- Kutná Hora: ensuring interoperability

### A – ÖBB-I

- section Wiener Neustadt – Sopron: electrification

### SK – ŽSR

- junction Bratislava: increasing speed, ensuring interoperability

### H – MÁV, GYSEV

- section Sopron – Wiener Neustadt: electrification
- section Murony – border H/RO: increasing capacity
- section border SK/H – Hegyeshalom: increasing allowed axle load
- ERTMS L2 installation in all sections

### RO – CFR

- section border H/RO – Curtici: modernization double track, increasing capacity
- sections Videle – border RO/BG: electrification
- Craiova – Calafat: electrification
- section Calafat (CFR) – Vidin (NRIC): commissioning of the new rail line on the bridge over Danube

### BG – NRIC

- section border RO/BG – Vraca: modernization, increasing capacity
- section Dimovo-Oreshec and Dimovo-Sracimir (line section Vidin–Brusartsi): modernization, increasing speed
- section Brusartsi-Medkovec and Mezdra-Vraca (line section Brusartsi – Mezdra): modernization, increasing speed
- section Zverino-Lakatnik and Iliyanci-Kurilo (line section Mezdra - Sofia): modernization, increasing speed
- Sofia – border BG/GR: increasing capacity& speed
- section Calafat (CFR) – Vidin (NRIC): commissioning of the new rail/road bridge over Danube -
- section Hrabursko-Razmenna and Batanovci-Razmenna (line section Sofia - Radomir): modernization, increasing speed
- section Gulubnik-Delyan and Dyakovo-Delyan (line section Radomir - Kulata): modernization, increasing speed
- section Kulata – border BG/GR: modernization and electrification

## RAIL FREIGHT CORRIDOR 7 - ORIENT CORRIDOR: INVESTMENT PLAN

### GR – OSE

- **sect. border BG/GR – Thessaloniki:** electrification and modernization
- **section Domokos – Tithorea:** double track, increasing capacity, electrification, increasing speed
- **section SKA – Inoi:** modernization, increasing capacity

## 5. List of developments being under progress or preparation

### CZ – SŽDC

#### **Track optimisation of the line Praha-Bubeneč – Praha-Holešovice**

- construction under way, time of finishing 2015
- the construction's objective is ensuring obstruction track clearance UIC GC, track load class UIC D4, track layout adaptations, eliminating local speed drops especially within the district of Praha-Bubeneč Railway Station, contact line and safety installations reconstruction

#### **Modernisation of section Praha-Běchovice – Úvaly**

- the construction project is currently finished, preparations for a contractor selection are under way, estimated construction start in the 2<sup>nd</sup> half of 2013
- works deal with reconstruction of the section Praha-Běchovice, district Blatov – Úvaly including reconstruction of the Úvaly Railway Station, contact line and safety installations modernisation included
- the construction's objective is ensuring obstruction track clearance UIC GC, track load class UIC D4, track layout adaptations, eliminating local speed drops and increasing speed up to 160 km/h

#### **Modernisation of the line Choceň – Ústí nad Orlicí**

- in stage of preparation
- the construction should deal with relaying of the current line led in totally inappropriate conditions (speed only 80 – 85 km/h)

#### **Passage through the junction Ústí nad Orlicí**

- construction under way, time of finishing 2015
- the construction's objective is eliminating local speed drops to 70 km/h, ensuring obstruction track clearance UIC GC and track load class UIC D4, modernisation of safety and communications equipment and the conduct line

#### **Reconstruction of junction point Česká Třebová**

- the construction will deal with local speed drops in the Česká Třebová junction district down to 60 km/h

#### **Junction point Brno**

- in stage of preparation
- the junction reconstruction must provide sufficient capacity for suburban transport with the South Moravia Region, rigorous separation of passenger and freight transport passing through the junction and eliminating current speed drops down to 30 km/h

#### **Reconstruction of junction point Břeclav, Construction No 2**

- construction under way, time of finishing 2015
- part of the works is reconstruction of the Railway Station Břeclav middle headpiece, finishing the construction of the station safety and communications equipment Category 3

## **RAIL FREIGHT CORRIDOR 7 - ORIENT CORRIDOR: INVESTMENT PLAN**

- construction's end will i.a. eliminate current speed limitations to 40 km/h

### **ETCS Praha – Břeclav**

- the construction deals building new ETCS L2, works under way

### **Railway Station Kutná Hora, replacement of 25 Hz track circuits**

- currently in stage of project preparation, expected realisation in 2013
- the construction's objective is replacing current impulse track circuits using a 25 Hz frequency with new track circuits with a 275 Hz frequency and axle counting installation
- after realisation, the construction will enable operation of locomotives Siemens ES64U4, ES64F4-50 Hz and ŠKODA 109E without limitation through the Kutná Hora Railway Station

### **Reconstruction of tracks in section Havlíčkův Brod – Brno**

- in stage of preparation, partly under construction
- the construction includes reconstruction of tracks incl. increasing speed limit in part sections of section Havlíčkův Brod – Brno and putting into standardised state according to relevant international agreements

Investments undertakings currently in stage of planning and preparation deal mostly with modernisation and reconstruction of current unreconstructed line sections within the “corridor” constructions and their putting into standardised state according to relevant international agreements. Above-mentioned bottlenecks in the railway infrastructure operated by SŽDC are therefore eliminated in part only. This concerns especially eliminating speed limitations while passing through the Ústí nad Orlicí junction point and operating limitations for above-mentioned types of locomotives while passing through the Kutná Hora Railway Station. Insufficient capacity of the line section Praha – Česká Třebová is de facto not solved within investment undertakings mentioned above. From all constructions mentioned above, only the planned ETCS L2 construction could contribute to a partial capacity increase of this section but we can assume by no means that insufficient capacity problems could be solved with this system's construction.

## **A – ÖBB-I**

### **border CZ/A – Süssenbrunn**

- construction deals with increasing capacity of this section including speed increase

### **Electrification Wiener Neustadt – Loipersbach-Schattendorf – border A/H**

- construction deals with electrification of the borderland section Wiener Neustadt – Loipersbach-Schattendorf – Hungary state border (2025+)

### **Electrification of the line Gänserndorf – Marchegg – border A/SK**

- electrification of this border crossing between ŽSR and ÖBB-I (postponed)

### **Modernisation of safety installations**

- with use of investments package, ETCS L2 and GSM-R (ETCS L1 reconstruction onto ETCS L2 on the section Wien – Nickelsdorf – Hungary state border) will be built / finished

Within investments planned by ÖBB-I a bottleneck will be eliminated by a still non-electrified section Wiener Neustadt – Loipersbach-Schattendorf – border A/H. The term of this construction's realisation is still not known however.

## **SK – ŽSR**

### **Reconstruction of junction point Bratislava**

- the construction will deal with eliminating speed drops in the Bratislava Main Railway Station district.
- replacing track circuits with a 25 Hz frequency by axle counting installations, this adaptation will enable operation of ÖBB TAURUS locomotives in the junction point

### **Electrification of the line Devínská Nová Ves – Marchegg**

- electrification of this border crossing between ŽSR and ÖBB-I is being prepared in cooperation with ÖBB-I

### **Reconstruction of safety installations**

- GSM-R and ETCS L2 will be built within reconstruction of safety installations on ŽSR lines incorporated into RFC 7

Within planned investments on RFC 7 lines, ŽSR deals mostly with building new safety equipment. Partial construction works in the Bratislava junction should eliminate limiting infrastructure elements causing speed drops while passing through Bratislava Main Railway Station as well as operation limitations for TAURUS locomotives.

## **H – MÁV, GYSEV**

### **Biatorbágy – Tata; Szolnok – Szajol; Gyoma - Mezöberény**

- track reconstruction in sections mentioned above with speed increase up to 60 km/h

### **Murony – Békéscsaba – Lököshaza – border H/RO**

- construction of second track, increasing line section capacity and speed up to 160 km/h

### **Győr – Csorna; Fertőszentmiklós – Sopron (GySEV)**

- construction of second track, increasing line section capacity and speed up to 160 km/h

## **RAIL FREIGHT CORRIDOR 7 - ORIENT CORRIDOR: INVESTMENT PLAN**

### **Increasing allowed axle load on the section Gyoma - Lököshaza**

- the construction's objective is increasing allowed axle load from 21.0 tonnes to 22,5 tonnes

### **Reconstruction of safety installations**

- ETCS L2 will be built on RFC 7 lines equipped with a national control-command EVM 120 system within the construction; on lines already equipped with ETCS L1 these systems will be adopted to ETCS L2
- **GSM-R system is under preparation covered all of the sections**

Current MÁV and GySEV investment plans deal mostly with eliminating above-mentioned limiting infrastructure elements by building a second track on the section Murony – Romania state border and electrification of the borderland section Austria state border - Sopron. Limitation of maximum axle load allowed on the section Slovakia state border - Hegyeshalom still remains.

## **RO – CFR**

### **H/RO – Curtici, Arad – Timisoara, Orsova - Filiasi**

- construction of second track on above-mentioned sections where the Feasibility studies justify this solution, increasing the section's capacity and speed up to 160 km/h for passenger trains

### **Electrification of the line Craiova – Calafat**

- the construction deals with electrification of the line section in direction to Bulgaria state border including its reconstruction and speed increase up to 160 km/h for passenger trains

### **Calafat – border RO/BG**

- a totally new electrified line 3.6 km long for a speed of 160 km/h will put in operation in 2013

### **Electrification Videle – Giurgiu – border RO/BG within the modernisation of the Corridor IX**

### **Electrification Baciú Triaş – Ciucea – Oradea – Episcopia Bihor – border RO/H**

### **Poieni – Oradea**

- a second track will be completed to current single-track sections within construction adaptations

### **RFC 7 Infrastructure Modernization**

- reconstruction of water channels, bridges, tunnels and conduct line will be carried out within investment undertakings, adaptations for speed increase up to 160 km/h for the passengers trains and 120 km/h for the freight trains will be made, local limitations of allowed axle load will be eliminated (22,5 t/axle will be implemented uniformly) and GSM-R and ETCS L2 will be built



CFR investment undertakings deal mostly with modernisation and reconstruction of current unsatisfactory infrastructure and its putting into standardised state according to relevant international agreements. It also deals with eliminating limiting elements consisting in single-track sections border H/RO – Curtici, Arad – Timisoara and Orsova – Filiasi where justified and electrification of the borderland section Videle – Giurgiu – border RO/BG and Craiova – Calafat including construction of a new cross-border section Calafat/CFR – Vidin/NRIC (not included in NRIC investments plan however!). Moreover CFR assumes finishing electrification of the line Cluj-Napoca – Episcopia Bihor – border RO/H, however MAV does not take account of electrification on this border crossing, any more than electrification of the borderland section Ruse – border RO/BG on the NRIC side which should be connected however to above-mentioned electrification Videle – Giurgiu – border RO/BG on the Romanian side.

### **BG – NRIC**

#### **Modernization of the railway line Vidin-Sofia**

- The investment project envisages: modernization of the infrastructure, superstructure, culverts, bridges, contact line, power supply, civil engineering, etc. introducing ERTMS / ETCS level 1, CTC (centralised traffic control), GSM-R, environment measures (noise barriers, etc.), the maximum operational speed 160 km/h for passenger trains and 120 km/h for freight.
- Stage I of project preparation is finished. Results – the feasibility study, financial and economic analysis, cost-benefit analyses and preliminary design, EIA.
- Stage II of project preparation is currently under way. Results expected - Elaboration of detailed spatial plans and Technical design, Assessment for compliance with the essential requirements towards constructions, Assessment for compliance with the interoperability requirements, Implementation of an archeological investigations.

#### **Modernization of Sofia-Pernik-Radomir Railway Line**

- The investment project envisages: modernization of the infrastructure, superstructure, culverts, bridges, contact line, power supply, civil engineering, etc. introducing ERTMS / ETCS level 1, CTC (centralised traffic control), GSM-R, the maximum operational speed 160 km/h for passenger trains and 120 km/h for freight
- Stage I of project preparation is finished. Results – feasibility study, financial and economic analysis, cost-benefit analyses and preliminary design
- Stage II of project preparation is currently under way. Results expected – Elaboration of detailed spatial plans and Technical design, Assessment for compliance with the interoperability requirements, Assessment for compliance with the essential requirements towards constructions, Implementation of an archeological investigations

### Modernization of the railway line Radomir – Kulata

Stage I of project preparation is currently under way. Results expected – feasibility study, financial and economic analysis, cost-benefit analyses and preliminary design for the modernization of the section, EIA, geological survey, archeological investigations.

### GR – OSE

#### Electrification and Upgrade of line Border GR/BG – Promahonas – Strimonas – Thessaloniki

- constructions will deal with the upgrade of certain sections and the complete electrification of the line Thessaloniki – Bulgaria state border. Planed speed up to 160 km/h (100 for freight trains) on the section Strimonas – Thessaloniki and up to 100 km/h (80 for freight trains) on the section Strimonas – border BG/GR.

#### Construction of the line Domokos – Lianokladi – Tithorea

- The ongoing project involves the construction of a new double-track High Speed Railway Line with electrification, ETCS level 1 and GSMR, for speeds of 160 – 200 km/h, in a totally new path, replacing the mountainous part of the existing single line of length 122 km with a length of 106 km. Planned max speed for freight trains, over 100 km/h

#### Electrification and Upgrade of line Inoi – SKA

- The railway line needs to be upgraded. Only electrification system has been installed. The upgrading works planned to be completed by 2017. The ERTMS system planned to be installed by 2015
- The planned project involves the complete renovation of the double railway line, other than those already renovated stations. Also includes the enlargement of some structures in specific parts of the line, reconstruction or repair of problematic embankments and slopes and extensive work in the area of Agios Stefanos (refurbishment of 3 tunnels in order to allow the circulation of freight wagons of enlarged gauge), construction of passing loops etc, in order to increase line capacity. Planned max speed for freight trains 100 km/h.

#### Construction of the line Thriassio – Ikonio (Pireaus Port)

- The new railway line equipped with signalling and telecommunications systems has been completed. The remaining construction deals with building GSM-R. Max speed for freight trains 90 km/h

#### Modernisation of safety installations

- the construction deals with building GSM-R and ETCS L1

#### Electrification and Upgrade of line Larissa – Volos

- Planned upgrade, including Electrification of the line, for max speed of freight trains up to 100 km/h. Expected year of implementation 2015

### **Thriassio Complex (Marshalling yard and freight Station)**

- The Operational Phase A of Thriassio Pedio has been completed. The Operational Phase B which mainly includes : the trackworks for the remaining railway lines inside the Complex, the installation of signalling, telecommanding and electrification systems on all tracks, the procurement of gantry cranes and mechanical equipment and the construction of building projects required to carry out the operations of the Complex is planned to be completed by 2015.

Within investments into railway infrastructure, OSE plans to modernise the limiting section border BG/GR – Thessaloniki including electrification, construction of a totally new line on the limiting section Domokos – Tithorea and electrification including speed increase on the limiting section Tithorea – Inoi – SKA.

### **6. Deployment Plan of ERTMS**

The RFC 7, defined in accordance with the EU Regulation 913/2010, is based on the former ETCS Corridor E that was defined by the TSI CCS CR (2009/561/ES) and enlarged by the south branch via Bulgaria to Greece.

In the establishing process of the RFC 7 was agreed that the ETCS Corridor E project structures will be included in the organization structure of the RFC 7. In this process the ETCS Corridor E Management Committee was transformed to the ERTMS Deployment WG of the RFC 7 organization structure and the new companies that represent the south branch of the RFC 7 were joined into the WG.

#### **The ERTMS Deployment WG**

- is a supporting instrument for the Governance structure of the Rail Freight Corridor, it prepares data and documents for making decisions and realizes these decisions
- the basic task is to implement the ETCS project plan and to coordinate all other activities in this domain so as to improve the quality of the RFC
- is in charge of creating the organizational, technical and operational conditions so that ETCS on the RFC can be entirely operational on the whole stretch in time and for this reason it has to set up Expert teams and ad hoc groups if necessary
- ensures that the RUs are involved in the project and their requirements are considered in the implementation plans

#### **Statute of the ERTMS Deployment WG**

The ERTMS Deployment WG provides for the RFC Governance structure the organization of following activities in the area of the ERTMS deployment on the RFC 7 lines:

- monitoring of the preparation and the realization of the investment plans of involved companies through an Annual Status Report
- exchange of the information among the involved IM's and RU's in the ERTMS deployment domain for the ensuring of the ERTMS deployment coordination on the corridor level
- establishing the expert teams for technical tasks and operational rules tasks and setting up ad hoc groups during the life cycle of the project – if necessary
- the negotiation on technical and operational rules tasks in frame of the RFC by expert teams (ad hoc groups) on the corridor level and on the bilateral level for the specific cross border sections
- the contact to the ERTMS Users Group (EUG) for the negotiation of selected tasks for the cross corridor coordination based on MoU signed between the EUG and the ETCS Corridor E Management Committee in 2008

### Activities and coordination issues of the WG

- Since the beginning of the ETCS Corridor E project more bilateral technical consultations have taken place between SZDC and ZSSK Cargo, MÁV, CFR, ZSR
- 2010 - creation of “Technical Requirements for Technical Requirements for Development of ERTMS/ETCS L2 on the Czech part of Corridor E” (TR)
- 2011 - discussion of the TR with all ETCS Corridor E members and EUG, the consolidated version is put at the disposal of all corridor members
- The representatives of the ERTMS Deployment WG participated in the meeting of the Traffic Management WG held in Prague on 28th August 2012. The main discussed task was the necessity for close cooperation and good communication between both WG
- On 16th and 17th October 2012 there was a common meeting of the Czech representatives of the ERTMS Deployment WG and the ERA ERTMS Operational Feedback WP in Prague. The main discussed task was the possible harmonisation of the ETCS Operational rules and information on technical solutions used in the Czech Republic
- On 23rd November 2012 a bilateral meeting was organized between the ÖBB and the SŽDC and their ETCS suppliers so as to start the cooperation for the technical solution of the interconnection of both ETCS L2 systems in the cross border section CZ – AT

### Implementation of the ETCS on the RFC 7 line sections

#### CZ - SŽDC

The ETCS L2 trackside v. 2.3.0d on the Czech corridor south branch from the state border SK/AT – Břeclav – Česká Třebová – Kolín (277 km) is under construction. The completion of this section is set for the end of 2014.

The ETCS L2 trackside v. 2.3.0d on the Czech corridor north branch from the state border DE – Dolní Žleb – Děčín – Praha Libeň – Kolín (215 km): the preparatory documentation is being elaborated. The realization of this section depends on finishing modernization and optimisation works on this section (see chapter 5 of Investment plan). The realization is expected 2014 – 2017.

#### AT – ÖBB

The ETCS L2 trackside v. 2.3.0d on the Austrian corridor part from the state border CZ (Břeclav) – Vienna (78 km) is under construction. The completion of this section is set for the end of 2013.

The ETCS L1 trackside v. 2.2.2 on the Austrian corridor part from Vienna - Border HU (Hegyeshalom) (68 km) is in operation. An upgrade of system version or level is planned for the future (after 2015).

### SK – ŽSR

The main path of the Slovak corridor part in the sections border CZ (Breclav) - Kutý - Devínska N. Ves (58 km) and Devínska N. Ves - Junction Bratislava Rusovce – (HU Rajka) (63 km) is prepared to be equipped by ETCS L2 v. 2.3.0d. The preparatory documentation for these projects is under elaboration. The realization is expected in 2015 – 2016.

### HU – MÁV

The section state border AT - Hegyeshalom – Budapest (198 km) is already equipped by ETCS L1 v. 2.2.2 and in operation. An upgrade to ETCS L2 is planned after 2015.

The section Budapest - Szajol - Lőkösháza – state border RO (Curtici) (225 km) is prepared to be equipped by ETCS L2 v. 2.3.0d by 2015, the tender process is in preparation.

Budapest (Bp.-Kelenföld - Bp. Ferencváros) – the intention is to equip this part of the junction Budapest by ETCS L2 v. 2.3.0d by 2014, the tender process is in preparation.

### RO – CFR

In the section Campina – Bucharest (92 km) ETCS L1 v. 2.3.0d is in operation.

The sections Predeal – Câmpina (53 km) and Bucharest – Constanta (225 km) are under construction. The ETCS L1 v. 2.3.0d will come into operation by 2013.

The section Lőkösháza – Predeal (510 km) will be equipped by ETCS L2 v. 2.3.0d step by step – the start in 2015. The whole section will come into operation by 2020.

### BG – NIRC

On the section Plovdiv – Dimitrovgrad the ETCS L1 v. 2.3.0d is already installed and tested. ETCS L1 v. 2.3.0d is under construction also on the section Dimitrovgrad – Svilengrad – Turkish/Greek borders (83 km). The commercial operation will start together on the whole line Plovdiv – Svilengrad – Turkish/Greek border in 2014.

The ETCS L1 v. 2.3.0d is under construction on the sections Septemvri – Plovdiv (53 km). The operation will start by 2015.

### GR – OSE

ETCS L1 v. 2.3.0d is under construction on the section Thriasio – Ikonio (20 km), the commercial operation will start in 2014.

ETCS L1 v. 2.3.0d is under construction also on the section SKA - Promachonas (541 km), the commercial operation will start in 2015.

## **RAIL FREIGHT CORRIDOR 7 - ORIENT CORRIDOR: INVESTMENT PLAN**

This overview shows that the migration process to the ETCS trackside on the main path of the RFC 7 lines has started. There is a very good chance to operate under ETCS supervision on more cross-border sections between neighbour member states after 2015.

The aim is to bring the ETCS deployment in a routine process for decreasing development works and on side testing by the exchange of experiences and the reuse of proved solutions. Then this can accelerate the deployment process and decrease the investment costs.

### **Implementation of the ETCS on-board**

The situation in the equipping of vehicles by ETCS on-board units is shown in the table 6. 2 of Investment plan)

There is a very well managed Austrian project for equipping about 200 locos that will be completed in this year. This project gained the co-financing from the special budget of TEN-T fund for acceleration of ETCS deployment.

The equipping of the vehicles by ETCS is for RUs more difficult from the financial view. This process will be very slow in the future without the possibility of co-financing the vehicle equipping for RUs.

**The Annual Status Report of the ETCS deployment brings the whole overview of the ETCS on the RFC 7- see tables 6.1, 6.2 and 6.3 of the Investment plan.**

# RAIL FREIGHT CORRIDOR 7 - ORIENT CORRIDOR: INVESTMENT PLAN

## 6.1 Table: ERTMS Deployment - Annual Status Report Trackage (2013)

ERTMS Annual Status Report 2013 : Trackside											
Member State	Line section	Length (km)	Tracks	Existing CCS	ETCS level			Realization		Status	Annex Number
					1	2	3	Start	End		
DE	Dresden Hbf-Schöna Grenze-(CZ)	51	2	PZB				-	2020	Out of time scope	-
CZ	(D)-Dolní Žleb-Děčín hl.n.-Praha Libeň-Kolín	201	2	LS				2014	2017	Under preparation	TS-CZ-1
CZ	Kolín-Breclav-Border AT/SK	277	2	LS				2012	2014	Under realization	TS-CZ-2
CZ	Brno-H.Brod-Kolín-Lysá n.L.-Ústí n. L. Střekov-Děčín-(DE)	355	2	LS				-	2020	Out of time scope	-
AT	(CZ Breclav) - Vienna	78	2	PZB				2011	2014	Under realization	TS-AT-1
AT	Vienna - Border HU (Hegyeshalom)	68	2	PZB				-	-	In operation	-
SK	Border CZ (Breclav) - Kutý - Devinska N. Ves	58	2	LS				2016	2020	Under preparation	TS-SK-1
SK	Devinska N. Ves - Junction Bratislava Rusovce – (HU Rajka)	63	2	LS partly				2016	2020	Under preparation	TS-SK-2
SK	Bratislava - Nove Zamky - Sturovo – (HU Szob)	143	2	LS partly				2018	2021	Out of time scope	-
SK	Nove Zamky - Komárno – (HU)	33	1	Without				2018	2021	Out of time scope	-
HU	(AT) - Hegyeshalom – Budapest upgrade to L2	198	2	EVM				-	-	In operation	-
								-	after 2018	Out of time scope	-
HU	(SK) - Szob - Budapest	63	2	EVM				-	2020	Out of time scope	-
HU	Budapest - Szajol - Lőkősháza - (RO Curtici)	225	2	EVM				2013	2015/2016	Tender under evaluation	TS-HU-1
HU	Budapest (Kelenföld - Ferencváros)	8	2	EVM				2013	2015	Tender under	TS-HU-2



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									evaluation	
HU	Border SK - Komárom	3	1	Without			-	2020	Out of time scope	-
HU	Border SK - Hegyeshalom (GYSEV)									
RO	Lököshaza - Predeal	510	2	INDUSI			2012	2020	Under construction	TS-RO-1
RO	Predeal - Câmpina	53	2	INDUSI			2010	2013	Under construction	TS-RO-2
RO	Câmpina - Bucharest	92	2	INDUSI			-	-	In operation	-
RO	Bucharest - Constanta	225	2	INDUSI			2010	2013	Under construction	TS-RO-3
RO	Curtici - Craiova - Bucharest	607	2	INDUSI			2015	2020	Out of time scope	-
BG	Vidin-Medkovets-Ruska Byala (Mezdra)	182	1/2	Without			2015	2020	Out of time scope	-
BG	Mezdra - Sofia	85	2	Without			-	after 2020	Out of time scope	-
BG	Sofia – Pernik - Radomir	48+48	1/2	Without			2015	2020	Out of time scope	-
BG	Radomir – Kulata - GR	161	2	Without			after	2020	Out of time scope	-
BG	Sofia - Septemvri	103	2	EBICAB 700			2015	2020	Out of time scope	-
BG	Septemvri - Plovdiv	53	2	EBICAB 700			2012	2015	Under realization	TS-BG-1
BG	Plovdiv - Dimitrovgrad	78	1/2	Without			2007	2011	Installed and tested	TS-BG-2
BG	Dimitrovgrad – Svilengrad – Turkish/Greek borders	83	1	Without			2012	2014	Under realization	TS-BG-3
GR	SKA - Promachonas	541	2	Without			2007	2015	Under realization	TS-GR-1
GR	Thriasio – Ikonio	20	1	Without			2007	2013	Under realization	TS-GR-2

## 6.2 ERTMS Deployment - Annual Status Report GSM-R Trackside (2013)

ERTMS Annual Status Report GSM-R 2013 : Trackside										
Member State	Line section	Length (km)	Tracks	Existing radio system	GSM-R		Realization		Status	Note
					Voice	Data	Start	End		
DE	Dresden Hbf-Schöna Grenze-(CZ)	51	2	GSM-R						
CZ	(D)-Dolní Žleb-Děčín hl.n.-Praha Libeň-Kolín	201	2	GSM-R					In operation	
CZ	Kolín-Breclav-Border AT/SK	277	2	GSM-R					In operation	
CZ	Brno-H.Brod-Kolín	195	2	TRS			2014	2015	Under preparation	
CZ	Kolín - Lysá n.L.-Ústí n. L. Střekov-Děčín	160	2	150 Mhz					In operation	
AT	(CZ Breclav) - Vienna	78	2	GSM-R					In operation	
AT	Vienna - Border HU (Hegyeshalom)	68	2	GSM-R					In operation	
SK	Border CZ (Breclav) - Kutý - Devinska N. Ves	58	2							
SK	Devinska N. Ves - Junction Bratislava Rusovce – (HU Rajka)	63	2						In operation	
SK	Bratislava - Nove Zamky - Sturovo – (HU Szob)	143	2						In operation	
SK	Nove Zamky - Komárno – (HU)	33	1							
		198	2							
HU	(AT) - Hegyeshalom – Budapest									
HU	(SK) - Szob - Budapest	63	2							
HU	Budapest - Szajol - Lőkösháza - (RO Curtici)	225	2							

## RAIL FREIGHT CORRIDOR 7 - ORIENT CORRIDOR: INVESTMENT PLAN

HU	Budapest (Bp.-Kelenföld - Bp. Ferencváros)	8	2							
HU	Border SK - Komárom	3	1							
RO	Lököshaza - Predeal	510	2							
RO	Predeal - Câmpina	53	2							
RO	Câmpina - Bucharest	92	2							
RO	Bucharest - Constanta	225	2							
RO	Curtici - Craiova - Bucharest	607	2							
BG	Vidin-Medkovets-Ruska Byala (Mezdra)	182	1/2							
BG	Mezdra - Sofia	85	2							
BG	Sofia – Pernik - Radomir	48+48	1/2							
BG	Radomir – Kulata - GR	161	2							
BG	Sofia - Septemvri	103	2							
BG	Septemvri - Plovdiv	53	2							
BG	Plovdiv - Dimitrovgrad	78	1/2							
BG	Dimitrovgrad – Svilengrad – Turkish/Greek borders	83	1							
GR	SKA - Promachonas	541	2				2006	2014	Under preparation	
GR	Thriasio – Ikonio	20	1				2006	2014	Under preparation	

## 6.3 Table: ERTMS Deployment - Annual Status Report On-Board (2013)

ERTMS Annual Status Report 2013 : On-Board																			
Member State	Company	Series	Number	Existing CCS	Traction systems			Realization		Operation in:								Status	Annex Number
					25 kV 50 Hz	15 kV 16,7Hz	3 kV DC	Start	End	D	C Z	A	SK	HU	RO	BG	GR		
CZ	CD	380	20	MIREL, PZB, LZB				2018	2020									Planned	OB-CZ-1
CZ	CD	980	7	MIREL, PZB, LZB				2018	2020									Planned	OB-CZ-2
AT	ÖBB	1116	176	PZB, LZB				2009	2013									In operation	OB-AT-1
AT	ÖBB	1216	17	PZB, LZB				2010	2014									Under realization	OB-AT-2
SK	ZSSKC	38X*	1	MIREL				2015	2016									Planned prototype	OB-SK-1
SK	ZSSKC	38X*	1	MIREL				2015	2016									Planned	OB-SK-2
HU	MÁV	470	10	EVM,PZB				2011	2014									Under realization	OB-HU-1
HU	MÁV	480	25	EVM,PZB				2011	2015									Under realization	OB-HU-2
RO	CFR MARFA	-	103	INDUSI				-	2020									Out of time scope	Out of time scope
BG	BDZ	-	94	ETCS L1 V.1.2.0				-	2020* *									In operation	Out of time scope
GR	OSE	460	6	--				2008	2010									In operation	OB-GR-1
GR	OSE	120	29	--				2007	2015									Under realization	OB-GR-2

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GR	OSE	220	33	--				2007	2015									Under realization	OB-GR-3
GR	OSE	460	14	--				2007	2015									Under realization	OB-GR-4
GR	OSE	520	8	--				2007	2015									Under realization	OB-GR-5
GR	OSE	560	16	--				2007	2015									Under realization	OB-GR-6
GR	OSE	621	14	--				2007	2015									Under realization	OB-GR-7

	traction system = yes		operation = yes
	traction system = no		operation = no

\* New vehicle  
\*\* Upgrade planning

### 7. Financial sources available for development

Regarding to the large number of the Investment plan items with the critical effect from the competitiveness viewpoint and regarding to the lack of national financial sources there is a strong interest of each Infrastructure Manager involved in the Orient Corridor to utilize also all other available financial sources - especially financial contributions of the European Union, including the Cohesion fund, the European Regional Development Fund (ERDF), the TEN-T programmes, the Connecting Europe Facility (CEF) etc. More detailed list of estimated costs and financial sources is introduced at the Annex no. 1 to the Investment Plan "Financial sources".

Total estimated costs for the RFC 7 are approximately € 22 000 Mio. at present (but partly obviously unknown).

### 8. Suggestions on how to proceed

Regarding to the common aim to make the corridor fully operational within the term defined by the Regulation 913/2010/EU and to ensure its good-quality functionality and competitiveness it is necessary to eliminate all the bottlenecks with the critical effect as described at the chapters 2 and 3 as soon as possible, to implement the Investment plan specified at the list of developments as described at the chapters 4 and 5 and also to implement the Deployment Plan of ERTMS as described at the chapter 6. Therefore the management board shall periodically review this Investment plan each year with the focus on the Investment plan implementation progress.

## ANNEX

### 1. Financial sources