Note: The Working Party, at its fifty-second session, expressed interest in following progress made in the application of the geographic information system (GIS) in the railway transport sector. With this in mind, the Project Central Office of the Trans-European Railway (TER) Project wishes to inform the Working Party about the developments on GIS within the TER Project. The relevant information is reproduced below.

* * *

REPORT ON TER (TRANS-EUROPEAN RAILWAY) DATABASE AND MAPPING ACTIVITY

A. TER database

The TER Database is meant to cover all 16-member countries as well as several observer countries in TER (annex 1). The aim of this database is to provide the necessary data for the preparation of pre-feasibility studies, assessment of investments, facilitation of railway border crossings, etc., for upgrading and modernization of the TER lines in the member countries.
It also enables TER to cooperate with other Transport Information bodies and organizations like UNECE-Transport Statistics, UIC, Pan-European corridors’ secretariats, etc.

TER database upon the end of 2001 is a collection of distinct Excel files for each type of data (entity).

At present TER Database is built for Access Database. The structure of the database was obtained from the Conceptual Data Model created using the tool Sybase Power Designer 8. As a result the database can be translated to any main database management system known (like Oracle, Microsoft SQL, etc.).

The diagram of the Conceptual Data Model is presented in annex 2. The list of the data fields of the TER database is presented in annex 3.

TER Database contains four main groups of data:

1. Data for basic railway indicators and social information;
2. Data for infrastructure: line sections, bridges, tunnels, overpasses, and level crossings;
3. Operational data;
4. Data regarding transport equipment (cars, wagons, locomotives and railcars).

In order to facilitate the use of database a reporting application has been developed by the PCO and will be distributed to the TER member countries. The application was developed using Windows NT4.0 as operating system and Microsoft Visual Basic 6.0 and Crystal Reports 4.6 for Visual Basic as developing environment. The application provides over 70 different reports and can be developed according to the needs of the end users.

A list of main technical characteristics for TER lines is presented in annex 4.

(i) TER GIS mapping

For GIS Mapping System, MapInfo Professional version 6 is used.

The maps offer the possibilities to view, analyze and print images and views for TER Border Crossing Railway Stations, the TER / AGC / AGTC lines and their line sections as well as projects prepared for implementation and identified per corridor in various countries.

All these maps cover the whole TER region, separate member countries, selected areas, Pan-European corridors, etc.

The present GIS collection provides a lot of maps carried out in different analytical views that can be used for further data analysis.
The TER GIS maps are two dimensional, and can be grouped at present into the following:

1. TER member countries;
2. AGC, AGTC, TER lines;
3. TER network;
4. TER sections on the TER network;
5. TER border stations;
6. Projects for rehabilitation of the railway lines identified per corridor;
7. Pan-European corridors overlapping TER network.

All these maps were drawn on the basis of the information stored in the TER database.

At present, data continues to be processed and imported from Access database into MapInfo for all the countries that provided updated data.

Under preparation is a meeting of data experts to update the structure of the data collection in a way that will serve better the needs of the TER member countries.
# Annex 1

## List of member and observer TER countries

<table>
<thead>
<tr>
<th>#</th>
<th>Abbr.2</th>
<th>Abbr.3</th>
<th>Short Name</th>
<th>Full Name</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AT</td>
<td>AUT</td>
<td>AUSTRIA</td>
<td>Republic of Austria</td>
<td>Member</td>
</tr>
<tr>
<td>2</td>
<td>BA</td>
<td>BIH</td>
<td>BOSNIA and HERZEGOVINA</td>
<td>Bosnia and Herzegovina</td>
<td>Member</td>
</tr>
<tr>
<td>3</td>
<td>BG</td>
<td>BGR</td>
<td>BULGARIA</td>
<td>Republic of Bulgaria</td>
<td>Member</td>
</tr>
<tr>
<td>4</td>
<td>BY</td>
<td>BLR</td>
<td>BELARUS</td>
<td>Belarus</td>
<td>Observer</td>
</tr>
<tr>
<td>5</td>
<td>CZ</td>
<td>CZE</td>
<td>CZECH REPUBLIC</td>
<td>Czech Republic</td>
<td>Member</td>
</tr>
<tr>
<td>6</td>
<td>GE</td>
<td>GEO</td>
<td>GEORGIA</td>
<td>Georgia</td>
<td>Member</td>
</tr>
<tr>
<td>7</td>
<td>GR</td>
<td>GRC</td>
<td>GREECE</td>
<td>Hellenic Republic</td>
<td>Member</td>
</tr>
<tr>
<td>8</td>
<td>HR</td>
<td>HRV</td>
<td>CROATIA</td>
<td>Republic of Croatia</td>
<td>Member</td>
</tr>
<tr>
<td>9</td>
<td>HU</td>
<td>HUN</td>
<td>HUNGARY</td>
<td>Republic of Hungary</td>
<td>Member</td>
</tr>
<tr>
<td>10</td>
<td>IT</td>
<td>ITA</td>
<td>ITALY</td>
<td>Italian Republic</td>
<td>Member</td>
</tr>
<tr>
<td>11</td>
<td>LT</td>
<td>LTU</td>
<td>LITHUANIA</td>
<td>Republic of Lithuania</td>
<td>Member</td>
</tr>
<tr>
<td>12</td>
<td>LV</td>
<td>LVA</td>
<td>LATVIA</td>
<td>Republic of Latvia</td>
<td>Observer</td>
</tr>
<tr>
<td>13</td>
<td>MD</td>
<td>MDA</td>
<td>MOLDOVA</td>
<td>Republic of Moldova</td>
<td>Observer</td>
</tr>
<tr>
<td>14</td>
<td>MK</td>
<td>MKD</td>
<td>FYROM</td>
<td>THE FORMER YUGOSLAV REPUBLIC OF MACEDONIA</td>
<td>Observer</td>
</tr>
<tr>
<td>15</td>
<td>PL</td>
<td>POL</td>
<td>POLAND</td>
<td>Republic of Poland</td>
<td>Member</td>
</tr>
<tr>
<td>16</td>
<td>RO</td>
<td>ROU</td>
<td>ROMANIA</td>
<td>Romania</td>
<td>Member</td>
</tr>
<tr>
<td>17</td>
<td>RU</td>
<td>RUS</td>
<td>RUSSIAN FEDERATION</td>
<td>Russian Federation</td>
<td>Member</td>
</tr>
<tr>
<td>18</td>
<td>SK</td>
<td>SVK</td>
<td>SLOVAKIA</td>
<td>Slovak Republic</td>
<td>Member</td>
</tr>
<tr>
<td>19</td>
<td>SL</td>
<td>SLE</td>
<td>SLOVENIA</td>
<td>Republic of Slovenia</td>
<td>Member</td>
</tr>
<tr>
<td>20</td>
<td>TR</td>
<td>TUR</td>
<td>TURKEY</td>
<td>Republic of Turkey</td>
<td>Member</td>
</tr>
<tr>
<td>21</td>
<td>UA</td>
<td>UKR</td>
<td>UKRAINE</td>
<td>Ukraine</td>
<td>Observer</td>
</tr>
</tbody>
</table>
Annex 2

Conceputal Data Model
Model TER_Database
Package
Diagram TER_DATABASE
Author TER-PDO date 5/15/02

LOCOMOTIVES/RAILCARS
LOC_RN  L1
LOC_CC  TXT3
LOC_LORCODE  TXT3
LOC_TYPV  TXT3
LOC_ENTE2  TXT4
LOC_TNL  L1
LOC_TNLR  L1
LOC_TDRIVE  TXT6
LOC_BLENG  L1
LOC_VGAU  L1
LOC_MAL  L1
LOC_MAPE  L1
LOC_RELAD  D
LOC_CV  TXT8

COACHES
COA_RN  L1
COA_CC  TXT3
COA_COD  L1
COA_TYPC  TXT4
COA_ENTE2  TXT4
COA_TNCO  L1
COA_TNCOO  L1
COA_BLENQ  L1
COA_WGAU  L1
COA_MAL  L1
COA_MAPE  L1
COA_RELAD  D
COA_CV  TXT8

WAGONS
WAG_RN  L1
WAG_CC  TXT3
WAG_WOOD  TXT1
WAG_TYPW  TXT3
WAG_ENTE2  TXT10
WAG_TNMA  L1
WAG_TNMMA  L1
WAG_MAL  L1
WAG_MAPE  L1
WAG_RELAD  D
WAG_CV  TXT8

GENERAL
GEN_RN  L1
GEN_CC  TXT3
GEN_NC  TXT20
GEN_SC  L1
GEN_IDUN  L1
GEN_ODP  L1
GEN_FGOD  LF
GEN_TLENQ  L1
GEN_MPT  L1
GEN_PKM  L1
GEN_FGPK  LF
GEN_TONNE  L1
GEN_FKTM  L1
GEN_FGKTM  LF
GEN_TUNWOU  L1
GEN_RELAD  D
GEN_CV  TXT8

COMBINEDTRANSPORT
COM_RN  L1
COM_CC  TXT3
COM_ENTE2  TXT10
COM_TNTRIPS  L1
COM_TWTRIPS  L1
COM_TNTRIPS  L1
COM_TWTRIPS  L1
COM_TNTRIPS  L1
COM_TWTRIPS  L1
COM_DOR1  TXT3
COM_DOR2  TXT3
COM_DOR3  TXT3
COM_DOR4  TXT3
COM_DOR5  TXT3
COM_RELAD  D
COM_CV  TXT8
Annex 3

List of database fields

1. Master file
   1.1. Record Number
   1.2. Country Code
   1.3. National Time Table Code
   1.4. Name of Start Node of the Line Section
   1.5. Name of End Node of the Line Section
   1.6. Start Node Code
   1.7. End Node Code
   1.8. AGC or TER Line Code
   1.9. Section code
   1.10. Main Location of the Start Node
   1.11. Data relate to Year
   1.12. Control Value

2. General data per Country
   2.1. Record Number
   2.2. Country Code
   2.3. Name of the Country
   2.4. Size of the Country
   2.5. Number of Inhabitants in the Country
   2.6. Gross Domestic Product (GDP)
   2.7. Foreseen growth of the (GDP)
   2.8. Total length of the rail network (Km)
   2.9. Number of Passengers travelling by rail per year
   2.10. Number of passenger’s kilometers per year
   2.11. Foreseen growth of the rail passenger transport
   2.12. Number of tones transported by rail per year
   2.13. Number of tone kilometers realized per year
   2.14. Foreseen growth of the rail freight transport
   2.15. Total number of railway workers
   2.16. Data Relate to Year
   2.17. Control Value

3. Code file
   3.1. Record Number
   3.2. Country Code
   3.3. AGC or TER Line Code
   3.4. Section Code
   3.5. Railway Enterprise
   3.6. Number of the Railway service Operator
   3.7. Railway Service Operator-I.
   3.8. Railway Service Operator-II.
   3.9. Railway Service Operator-III.
   3.10. Railway Code
   3.11. AGC or TER Line Code
   3.12. AGC or TER Line Code
   3.13. Pan European Transport Code
3.15. Pan European Transport Code
3.16. Data Relate to Year
3.17. Control Value

4. Line section File

4.1. Record Number
4.2. Country Code
4.3. AGC or TER Line Code
4.4. Section code
4.5. Length of Line Section
4.6. Type of Line Section
4.7. Max. Speed Allowed by the Track
4.8. Design Speed
4.9. Load Limits for Railway Lines
4.10. Number of Tracks
4.11. Distance between Axes of Tracks
4.12. Track Gauge
4.13. Loading Gauge
4.14. Rail Structure gauge
4.15. Traction System
4.16. Two-way Direction Operation
4.17. Type of signaling
4.18. Max. Gradient
4.19. Min. Radius of Curve
4.20. Max. Capacity of Line Section
4.21. Authorized mass per axle wagons < 100 km/h
4.22. Authorized mass per axle wagons < 120 km/h
4.23. Construction year of the Line Section
4.24. Year of Last Main Overhaul of Line Section
4.25. Data relate to Year
4.26. Control Value

5. Nodes

5.1. Record Number
5.2. Country Code
5.3. Start Node Code
5.4. Node Type
5.5. Station type
5.6. Distance of the Node from the Main AGC or TER Line
5.7. Access to the station
5.8. Intermodal operation
5.9. System of traction on Border Station & on Border tracks
5.10. Abbreviation of the Connected Country
5.11. Average truck-waiting time
5.12. Combined Transport Border Crossing Possibilities
5.13. Minimum Main Track Length
5.14. Minimum Siding (Track) Length
5.15. Minimum (Main) Passenger Platform Length
5.16. Number of Tracks
5.17. Maximum Speed on Switches
5.18. RO-LA Transit Trains
5.19. RO-LA Export or Import Trains
5.20. Combined Transit Transport
5.21. Combined Export or Import Transport
5.22. Block or Shuttle Trains Transit
5.23. Block or Shuttle Export or Import Trains
5.24. Mixed Freight Transit Trains Inspected
5.25. Mixed Freight Transit Trains without Inspection
5.26. Mixed Freight Trains Export or Import Inspected
5.27. Mixed Freight Trains Export or Import without Inspection
5.28. Processing Time for Passenger Long Distance Trains
5.29. Processing Time for Passenger Regional or Local Trains
5.30. Type of Passenger Border Control
5.31. Customs Procedure for Freight on the Border
5.32. Track Gauge
5.33. Change of gauge
5.34. Phytosanitar Inspection
5.35. Veterinary Inspection
5.36. Nuclear safety Inspection
5.37. Dangerous Goods Transported across the border
5.38. Construction year of the Node
5.39. Year of Last Main Overhaul of Node
5.40. Data Relate to Year
5.41. Control Value

6. Bridges

6.1. Record Number
6.2. Country Code
6.3. AGC or TER Line Code
6.4. Section Code
6.5. Order Number of the parallel railway Structure
6.6. Location from the Start Node of the Line Section
6.7. Length of Bridge
6.8. Number of Tracks
6.9. Loading Gauge
6.10. Rail Structure Gauge
6.11. Test Train
6.12. Construction year of the Bridge
6.13. Year of Last Main Reconstruction of Bridge
6.14. Data Relate to Year
6.15. Control Value

7. Tunnels

7.1. Record Number
7.2. Country Code
7.3. AGC or TER Line Code 1
7.4. Section Code
7.5. Order Number of the parallel railway Structure
7.6. Location from the Start Node of the Line Section
7.7. Length of the Tunnel
7.8. Number of Tracks
7.9. Loading Gauge
7.10. Rail Structure Gauge
7.11. Construction year of the Tunnel
7.12. Year of Last Main Reconstruction of Tunnel
7.13. Data Relate to Year
7.14. Control Value

8. Overpasses

8.1. Record Number
8.2. Country Code
8.3. AGC or TER Line Code 1.
8.4. Section Code
8.5. Location from the Start Node of the Line Section
8.6. Number of Tracks
8.7. Loading Gauge
8.8. Rail Structure Gauge
8.9. Construction year of the Overpass
8.10. Year of Last Main Reconstruction of Overpass
8.11. Data Relate to Year
8.12. Control Value

9. Level crossings

9.1. Record Number
9.2. Country Code
9.3. AGC or TER Line Code 1.
9.4. Section Code
9.5. Location from the Start Node of the Line Section
9.6. Number of Tracks
9.7. Type of Protection of Crossing
9.8. Construction Year of the Level Crossing
9.9. Year of Last Main Overhaul of Level Crossing
9.10. Data Relate to Year
9.11. Control Value

10. Operational data

10.1. Record Number
10.2. Country Code
10.3. AGC or TER Line Code 1.
10.4. Section Code
10.5. Minimum Travel Time for Passenger Trains
10.6. Minimum Travel Time for Freight Trains
10.7. Number of Present Freight Train
10.8. Number of Present Passenger Train
10.9. Freight Net Load
10.10. Passenger - km per year
10.11. Passenger Gross Load
10.12. Freight Gross Load
10.13. Passenger Train Movements
10.14. Freight Train Movements
10.15. Type of service
10.16. Frequency of service
10.17. Data Relate to Year
10.18. Control Value

11. Locomotives or Railcar

11.1. Record Number
11.2. Country Code
11.3. Locomotives / Railcars Code
11.4. Type of Locomotives / Railcars
11.5. Railway Enterprise Code 2.
11.6. Total Number of the owned Locomotives / Railcars by Railway Enterprise
11.7. Total Number of the Not owned Locomotives / Railcars by Rail. Enterprise
11.8. Type of Power Driven
11.9. Length over Buffers
11.10. Wheel set Gauge
11.11. Maximum Axle Load
11.12. Maximum Speed
11.13. Data Relate to Year
11.14. Control Value

12. Coaches

12.1. Record Number
12.2. Country Code
12.3. Coach Code
12.4. Type of Coach
12.6. Total number of the owned coaches by the Rail. Enterprise
12.7. Total number of the Not owned coaches by the Rail. Enterprise
12.8. Average Length over Buffers
12.9. Wheel set Gauge
12.10. Maximum Axle Load
12.11. Maximum Speed
12.12. Data relate to Year
12.13. Control Value

13. Wagons

13.1. Record Number
13.2. Country Code
13.3. Wagon Code
13.4. Type of Wagon
13.6. Total Number of the owned Wagons by the Railway Enterprises
13.7. Total Number of the Not owned Wagons by the Rail Enterprises
13.8. Average Length over Buffers
13.9. Wheel set Gauge
13.10. Maximum axle load
13.11. Maximum speed
13.12. Data relate to Year
13.13. Control Value

14. Combined Transport Quantity

14.1. Record Number
14.2. Country Code
14.4. Total number of TEU Export
14.5. Total weight of Combined Transport Export
14.6. Total number of TEU Import
14.7. Total weight of Combined Transport Import
14.8. Total number of TEU Transit
14.9. Total weight of Combined Transport Transit
14.10. Definition of route (relation-1) Start Node 1
14.11. Definition of route (relation-2) End Node 1
14.12. Definition of route (relation-3) Via Node 1
14.13. Definition of route (relation-4) Via Node 2
14.15. Data relate to Year
14.16. Control Value
# Annex 4

## BASIC LENGTHS OF THE TER LINES

<table>
<thead>
<tr>
<th>Country</th>
<th>TOTAL LENGTH OF THE TER LINES</th>
<th>TOTAL LENGTH OF THE TER ELECTRIFIED LINES</th>
<th>TOTAL LENGTH OF THE TER NON-ELECTRIFIED LINES</th>
<th>TOTAL LENGTH OF THE TER SINGLE TRACK LINES</th>
<th>TOTAL LENGTH OF THE TER DOUBLE TRACK LINES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>2651</td>
<td>2436</td>
<td>215</td>
<td>1210</td>
<td>1441</td>
</tr>
<tr>
<td>Bosnia and Herzegovina</td>
<td>405</td>
<td>405</td>
<td>0</td>
<td>310</td>
<td>95</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>2509</td>
<td>2008</td>
<td>501</td>
<td>1667</td>
<td>842</td>
</tr>
<tr>
<td>Croatia</td>
<td>1502</td>
<td>856</td>
<td>646</td>
<td>1259</td>
<td>243</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>2349</td>
<td>2110</td>
<td>239</td>
<td>732</td>
<td>1617</td>
</tr>
<tr>
<td>Hungary</td>
<td>2574</td>
<td>2228</td>
<td>346</td>
<td>1412</td>
<td>1162</td>
</tr>
<tr>
<td>Lithuania</td>
<td>847</td>
<td>103</td>
<td>744</td>
<td>565</td>
<td>282</td>
</tr>
<tr>
<td>Poland</td>
<td>4813</td>
<td>4652</td>
<td>161</td>
<td>613</td>
<td>4200</td>
</tr>
<tr>
<td>Romania</td>
<td>3514</td>
<td>2357</td>
<td>1157</td>
<td>1456</td>
<td>2058</td>
</tr>
<tr>
<td>Russian Federation</td>
<td>1819</td>
<td>1819</td>
<td>0</td>
<td>32</td>
<td>1787</td>
</tr>
<tr>
<td>Slovakia</td>
<td>1005</td>
<td>985</td>
<td>20</td>
<td>179</td>
<td>826</td>
</tr>
<tr>
<td>Slovenia</td>
<td>604</td>
<td>483</td>
<td>121</td>
<td>274</td>
<td>330</td>
</tr>
<tr>
<td>Turkey</td>
<td>3985</td>
<td>1523</td>
<td>2462</td>
<td>3673</td>
<td>312</td>
</tr>
<tr>
<td>TOTAL LENGTH</td>
<td>28577</td>
<td>21965</td>
<td>6612</td>
<td>13382</td>
<td>15195</td>
</tr>
</tbody>
</table>

---