- Vassilys Fourkas
- Zoe Papasiopi
- Athena Giannakou

SEMSON, Final Seminar, 11-12.04.2008, Thessaloniki
Egnatia – TENs & Pan European Corridors
Egnatia motorway project status, Feb. 2008
Egnatia Odos Motorway: axis of growth and collaboration
Egnatia Odos Observatory

monitoring and assessing the spatial impacts of the motorway

The Observatory develops a methodological and operational framework, which applies well-documented scientific methods and modern GIS & Internet infrastructure, in order to collect and provide reliable and updated information and data for the monitoring and assessment of the Egnatia Odos Motorway’s spatial impacts. This information concerns:

• the mobility in and accessibility to regions, urban centres, markets, and services,
• the development level, the cohesion degree, the competitiveness, and the intraregional inequalities,
• the building development and the networking of urban centres,
• the properties of the transport system and the operation of the road network, and
• the quality of the environment.
INFORMATION SYSTEM INFRASTRUCTURE

The Egnatia Odos Observatory has set up an Information System for Documentation and Data Management and Indicator Monitoring, based on the operation of a specially configured Geographical Information System (GIS), including processed statistical and mapping information on Prefectures, Regions, and residential areas of the immediate and greater zones of impact of the Egnatia mainline and vertical axes. The operation and output of the Information System of the Observatory are based on a constantly renewed infrastructure:

- A computer network supported by a Spatial Database Engine and equipped with specialized operating systems (GIS, measurement processing, statistics, graphics and web development, production of documents etc.) and peripherals (colour printers, plotters, scanner etc.).
- Official data and processed statistical data of censuses and researches of the Greek National Statistics Agency (ESYE) and Eurostat.
- Environmental data on the basis of EU official data (EEA, CORINE Land Cover 1990 & 2000, RAMSAR, NATURA 2000 etc.).
- Traffic and Transport data (traffic volume in the road network, traffic composition, classification and evaluation data, data of Origin – Destination National Researches etc.).
- Digital files of Regional and Spatial Planning and Programmes, as well as data on Trans-European Networks (TEN-T), Pan-European Corridors (TINA), and EU policies – programmes of regional development.

- Base maps:
  - A digital elevation model (DEM, 3D),
  - Aerial photographs, SPOT satellite pictures, and orthophoto-maps,
  - Administrative and geographical boundaries (NUTS 1-3, urban masterplan extends, municipal districts, protected areas etc.),
  - Digital data WDC ESRF,
  - Updated road and railway network,
  - Updated data of residential areas network,
  - Updated hydrographic network and coastline,
  - Contour network.
- Equipment for transport and environment measurements supported by GPS.
- Electronic library and database for collecting supporting material and metadata.
### Egnatia Odos Observatory

**Socio-economic Indicators**
- Basic
  - Benefited population
  - Market size (GDP)
  - City gravity
  - Growth and prosperity level (GDP per head)
  - Unemployment rate
- Framework
  - Accessibility of transport modes
  - Accessability of industrial areas
  - Accessibility of sites of cultural & tourist interest
  - Population change within impact zones
  - Urban population changes
  - Hierarchy of urban centres
  - Population density
- Special
  - Composition of production by industry sector (GVA)
  - Labour force
  - Composition of employment by industry sector
  - Business location
  - Foreign trade

**Environmental Indicators**
- Basic
  - Noise pollution
  - Traffic air quality
  - Cohesion - fragmentation of settlements
- Framework
  - Population no longer exposed to noise pollution
  - Landscapes fragmentation
  - Fragmentation of natural areas
  - Pressure for land use change
  - Proximity to conservation areas
- Special
  - Air pollution
  - Crossings with surface waters
  - Pattern of use of combined modes of transport

**Transport Indicators**
- Basic
  - Traffic volume (AADT)
  - Traffic composition
  - Average occupancy rate
  - Travel speed
  - Travel time
- Framework
  - Human movements and commuting
  - Commercial transportation
  - Time distance between towns and terminal stations
  - Generalized cost of transport
  - Road safety

#### Impact Zones
- 60% in-house
- 40% out-sourcing
The combined assessment and evaluation of indicator results is carried out around four basic parameters related to the main objective of the EU policy:

1. Mobility and accessibility,
2. Economic and social cohesion,
3. Spatial balance and networking, and
4. Quality of environment.

For each indicator the following are drafted: (a) The Technical Bulletin providing the scientific and technical - methodological specification for calculating the indicator. (b) The Calculation Bulletin describing each step of the calculation and monitoring method. (c) The Results Fact Sheet, presenting the processed results and the long-term and geographical evolution of each indicator.
Το ΕΓΝΑΤΙΑ ΟΔΟΣ αναφέρεται σε έναν από τους μεγαλύτερους έλεγχους οδικών δικτύων στην Ευρώπη. Περιλαμβάνει τμήματα από πολλές χώρες, όπως η Ελλάδα, την Κύπρο και η Κύπρο της Ανατολίας. Οι οδικές προοπτικές ενισχύονται από την στρατηγική του Προγράμματος Ρύθμισης της Ευρωπαϊκής Οικονομίας και Εταιρικής Δράσης που συνεχίζει την επεξεργασία των οδικών δικτύων. Οι ορισμένες περιοχές συμπεριλαμβάνονται στο πλαίσιο των Προγραμμάτων Ρύθμισης και Επεξεργασίας της Ευρωπαϊκής Οικονομίας και διευρύνονται τα οδικά δίκτυα. Οι οδικές προοπτικές ενισχύονται από την στρατηγική της Ευρωπαϊκής Οικονομίας και Εταιρικής Δράσης που συνεχίζει την επεξεργασία των οδικών δικτύων.
methodology for data storage & processing and indicator calculation

External Data
- External organizations (Eurostat, ESYE, etc.), Universities, Companies, Local Authorities

Internal Data
- Egnatia Odos A.E., regional branches

Tabular data
- Excel, html files

Spatial data
- Shapefiles, Coverages, Geodatabases

Raster Data
- Images, Grid files

processing, clean-up, validation & redundancy checking

SDE Server Database (Oracle)

File server

collection, categorization

Excel

Access (Geodatabase)

Export as tables to:
- ArcSDE (Oracle)

Link spatial + tabular data

Indicator result

Import into:
- ArcSDE (Oracle)
Observatory

Workstations:

PCs:

**ArcGIS:**
(ArcInfo–ArcEditor–ArcView)
5 floating licenses

Observatory Unit

Environment
Discipline

Traffic &
Telematics Dept.

Building

Building

Building

User 1, 2, 3

User 4

User 5

Server

ArcSDE

Database (Oracle)

Files

Internet

File sharing

SDE GIS Processes

Internet/intranet

publishing

Intranet (EOAE)

IT Unit

User 1, 2, 3

User 4

User 5

User 1, 2, 3

User 4

User 5
The highest traffic volumes in 2007 (62,000 AADT) were recorded along the sections in the outer area of Thessaloniki.

Composition of traffic: 80-90% are passenger cars or similarly sized vehicles.
sample of indicators’ latest results

Data source: Dept. of traffic, EGNATIA ODOS S.A.
sample of indicators’ latest results

Raw data source: EUROSTAT, Apr. 2008

GDP per habitat 2005
### GROSS VALUE ADDED BY SECTOR AND BY PREFECTURE AND REGION IN mil. €, 2005

#### Sample of indicators’ latest results

**GVA Annual rate shift 2000-2005**

<table>
<thead>
<tr>
<th>NUTS Region-Prefecture</th>
<th>Total GVA (%)</th>
<th>Agriculture (%)</th>
<th>Industry (%)</th>
<th>Annual rate shift</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greece</td>
<td>178,017.3</td>
<td>4.70%</td>
<td>7,697.4</td>
<td>100.00%</td>
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<tr>
<td>znIV Impact Zone IV</td>
<td>48,005.5</td>
<td>3.43%</td>
<td>3,640.8</td>
<td>100.00%</td>
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<tr>
<td>znII Impact Zone II</td>
<td>30,728.3</td>
<td>3.85%</td>
<td>1,596.6</td>
<td>100.00%</td>
</tr>
<tr>
<td>znIII Impact Zone III</td>
<td>17,276.8</td>
<td>2.72%</td>
<td>2,044.1</td>
<td>100.00%</td>
</tr>
<tr>
<td>gr11 East Macedonia &amp; Thrace</td>
<td>6,414.6</td>
<td>2.38%</td>
<td>597.4</td>
<td>100.00%</td>
</tr>
<tr>
<td>gr111 Evros</td>
<td>1,736.1</td>
<td>2.33%</td>
<td>162.5</td>
<td>100.00%</td>
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<tr>
<td>gr112 Xanthi</td>
<td>1,152.9</td>
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<td>93.4</td>
<td>100.00%</td>
</tr>
<tr>
<td>gr113 Rodopi</td>
<td>1,068.3</td>
<td>3.22%</td>
<td>126.3</td>
<td>100.00%</td>
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<tr>
<td>gr114 Drama</td>
<td>907.0</td>
<td>0.71%</td>
<td>98.9</td>
<td>100.00%</td>
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<tr>
<td>gr115 Kavala</td>
<td>1,550.1</td>
<td>1.82%</td>
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<td>100.00%</td>
</tr>
<tr>
<td>gr12 Central Macedonia</td>
<td>24,830.1</td>
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<td>1,479.6</td>
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<tr>
<td>gr121 Imathia</td>
<td>1,607.1</td>
<td>-1.07%</td>
<td>252.5</td>
<td>100.00%</td>
</tr>
<tr>
<td>gr122 Thessaloniki</td>
<td>16,706.9</td>
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<td>310.5</td>
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<tr>
<td>gr123 Kilkis</td>
<td>1,122.1</td>
<td>3.73%</td>
<td>139.6</td>
<td>100.00%</td>
</tr>
<tr>
<td>gr124 Pella</td>
<td>1,390.7</td>
<td>0.93%</td>
<td>273.4</td>
<td>100.00%</td>
</tr>
<tr>
<td>gr125 Pieria</td>
<td>1,218.3</td>
<td>0.94%</td>
<td>127.1</td>
<td>100.00%</td>
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<tr>
<td>gr126 Serres</td>
<td>1,596.6</td>
<td>-0.17%</td>
<td>252.8</td>
<td>100.00%</td>
</tr>
<tr>
<td>gr127 Chalkidiki</td>
<td>1,188.4</td>
<td>0.84%</td>
<td>123.6</td>
<td>100.00%</td>
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<tr>
<td>gr13 West Macedonia</td>
<td>3,781.9</td>
<td>3.63%</td>
<td>262.0</td>
<td>100.00%</td>
</tr>
<tr>
<td>gr131 Grevena</td>
<td>435.9</td>
<td>9.17%</td>
<td>32.6</td>
<td>100.00%</td>
</tr>
<tr>
<td>gr132 Kastoria</td>
<td>595.0</td>
<td>3.85%</td>
<td>49.4</td>
<td>100.00%</td>
</tr>
<tr>
<td>gr133 Kozani</td>
<td>2,172.3</td>
<td>3.26%</td>
<td>97.0</td>
<td>100.00%</td>
</tr>
<tr>
<td>gr134 Florina</td>
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<td>1.38%</td>
<td>83.0</td>
<td>100.00%</td>
</tr>
<tr>
<td>gr14 Thessaly</td>
<td>9,055.3</td>
<td>4.07%</td>
<td>983.0</td>
<td>100.00%</td>
</tr>
<tr>
<td>gr141 Karditsa</td>
<td>959.4</td>
<td>0.24%</td>
<td>179.3</td>
<td>100.00%</td>
</tr>
<tr>
<td>gr142 Larisa</td>
<td>3,715.2</td>
<td>3.83%</td>
<td>540.2</td>
<td>100.00%</td>
</tr>
<tr>
<td>gr143 Magnisia</td>
<td>3,026.9</td>
<td>5.42%</td>
<td>140.0</td>
<td>100.00%</td>
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<tr>
<td>gr144 Trikala</td>
<td>1,353.9</td>
<td>4.89%</td>
<td>123.6</td>
<td>100.00%</td>
</tr>
<tr>
<td>gr21 Epirus</td>
<td>3,923.6</td>
<td>2.88%</td>
<td>318.8</td>
<td>100.00%</td>
</tr>
<tr>
<td>gr211 Arta</td>
<td>627.0</td>
<td>1.47%</td>
<td>90.5</td>
<td>100.00%</td>
</tr>
<tr>
<td>gr212 Thesprotia</td>
<td>461.8</td>
<td>1.65%</td>
<td>46.8</td>
<td>100.00%</td>
</tr>
<tr>
<td>gr213 Ioannina</td>
<td>2,240.3</td>
<td>4.95%</td>
<td>105.9</td>
<td>100.00%</td>
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<tr>
<td>gr214 Preveza</td>
<td>594.4</td>
<td>-1.36%</td>
<td>75.6</td>
<td>100.00%</td>
</tr>
</tbody>
</table>

---

Raw data source: EUROSTAT, Apr. 2008
sample of indicators’ latest results

Land covers in Impact Zone I
(5km buffer zone)

- Artificial surfaces: 2.2%
- Agricultural areas: 4.5%
- Forest and seminatural areas: 49.4%
- Water bodies: 0.9%
- Wetlands: 42.9%
- Water bodies: 49.4%

Raw data source: CORINE Land Cover 2000, EEA
sample of indicators’ latest results

<table>
<thead>
<tr>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. European Environment Agency, TERM 2002, Fragmentation of ecosystems and</td>
</tr>
<tr>
<td>habitats by transport infrastructure, Indicator fact sheet</td>
</tr>
<tr>
<td>2. European Environment Agency, TERM 2002, Average size of forest patches,</td>
</tr>
<tr>
<td>Indicator fact sheet</td>
</tr>
<tr>
<td>3. European Environment Agency, Anthropogenic fragmentation of potential</td>
</tr>
<tr>
<td>semi-natural and natural area, 1998</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fragmentation of Natural Areas</th>
<th>Indicator without Egnatia Motorway</th>
<th>Indicator with Egnatia Motorway</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thesprotia</td>
<td>4.35</td>
<td>4.47</td>
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<tr>
<td>Ioannina</td>
<td>2.83</td>
<td>2.87</td>
</tr>
<tr>
<td>Grevena</td>
<td>3.74</td>
<td>3.86</td>
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<tr>
<td>Kozani</td>
<td>3.57</td>
<td>3.60</td>
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<td>Imathia</td>
<td>4.48</td>
<td>4.58</td>
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<td>Thessaloniki</td>
<td>6.65</td>
<td>6.75</td>
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<tr>
<td>Serres</td>
<td>3.43</td>
<td>3.43</td>
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<tr>
<td>Kavala</td>
<td>3.39</td>
<td>3.60</td>
</tr>
<tr>
<td>Xanthi</td>
<td>3.24</td>
<td>3.22</td>
</tr>
<tr>
<td>Rodopi</td>
<td>3.20</td>
<td>3.23</td>
</tr>
<tr>
<td>Evros</td>
<td>4.42</td>
<td>4.43</td>
</tr>
<tr>
<td>Zone II</td>
<td>3.76</td>
<td>3.82</td>
</tr>
</tbody>
</table>
### Fragmentation of settlements

<table>
<thead>
<tr>
<th>Prefecture</th>
<th>Indicator before Egnatia</th>
<th>Indicator after Egnatia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evros (Alexandroupoli)</td>
<td>7.6</td>
<td>4.8</td>
</tr>
<tr>
<td>Rodopi</td>
<td>21.6</td>
<td>10.1</td>
</tr>
<tr>
<td>Xanthi</td>
<td>20.9</td>
<td>2.4</td>
</tr>
<tr>
<td>Kavala</td>
<td>20.2</td>
<td>12.2</td>
</tr>
<tr>
<td>Thessaloniki</td>
<td>32.5</td>
<td>11.3</td>
</tr>
<tr>
<td>Serres</td>
<td>0.7</td>
<td>0.3</td>
</tr>
<tr>
<td>Imathia</td>
<td>9.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Kozani</td>
<td>13.1</td>
<td>1.7</td>
</tr>
<tr>
<td>Grevena</td>
<td>-</td>
<td>1.0</td>
</tr>
<tr>
<td>Ioannina</td>
<td>8.5</td>
<td>4.5</td>
</tr>
<tr>
<td>Thesprotia (Igoumenitsa)</td>
<td>8.5</td>
<td>4.4</td>
</tr>
<tr>
<td>Trikala</td>
<td>-</td>
<td>0.3</td>
</tr>
</tbody>
</table>

Specifications:

- The problems with noise and atmospheric pollution are mainly located in the suburban area of Thessaloniki.

Sample of indicators’ latest results

Efkarptia I/C (Thessaloniki)

Ioannina I/C

Komotini I/C

1998

2007

Urban (building)
Land
Natural ground
Rural ground
sample of indicators’ latest results

- Urban land use changes around Efkarpi I/C, outer Thessaloniki area

### 1998
- Continuous: 37%
- Linear: 25%
- Discontinuous: 38%

### 2007
- Continuous: 43%
- Linear: 23%
- Discontinuous: 34%
sample of indicators’ latest results

- mercantile landuse changes around Ioannina I/C, 1998 – 2007: 50%
sample of indicators’ latest results

• Business location around Ioannina I/C, 1998 – 2007: + 36%
  – Number of employees in the 67 new enterprises: 426 persons
  – Employment in the 74 new enterprises: 52% commerce, 22% hotels and restaurants, 13% alteration

• Business location around Efkarpia I/C (Thessaloniki): + 12%
  – Number of employees in the 74 new enterprises: 668 persons
  – Employment in the 67 new enterprises: 46% commerce, 40% alteration, 9% transport & communications

• Business location around Komotini I/C: + 35%
  – Number of employees in the 19 new enterprises: 58 persons
  – Employment in the 19 new enterprises: 53% commerce, 29% transport & communications, 10% hotels and restaurants
Egnatia Odos Observatory: activities

- NEXT MONTH: Indicators’ factsheets 2008 >> Annual results report (check http://observatory.egnatia.gr)

- BY NEXT YEAR: results from 4 research studies
  1. Landuse and real estate changes in 16 I/C areas
     - SET16 Urban landuse changes
     - SET17 Industrial and commercial landuse
     - SET18 Real estate changes
     - SET19 Business location
     - ENV07 Land use changes
  2. Traffic characteristics research (O-D) study
     - TRA06 Commercial transportation
     - TRA12 Trans-border mobility
     - TRA13 Combined transport modes
     - TRA15 Mobility of alternative means
3. Traffic noise mapping

| ENV01  | Population exposed to traffic noise |

4. Accessibility of industrial zones & other productive infrastructures, of tourist/cultural areas and of means of mass transport (ports, airports, railway terminals)

<table>
<thead>
<tr>
<th>SET06</th>
<th>Accessibility of transport modes</th>
</tr>
</thead>
<tbody>
<tr>
<td>SET07</td>
<td>Accessibility of industrial areas</td>
</tr>
<tr>
<td>SET08</td>
<td>Accessibility of sites of cultural &amp; tourist interest</td>
</tr>
</tbody>
</table>

➢ 2010: 2nd spatial impacts report
Thank you for your attention!

http://www.egnatia.gr
http://observatory.egnatia.gr

Tel: ++ 30 2310 470 200
Fax: ++30 2310 475 937
Email: observe@egnatia.gr