Intern Report at ESRI, Redlands

GIS Research Group Seminar
June 7th, 2007

Chiaki Mizutani
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1. Overview of my internship

- **Term:** Feb 16\(^{th}\), 2007 ~ May 14\(^{th}\), 2007
- **Belongings:** Industry solution/Transportation
- **Courses taken:**
  1. Introduction to ArcGIS
  2. Introduction to ArcGIS
  3. Advanced Analysis with ArcGIS
  4. Working with ArcGIS Spatial Analyst
  5. Introduction to Geoprocessing Scripts Using Python
My Belonging

- Marketing Department
  >> Industry Solution
  >> Transportation Group

- Supervisor : Mr. Terry Bills

Building C: Industry Solution
Training at ESRI Campus, Redlands

Course Books

Instructor

Students
Intern Project

- To study four US-based Land Use and Transportation Models
  - 1) MEPLAN
  - 2) TELUS
  - 3) TRANUS
  - 4) UrbanSim

- To choose the most applicable one for my PhD study
2. My study

- To analyze the impact of New rail line (Tsukuba Express) connected from Tokyo area to remote area, Tsukuba city.

- To estimate land use change in the future
Study area

- **Tsukuba City**
- **Tokyo Metropolitan area**

- In 1963, Cabinet decided to establish Tsukuba Science City
  - To ease overcrowded conditions in Tokyo
  - To build up a high-level research & education center

Tsukuba Science City Information
(http://www.info-tsukuba.org/english/city/city_01.html)
Tsukuba City

- Area: 284km²
- Population: 200,000
- Tsukuba Science City
  - 1973 University of Tsukuba was established
  - 1985 TSUKUBA EXPO/ Joban Expressway
  - 2005 Tsukuba Express(TX)

Tsukuba Science City Information
(http://www.info-tsukuba.org/english/city/city_02.html)
3. Land Use and Transportation models

1) MEPLAN
2) TELUS
3) TRANUS
4) UrbanSim

- Developer, year
- Purpose of the model
- Application to Japanese Transportation models
MEPLAN

- Echenique, M. & Partners, 1995
- To forecast the spatial economies of cities or regions

- Applied to Japan
  - The MEMOTO; the MEPLAN model of Tokyo developed in 1996 by ME&P Ltd of Cambridge, and Appraisal Co of Tokyo (Estimated TX impact in 1996)
  - TAMA urban mono rail (Nishimura, and Matsuyuki 2005)
Figure 1: System of two types of markets: Markets in land and in transport and the interactions between them from the basis of the MEPLAN framework (Abraham, and Hunt, 1998).
TELUS

- The Institute for Transportation of the New Jersey Institute of Technology (NJIT)
- The Center for Urban Policy Research (CUPR) of Rutgers University (State of New Jersey)
- The North Jersey Transportation Planning Authority (NJTPA), 1996

To help MPOs* and DOTs** which produce TIP*** every year

*MPO: Metropolitan Planning Organization
**DOT: Department of Transportation
***TIP: Transportation improvement program
TRANUS

- De la Barra and Modelistica (in Venezuela), 1989

- To simulate the probable effects of projects and policies of different kinds in cities and regions

- To evaluate the effects from economic, financial and environmental points of view
Figure: Sequence of calculations in the TRANUS system (medelistica 2006).
UrbanSim

- Waddepell, 1998
- To support land use, transportation planning, and growth management
- To predict the location behaviors of households, businesses, developers, consequent changes in land uses, and physical development
Figure: Data modeling in UrbanSim

4. Comparisons

- MEPLAN, TRANUS, and UrbanSim

- TELUS:
  - low documents accessibility
  - The purpose of TELUS is focusing on MPO or DOT
## 4. Comparisons

<table>
<thead>
<tr>
<th>Name</th>
<th>System Structure</th>
<th>Applied to Japan</th>
<th>Regional Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEPLAN</td>
<td>Original Package</td>
<td>MEPLAN of Tokyo, TAMA rail line</td>
<td></td>
</tr>
<tr>
<td>TRANUS</td>
<td>Windows base, ArcObjects</td>
<td>Sapporo</td>
<td>Flexible for Regional Scale</td>
</tr>
<tr>
<td>UrbanSim</td>
<td>Open Source(Phyth on, MySQL...)</td>
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</tbody>
</table>

Which does have the highest APPLICABILITY for my study?
5. Conclusions

The reason why I chose “TRANUS”

1. The flexibility at Regional scale
2. The friendly system to ArcGIS (ArcObjects)
   - PROPOLIS (EU)
3. TRANUS has graphic interface with full documentation
5. Conclusions

- What is the next step?
  - To get the results of “MEPLAN of Tokyo”
  - To review the papers related to “TELUS”

- What kind of skills do I need to perform my goal?
  - ArcObjects
Acknowledgement

I would like to express my gratitude to President Jack Dangermond and Mr. Jim Henderson for giving me the opportunity to come and stay at ESRI.

I really appreciate the considerations from Terry, Laurie, Annie and Fumi. All ESRI employees and interns helped me greatly as well.
Thank you for your attention!
ESRI Campus