2nd Newsletter, *2011 October*

RATIONALE OF THE PROJECT

TRANS-TOOLS ("TOOLS for TRansport Forecasting ANd Scenario testing") is a **European transport network model** that has been developed in collaborative projects funded by the European Commission Joint Research Centre's Institute for Prospective Technological Studies (IPTS) and DG MOVE.

WHAT'S NEW IN THE PROJECT?

In this issue **the focus is on** the exciting topics of

Model design and development

and you can find at the end some information about

the professional community involved in dissemination.

THE MODEL DESIGN!

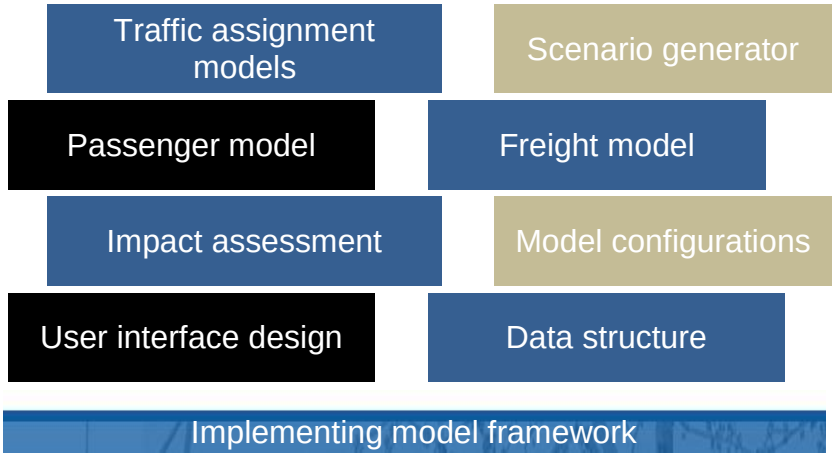
TRANSTOOLS 3 is a step closer towards its ultimate objective: to develop a validated user friendly model that will provide policy makers with a tool for assessing and developing better transport policies. The TT3 project has now **set up the model framework** which builds on a mixture of prior models and new sub-models.

The **sub-models** include freight models and logistics, passenger demand models, traffic assignment and project assessment models.

The partners involved in the Transtools 3 have agreed to **focus on model design at the two upcoming October meetings** in Copenhagen and London.

Project coordinator Professor Otto Anker Nielsen explains: *"**The next step of our model design is a very crucial part of the project** and I'm looking forward to be presented with an array of model improvements"*.

The **current state** of the sub-model design and development can be followed in the following chapters:



JUST CLICK ON THE CELL TO READ MORE

Next TT3 Steering Committee meeting is scheduled to align with the London event.

The following is a brief summary of the work progress of some of the ongoing sub-model development that have been submitted so far. Discussion of all model designs and their interactions is scheduled at the October TT3 meetings.

Traffic assignment models

Traffic assignment models will be developed by Rapidis on the ArcGIS platform, and will account for correlation across alternative routes and taste heterogeneity across the population, be multi-class and multi-purpose, and will use specific speed-flow curves for specific road types. The models will be extremely flexible in the selection of the number of iterations, the solution method, the definition of trip purposes, and the choice of distributions of random coefficients.

Traffic assignment models within TT3 will improve existing models within TT1 and TT2 by proposing enhancements for fast implementations and validated equilibrium solutions. The presentation in October will delineates two directions that traffic assignment models should move toward, namely the implementation of fast algorithmic solutions and the design of models for specific modes.

Scenario generator

The objective of the Scenario Generator is to allow the user to define inputs to TT3 in a convenient way and to ensure that the user's wishes are communicated to the forecasting models correctly and consistently. Generally, we can consider two types of data, as follows.

- **Spatial data:** This will include population and employment and will be defined relative to the zonal system which is to be agreed in Task 5.2. Clearly, it will be necessary to define further detail for this data once the requirements of the models have been clarified.
- **Transport networks:** In TT3 there will be road network (including ferries), railways (including ferries), inland waterways and air networks. The treatment of sea connections is not clear at this point, while the possible coding of long-distance bus services is also open. It will not be possible, within the resources of the project to perform very detailed processing of transport network data, but limited adjustments such as general speed changes will be possible.

Other data, and in particular economic data such as incomes, will be attached to the two main data bases as far as possible to maintain simplicity. A key function of the SG is to ensure consistency of data between different components of the model and to this end it may be necessary to amend sub-models of the system to ensure compatibility of the definitions in use.

Passenger model

Short distance model: The scope is to establish a set of models by travel purpose containing mode, destination and frequency choice. The model should be able to respond to transport policy changes with respect to infrastructure and pricing as well as to background variables like land use, economic growth and car ownership developments.

Car ownership is a difficult question in a model that covers areas with large income differences. Since car ownership is a key variable in travel demand models care is needed in formulating these variables. License holding is information that should be used together with car ownership in order to compute car competition.

Long distance models: The issues of segmentation with regard to journey duration and geography, introduction of variables for barriers and affinities, attraction variables and use of seasonal dummy-variables variables are discussed in the model design note and should be decided upon. The data that will be used is the Dateline survey from 2001. An example of use of available data in the Dateline survey is seen in Figure 1.

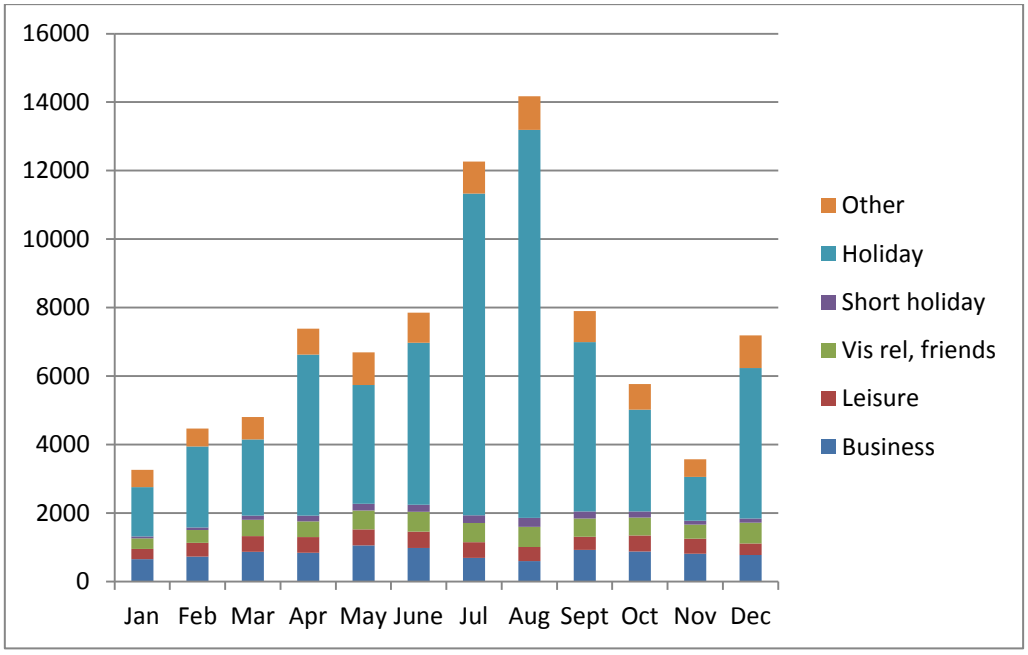


Figure 1. Trip distribution over the year. Source: Dateline.

Freight model

In WP7 **a new freight model, based on 2010 data, will be developed**. The new model will contain **modules for: (i) market size estimation** incorporating trade (i.e., determining Production – Consumption matrices); **(ii) logistics modelling** (depot arrangements and shipment size) to determine Origin – Destination matrices; and **(iii) choice of mode.** The development in WP7 will be closely related to WP9 which is concerned with assignment models. The joint effort in WP7 and WP9 will make it possible to allocate traffic and vehicle movements to the transport network. It will be presented in a form ready for implementation in the open source IPR free software platform. Modelling features that are currently fit for purpose will be taken from existing models wherever possible.

The freight model design task will involve:

- **Investigation** on how the recent innovations in the **freight literature** can be implemented in the model. Particular emphasis will be given to the national freight models from Norway, Sweden, UK, and the current development of a Danish freight model.
- **Sketch of model design** and outline of a course-of-action. This includes description of different design phases as inputs and guidelines to the following tasks.

Impact assessment

The socio-economic impact assessment includes the external costs of traffic congestion, accidents, climate change, pollutant emissions, and noise. The **impact assessment for land transport and short-sea shipping** is a transparent and clear framework designed from a bottom-up approach, on the basis of input from the traffic assignment of TT3, recommended parameters and user input. The framework complies with EU best practices for impact assessment and recommended parameters deriving from previous EU projects and state-of-the-art studies. The impact assessment is also capable of accounting for country, region, road type, vehicle type, and day/season effects. The impact assessment is an important addition to TT2 due to the importance attributed to the internalization of external costs for project assessment and policy development in the transport sector in Europe.

The following description of work carried out in WP3 and WP4 contains information that is important for the development of the other work packages. Other work packages needs to consider the implications of the reformation of the zone system and zone relation matrices. Most importantly other work packages needs to adhere to the model configurations.

Model configurations

It is very important for other work packages to have model configurations as an integrated part of the design. The **methodology which was used to build the complete model with ArcGIS Geoprocessing** is a visual process where the modeller points and clicks at model components and connects them with arrows on a canvas. ArcGIS Geoprocessing is able to execute the models in the specified order and in a robust manner.

This reworked framework lays the foundation for **a far more easy creation of a wide set of different configurations** of the model. Users will be able to switch between the different base configurations without the need of having to make any modifications whatsoever (while also retaining the full flexibility for users themselves to create even more specialized configurations). **The base configurations will combine several factors:**

- General level of detail.
- Specific level of detail for sub-models.
- Different sectors in focus (freight versus passenger transport).
- Different modes in focus (road, rail, air, sea transport and inland waterways).
- Different policy assessment (policy appraisal versus project appraisals).

User interface design

The **TT3 model will have two separate user interfaces**.

1. **A detailed interface for experienced users** will allow full control of model configuration and runs. The detailed user interface will build on the proven interface of TT1 and TT2. The fundamentals of how it will function will be the same as in TT2: Users run the model from inside ArcGIS. **The user friendliness will be improved** as a result of the restructuring of the model logic and the development of a set of standard configurations, since this will significantly reduce the need for reconfiguring the models.

2. The model will also include **a much simpler user interface aimed at less experienced users**. The simple user interface will be **a stand-alone application with a graphical user interface** where users will be able to select and to run a specific scenario with a specific predefined model configuration. The application will log the progress of the calculation, and will allow the user to interrupt the calculation during model run. The simple interface **will not require knowledge of ArcGIS or Traffic Analyst.**

The detailed interface design is completed.

The TT3 detailed interface is being implemented in ArcGIS version 10 or later. The final ArcGIS version upon which the deployed model will rely has not yet been decided. The Traffic Analyst package that is integrated in TransTools for assignment purposes has been upgraded to ArcGIS 10.

Data structure

In TT1 and TT2 quite some emphasis was put on designing rigid data structure early in the project. In the end the modelers always needed something else and the data structure had to be changed substantially and repeatedly quite late in the process.

After careful consideration, it was decided in **TT3 to aim on focusing** the initial effort **on general principles and specific improvement that will be beneficial for the entire project** while not interfering with the still on-going model design processes. On the other hand, the DoW specifies, that the data architecture (meaning the type of databases and the methodology for scenario handling) in TT3 will be the same as in TT1 and TT2. This has proved to give some problems when operating the model, and the issues needed to remedy these shortfalls are presently being considered.

Implementing model framework

This task is progressing on schedule. Preparatory tasks have been carried out. Further completion awaits other work packages.

- **Flexible execution framework**
  This task is progressing on schedule. Preparatory tasks have been carried out. Further completion awaits other work packages

- **Automatic calculations of key figures**
  Developers of sub models need to consider and describe key figures that are relevant for the sub model. This task is progressing on schedule. Further completion awaits input from the sub models.

- **Automatic creation of maps**
  A **prototype of automatic map creation is ready**. This task is progressing on schedule. Further completion awaits input from the sub models.

TT3 GOES ON-LINE TO INVOLVE STAKEHOLDERS

The **1st Newsletter was sent out to some 800 validated email addresses** that generated an increasing interest in the project website as well. The average time spent on the site was some 4 minutes with a bounce rate at around 35%; later this rate was continuously decreasing. Most of the visitors were from the old member states.

THE CONSORTIUM

Beneficiary name	Country
Technical University of Denmark	Denmark
Institute of Transport Studies, Leeds	United Kingdom
Royal Institute of Technology	Sweden
Rapidis	Denmark
Tetraplan	Denmark
University of Oxford	United Kingdom
National Technical University of Athens	Greece
John Bates Services	United Kingdom
Swedish National Road and Transport Research Institute	Sweden
Nouveau Espaces de Transport en Europe Application de Recherce	France
ETH Zürich	Switzerland
University of Belgrade	Republic of Serbia
FŐMTERV Zrt.	Hungary
AustriaTech – Federal Agency for Technological Measures Ltd.	Austria

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