

The Space-Time Representation of Complex Transportation Networks

C. Y. Chew¹, Albert K. Chong¹ & Antoni Moore²

¹School of Surveying
University of Otago, Dunedin, New Zealand.
Phone: +64 3 479-7592
Email: chewc@albers.otago.ac.nz

¹School of Surveying
University of Otago, Dunedin, New Zealand.
Phone: +64 3 479-7587 Fax: +64 3 479-7586
Email: chonga@albers.otago.ac.nz

²Spatial Information Research Centre
University of Otago, Dunedin, New Zealand
Phone: +64 3 479-8138 Fax: +64 3 479-8311
Email: amoore@infoscience.otago.ac.nz

**Presented at SIRC 2005 – The 17th Annual Colloquium of the Spatial Information Research Centre
University of Otago, Dunedin, New Zealand
November 24th-25th 2005**

ABSTRACT

The complexity of land transportation systems nowadays requires an appropriate way of modelling and representing its related transportation features for ease of storage, retrieval, analysis and decision making. Transportation agencies and academic researchers participate actively in the GIS for transportation (GIS-T) community to improve and implement an ideal transportation data model, either for general purposes or for specific transportation applications.

Besides research focused on Intelligent Transportation Systems (ITS), this presentation will specifically explore issues associated with a proposed model of individual accessibility in the space-time domain (founded on Hägerstrand's Time Geography - TG). The space-time framework helps one to understand the nature and constraints of human travel behaviour within a limited space and the limited time available to an individual. Alternative representation of the TG element of lifelines will be specifically explored. It is put forward that adapting the TG concept with various cartographic symbologies can reflect the complexity of land transportation networks associated with human daily travel activities at the individual level.

Therefore, this paper studies the implementation of the GIS-T data model for the Malaysian land transportation network system in Kuala Lumpur. This network is representative of the complex transportation systems prevalent in major cities worldwide. Key to this complexity is the increasing use of the vertical dimension (i.e. besides routes on the ground surface, we have flyovers, underpasses, raised monorails, submerged underground rail tunnels) and increased width (number of lanes). As well as symbolized space-time display, network analysis and linear referencing systems (LRS) issues will be discussed.

Keywords and phrases: GIS-T, Intelligent Transportation System, Time Geography, Linear Referencing Systems