Traffic Software News

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TRL Software at TRAFFEX 2005

TRL Software demonstrated many of its innovative and world renowned software products at TRAFFEX 2005 on 19th – 21st April 2005 held at Birmingham NEC, Hall 4. TRAFFEX is the largest Transport event in the UK and is held every 2 years. TRL Marketing department headed by Robert Flenley and TRAFFEX coordinator, Kathryn Richardson organised TRL's participation at the event.

TRL demonstrated some of its world recognised software products through touch screen presentations and demonstrations. Among the software demonstrated included:

- Junction Design (ARCADY, PICADY, OSCADY)
- Traffic and Network Assessment and Control (TRANSYT, MOVA, SCOOT, MTV, CONTRAM, BUNDLE, MOLA)
- Strategic Modelling (STM)
- Environment (PERS, CarShare)
- Safety (MAAP, SafeNET)
- Bespoke Software (EIRVOL, VOSA, OTS, TCIS, CCIS, ALDM)

TRL staff interacted with delegates explaining our software capabilities and providing delegates with software demo CDs, product leaflets and merchandise. Some delegates who are current users of our software products were particularly interested in meeting our developers to ask specific questions and discuss ways in which TRL software can continue to develop and meet their current and future needs.

Abs discussing TRL Software capabilities and applications

In addition to our software, TRL also displayed DataBike, the latest technological development to help combat motorcycle rider causalities. This attracted many delegates who were keen to find out more about DataBike's capabilities and possible applications.

Developed to encourage safer motorcycling, DataBike's data recording equipment enables it to be used for:

- Collecting information about the road environment and driver behaviour
- Identifying areas of potential risk at specific motorcycle accident black spots
- Producing simple audits of signage, street furniture and the road surface
- Training purposes
- Making road safety videos

Software Bureau

TRL's new DataBike

The TRL Stand at TRAFFEX

A floor-mounted demonstration on the TRL stand entitled "Effects of transport scene" brought to life TRL's modelling capabilities showing the environmental, traffic and safety-related effects of different variables or policies (e.g. weather conditions or road layout). These modelling capabilities can be used to provide tailor made solutions for clients.

The event was a great success for TRL and we will soon follow up delegates who requested further information. Meanwhile, if you need more information on TRL events, services, or products, please contact us.

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FAQ's

This month's FAQ's brings you a selection of Frequently Asked Questions covering ARCADY, PICADY, and TRANSYT.

In ARCADY I would like to know how to model a large number of cyclists in the demand matrix?

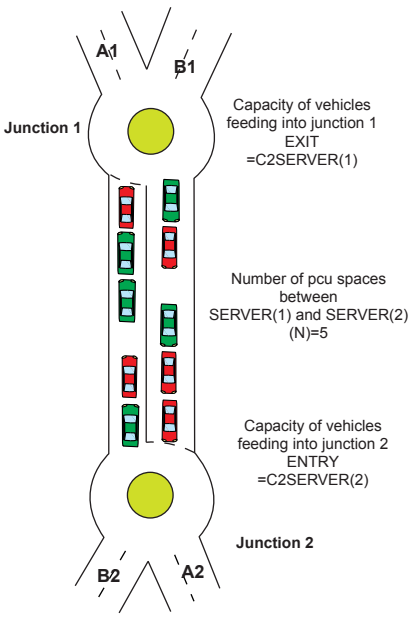
Cyclists have a greater effect on the circulating carriageway than on the entry. Ideally you would like to use 0.2 PCU on entry and, say, 1.0 PCU for circulating cyclists. This can't be done - but a 'work around' can help to achieve a similar result! First, run the model twice – first using 0.2 then using 1.0 for the PCU value of a bicycle. The run which uses 1.0 PCU for a cyclist should then be used, setting the site-specific correction to adjust the capacity of the entries upwards to compensate for the fact that the cyclists have a 0.2 PCU effect rather than 1.0 on the entries, i.e. using the difference in capacity between the two runs. The slope of the linear capacity relationship cannot be changed in ARCADY, hence why you want to use a PCU value for cyclists which is appropriate for the CIRCULATING carriageway. N.B. This should work quite well, but it should be remembered that the site-specific variation is making a FIXED difference in the entry capacities - if the geometries change the difference between the two different PCU runs may change. If significant geometric or flow changes are made the process should be repeated.

Within ARCADY does it matter whether the arms A, B, C, D are labelled clockwise or anticlockwise as long as the traffic flows are in the right direction?

Yes it does make a difference since the circulating flows past each of the entry arms will be calculated incorrectly.

Wishing to take account of the effect on capacity of two closely spaced junctions I read an old article in TSN Issue 9 called "Modelling double junctions". The article suggested a method of doing this, but I am unsure of how to obtain the values of C2SERVER(1) and the similar C2SERVER(2).

Peter's article says that the value is "simply the actual traffic flow down the exit..." I am assuming this article was written in response to a real user's enquiry and as such the solution works for that particular situation but not all, i.e. the article is not 'general' enough. The capacity of the Junction 1 'bottleneck' i.e. C2SERVER(1) is the actual traffic flow down the exit, *only when there is significant queueing on both A1 and B1*. If, for example there was no traffic on arms A1 and B1 the traffic flow on the exit would be near zero and would obviously not represent the capacity of the situation. I have suggested that the entries should be loaded with sufficient entry flows to establish sizeable queues on all entries and that the combined capacities can then be summed to provide a value. Put another way: if the upstream links have a demand flow that does not make full use of the available capacity the downstream links will have capacities which relate to the upstream demand, and as such cannot be summed to get a value for C2SERVER(1). This is because the upstream demand determines the downstream capacities. Note however, that if the combined capacities of the upstream links exceed those expected of the connecting exit link then you have just proved that the need for any capacity adjustment of the downstream entry is probably unnecessary.



Double junction

Is it possible to combine queuing and geometric delay to get the total delay per vehicle within current versions of the software?

It is <u>not</u> possible to do this since the definition of queuing delay has an element of geometric delay in it. The element of overlap is the delay associated with drivers checking that it is safe to enter a junction. It can be argued that this delay is both an element of queueing delay AND geometric delay and hence ARCADY is in fact correct to show it the way it does, included in both. Clearly this does not help those wishing to obtain a combined figure for total delay. However, It should be noted that, if the geometric delay was to be re-defined in ARCADY and PICADY to exclude this overlap it would then not be possible to measure the queueing delay as is currently possible! I would suggest that anyone facing a request for a total value of delay should provide both the queueing and geometric delay tables separately with an explanation of the fact that there is an overlap. Alternatively, there is an approximate representation of driver checking time given in TRL Supplementary Report SR810, although at the time of writing this, I have not sourced the origins of this 'estimate' of driver checking time and so cannot comment further on its usefulness.

Users running either OSCADY, ARCADY, PICADY or TRANSYT under Windows 2000 sometimes experience a problem with softlocx5.ocx. This usually takes the form of an error message appearing when you start the software, that states that the version of Softlocx is unlicensed.

The installation process can sometimes fail to register this component on the system. Therefore, the application is unable to run. To resolve this problem, the user can manually register the softlocx5.ocx file using the following simple steps:

1. From the Start Menu select Run…
2. Type in the command :
   regsvr32 C:\windows\system32\Softlocx5.OCX
3. Click OK.

If all is well, a message will appear saying that the registration has been successful. There is no need to re-install the software or to re-boot the PC.

Users running either OSCADY, ARCADY, PICADY or TRANSYT under Windows XP may find that when they come to transfer their licence to another PC, the option to transfer is not available.

This is usually caused by the use of Windows 'Themes'. There are two solutions:

1. Either locate the file "Transyt12.exe.manifest" and delete it. If you then follow the standard instructions on how to transfer the licence you will find that the option to transfer is now available.
2. Or use "START/Settings/Control Panel/Display" to change the theme to either "Windows Classic" or "Windows Classic (Modified)". Similar to the first option, when you retry accessing the registration screen you will find that the option to transfer is available. Once the new access code has been recorded the theme can be set back to what it was before.

In TRANSYT 12 I have three lanes represented by three shared links. For shared links are the queues shown in the TRANSYT final output table 'per lane? Furthermore, in the NetCon network diagram there appears to be a queue on the major link, but nothing on the minor ones. Is this right?

No! - The queues are not 'per lane'. The way to consider queue lengths in a master-shared link combination, and indeed all the data in the final output table, is as a single queue. Hence, if a queue is output as being 10 (and the same value will appear for the master and shared links) then the queue is 10 over the combined links: if the link represents one lane, the queue will be 10 per lane, if two lanes are modelled, the queue will be 5/lane, etc. It is a key to using TRANSYT that the master link and shared link(s) are NOT used to model lanes separately. The reason for using master and shared links is to allow cyclic flow profiles to be kept separate - for roundabouts this is to keep OD movements intact.

In the TRANSYT output 'PRT' file the queue associated with the shared link combination is repeated on each of the shared links. In the Network Construction Editor (NetCon) it was decided to display the queue just once and position it on the major link since there will only ever be one major link defined (for a shared link combination).

When I carry out a run of TRANSYT a dialog box appears with the message "Please wait - Formatting file...". The program then appears to do nothing. What is going wrong?

The reason for this is due to a problem associated with the VIEWER program. When a TRANSYT run is completed the VIEWER program is launched automatically. If before carrying out a TRANSYT run you already have the VIEWER running AND MINIMISED and you answer "Yes" to "Display in active Viewer?" you may get this problem. N.B. no drastic action is required – all that is needed is for you to task-switch (i.e. use alt-tab) to switch to the VIEWER icon on the task bar. Then immediately maximise the VIEWER. You will find that the VIEWER has successfully loaded and displayed your latest TRANSYT run output. If you experience this problem it can be avoided altogether simply by not minimising the VIEWER – just task-switch back to TRANSYT when you wish to leave the VIEWER running. **N.B. This problem is resolved in the version of VIEWER supplied with the latest releases of TRANSYT (Release 12.0 AD/4).**

I was wondering if there are any restrictions on distance between junctions in a TRANSYT network? If so, what is the largest acceptable distance?

No restrictions. Clearly if all the junctions in the model were a mile apart, TRANSYT would be of little use. The longer the links are the more dispersion will occur and there will be an associated reduction in the potential benefit gained by good coordination of traffic signals. The mean modulus of error (MME) value, reported in the cyclic flow profile (CFP) graphs in the TRANSYT output is a measure of how far the profile of arrival flow deviates from the mean. This gives an indication of the benefit of good coordination - a value of zero indicates no benefit. The spread of the CFP of the flow up to the stopline (i.e. the IN-profile) will also indicate the spreading out of the traffic by the time it has reached the downstream link.

In TRANSYT what are the limits regarding the number of junctions that can be modelled?

The limits are not defined in terms of numbers of junctions but in numbers of links and nodes. In TRANSYT 12 the maximum limits are 500 links and 100 nodes. In TRANSYT 11 they were 250 links and 50 nodes.

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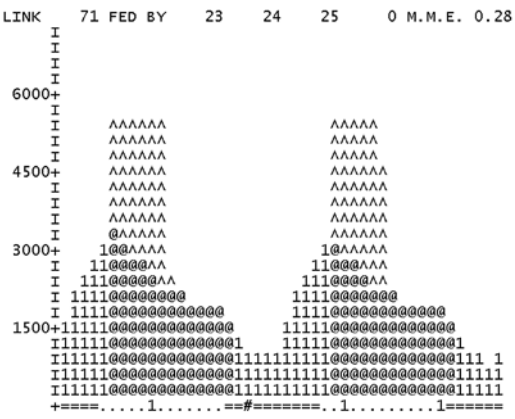
TRANSYT 12 – Maintenance Release

We are pleased to announce that a new maintenance release of TRANSYT 12 is now available to current maintenance holders (on request to the TRL Software Bureau). This release incorporates a number of improvements and minor repairs which are summarised below. This release (12.0 AD/4) can be used in place of all previous releases of TRANSYT 12.

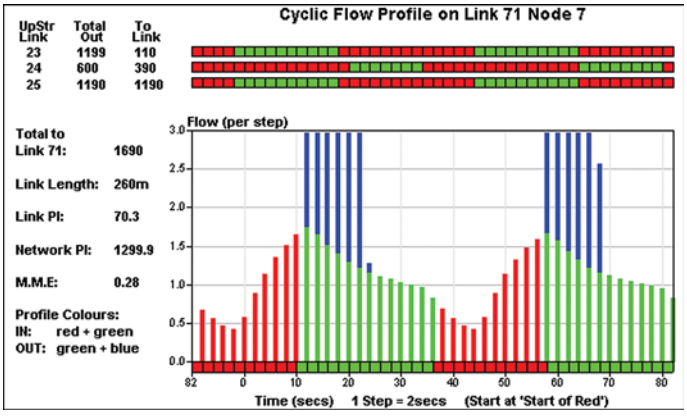
The main improvement is the addition of a new improved (and colourful!) version of the familiar Cyclic Flow Profile Graphs (CFPs) which are part of the existing TRANSYT output file. CFP graphs can now be generated via the TRANSYT 12 graphical interface in the same way as the Queue Graphs and Performance Index Graphs are created. These are based on the same data as those produced in the PRT file (which are generated by the analysis program), BUT... have a number of advantages, e.g.

- graphical display (instead of ASCII characters)
- no rounding of displayed data values
- values for ALL steps of the cycle shown (up to 300)
- saving to file (BMP and JPEG).
- scalable multiple graphs on-screen
- upstream (time-shifted) red/green times
- choice of time-axis starting at start of first red period or at the network's arbitrary zero
- choice of 'flow per hour' or 'flow per step'

i.e. from this...



to this...



Other improvements and repairs are as follows:

- GUI: various link data checks revised to avoid unnecessary warning messages, e.g. erroneous warnings of missing shared links now fixed.
- NetCon: Sub-nodes: Using View Network Details on sub-nodes no longer crashes NetCon.
- NetCon: Sub-nodes: Shared minor links now shown correctly.
- Analysis: Occasional 'equal length' double-cycling error now resolved.
- Analysis: Maxflow value no longer demanded by the analysis program for Shared Minor Links.
- Analysis: Writing out of trailing zero data values in Cards 10 - 18 fixed.
- Analysis: When step size > 60, CFP graphs no longer split unnecessarily between pages when printed.
- Viewer: VIEWER program no longer hangs with "Formatting File.." message when VIEWER is accessed while minimised.

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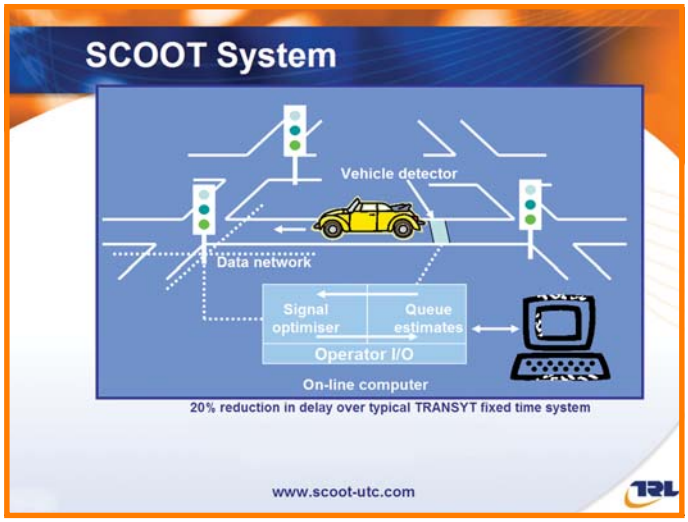
RELEASE OF SCOOT MC3

The SCOOT Urban Traffic Control system is now operating in over 200 cities and towns worldwide. Since the first system was installed there has been a continuous program of research and development to provide new facilities which take into account new technology and meet the requirements of the traffic manager. A new version, SCOOT MC3 (Managing Congestion, Communications and Control) has now been released which will improve SCOOT's operation in four key areas: communications, congestion control, bus priority and puffin pedestrian facilities.



Communication systems are continually developing and analogue dedicated lines, which currently most SCOOT systems depend on, are likely to become increasingly expensive and possibly not supported at all. A major new development has now enabled SCOOT to make flexible use of new communication systems and remove the reliance on second-by-second communication. SCOOT has been modified to use time-stamped data to allow for small time delays in communication between the UTC software and out station transmission units (OTUs). This increases the range of communication options available and in particular allows the use of some of the newer data communications systems e.g. ADSL, GPRS, G3, etc. which are packet based.

Another current day trend is the increasing problem with congestion in our towns and cities. From the outset the optimisers in SCOOT have acted in a way so as to help to control congestion. Over the years a number of additional facilities have been provided. Whilst the facilities provided are of proven value, there can be a problem in knowing where and how best to deploy them. To assist in this a congestion supervisor has been developed based on the information available in SCOOT. The aim of the supervisor is to continuously monitor congestion throughout the SCOOT controlled network, to identify links causing serious problems and to diagnose the probable reason for congestion emanating from those links.

A third trend is the desire to give increasing levels of priority to public transport vehicles. Currently bus priority in SCOOT is constrained by the normal stage order, but in SCOOT MC3, it has been made possible to skip stages. Trials have demonstrated that an average benefit of 4 seconds per bus per junction can be achieved in addition to that obtained through normal SCOOT bus priority. If stage skipping is introduced carefully and providing that main road stages and pedestrian stages are not skipped then there should be no increase in accident risk.

Puffin (Pedestrian User Friendly Intelligent) crossings are relatively new and are intended to become the UK standard for signal controlled pedestrian facilities at stand-alone crossings and junctions. Unlike pelicans, there is no flashing amber period and, instead, the length of the red to vehicles is variable depending on the time that pedestrians take to cross the road. At present when SCOOT is controlling Puffins, the feedback logic in SCOOT assumes (incorrectly) that the pedestrian stage is a fixed length. In SCOOT MC3 the kernel has now been modified to correctly model the variable intergreen period that follows the pedestrian stage rather than assuming it runs for a fixed length. SCOOT should now accurately model the on-street behaviour of Puffins and Puffin pedestrian facilities and thus provide improved control and reductions in delay to vehicles.

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Editorial

Modelling complexity in traffic systems – Vehicular traffic flow is a typical complex system. Such a traffic system involves complex interaction between drivers, vehicles, and the road infrastructure. Driver behaviour in particular is a challenging area for researchers. Have you ever wondered how a driver perceives visual information within the environment, uses some of this information for example, to assess the risk of collision, and take avoiding action? Or how limb coordination enables steering and braking? To assess these processes and operations requires detailed behavioural research into the dynamic relationship between the driver, the vehicle, and the highway network.

In modelling complex traffic systems, using a combination of microscopic and macroscopic or analytical techniques to address these issues offers the opportunity to improve the realism of traffic system behaviour, whilst producing credible models that can be robustly validated. The macroscopic or analytical approach can be used to capture traffic dynamics of networks in less detail, reducing data requirements and providing greater flexibility for calibration of the model. An agent-based microscopic technique can be applied to represent the inherent complexity and uncertainty in the system by explicitly modelling the characteristics of the traffic entities (i.e. agents) such as the vehicle, driver and network.

TRL has expertise and experience in developing such models, techniques, technologies and the application of these to help understand the complex interaction between drivers, vehicles, the environment, climate and the road infrastructure. In addition, TRL has recently strengthened this area of modelling by the appointment of Dr. Ronghui Liu (see article on page 5). We are interested to hear your views on these techniques and how we can provide innovative modelling solutions to meet your needs.

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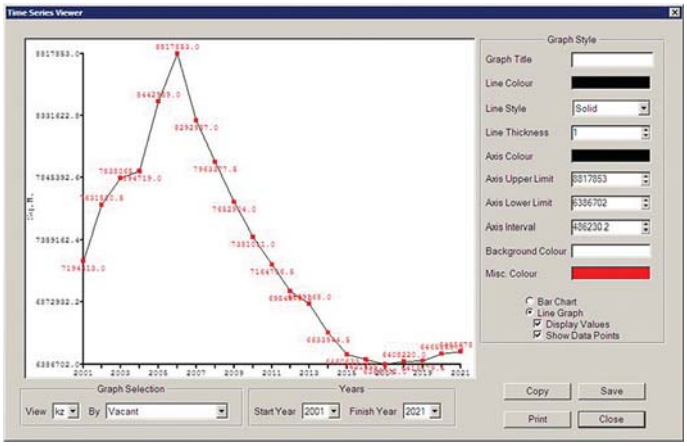
TRL'S STRATEGIC TRANSPORT MODEL

The Strategic Transport Model (STM) was originally developed at TRL to test multi-modal transport policies. The key design objective was a high-speed desktop tool which planners and policy makers could use to assess the potential impacts of policy levers applied either singly or in combination. Users would be able to identify, at an early stage, promising strategies on which more detailed investigation could be concentrated.

STM was therefore designed to model travellers' responses to the various components of travel costs, but without using a detailed representation of transport networks and route choice which accounts for a substantial part of the run time of large-scale models. The STM study area usually has a relatively smaller number of zones when compared with large assignment models; up to 173 zones have been used to date to model towns/cities, conurbations and regions. The range of modelled modes includes car, public transport and slow modes. There is also provision for the modelling of new Park-and-Ride schemes, and new light rail links and the impact of new railway stations. STM trip purposes cover home-based purposes (work, education, social/leisure, etc) and non-home-based trips. The STM applications to date have used two time periods: am peak and interpeak but these can also be extended.



Investigation of changes in transport and land-use variables over time in TRL's Strategic Transport Model (SITLUM application)

Levels of travel in STM are driven by planning data describing the spatial distribution of population, jobs and car ownership. Planning projections can be created within the STM software using TEMPRO growth factors or they may be user supplied. In the last two years TRL and David Simmonds Consultancy have built SITLUM (Strathclyde Integrated Transport and Land-Use Model) for Strathclyde Passenger Transport. This integrates STM and the DELTA land-use Model into a single system in which land-use and transport interactions are represented. In SITLUM, planning data are supplied to STM by DELTA. DELTA determines land-use patterns influenced by time-lagged transport costs from STM.

To increase robustness, STM is "incremental", i.e. it uses demand models (distribution/modal split) which derive future patterns of modal share and distribution from cost changes and the corresponding patterns in a base year. Highway travel times are calculated in STM using zonally-based speed-flow relationships for different road types. Road and rail trips follow routes through the zonal system based on the actual networks. Provision now also exists for using different highway routings in forecast years arising from changes in the road networks. STM iterates so as to converge towards "solutions" with equilibrium between demand levels and supply costs. The user can also specify a practical maximum limit for the number of iterations.

The user can apply a range of policy levers over modelled forecast years : cordon charges, parking, public transport supply and fares; as well as explore the implications of scenario changes in terms of demography and car ownership, real earnings and fuel prices. STM can then run in "time-marching" fashion over the specified forecast years to provide outputs for those years. A variety of STM outputs are possible relating to congestion, modal shift, emissions and road safety. Cost-benefit calculations based on the TUBA approach can also be enabled. A striking feature of STM is its Graphic User Interface (GUI) with an interactive map which gives exportable displays of changes in policy impact measures for comparison scenarios and GIS-style "thematic" mapping of outputs – the latest version of STM (used in SITLUM) also allows land-use variables to be displayed.

STM has found practical application in a number of key policy areas: LTP development; parking and public transport policy formulation; assessing the value of light rail schemes; modelling the impact of housing development and as a provider of input for regional transport and land use policies. As can be seen, STM has developed considerably over the years in a competitive market, taking into account Government guidance on modelling practice and recommended values for key parameters (e.g. values of time). It continues to evolve to provide the customised innovation which informed clients demand.

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TRL STRENGTHENS MODELLING TEAM

Dr Ronghui Liu has been appointed as Head of Transportation Modelling at TRL, effective from June 1st 2005. She is currently a Senior Research Fellow at the Institute for Transport Studies, University of Leeds.

Dr Liu is an internationally recognised expert in traffic microsimulation modelling, and has been a special adviser to both the UK Highways Agency and the US Federal Highway Administration.

After completing her PhD at the Cavendish Laboratory, University of Cambridge in 1991, Dr Liu spent two years as a Research Fellow at University College London, before moving to the University of Leeds in 1993. Her primary research area over the last twelve years has been in the development of dynamic traffic micro-simulation models, including novel applications such as guided bus, bus priority, selective vehicle priority, intelligent speed adaptation, and congestion pricing.

She was one of seven international experts invited to give keynote speeches at the International Symposium on Traffic Simulation in Yokohama in 2003, and has presented at seminars in China, Spain, Sweden, the Netherlands, and the UK.

At TRL she will lead a very strong and expanding transportation modelling team, with expertise across a number of disciplines, including the development of traffic micro-simulation models, macroscopic assignment modelling, and multi-modal strategic transport / land use models. Her role will include both applied research and consultancy for internal and external clients. Her strong academic background will enhance TRL's capability and scientific reputation in these key business areas, and will be a useful input into future product development.

Glyn Rhys-Tyler, Group Manager at TRL says, "We are delighted to welcome Ronghui to the team. She brings extensive research and technical expertise, which will be of significant benefit to TRL and our clients. We look forward to further growth of our transportation modelling capability in the near future."

Dr Liu will undertake a graduated move from the University of Leeds and will be working full time for TRL by December 2005.

Ronghui Liu
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TRAINING COURSES, SEMINARS & USER GROUPS 2005

TRANSYT
2 day Training Course at TRL
20th - 21st September 2005

If first fully booked, the 2nd course will be held on
22nd - 23rd September 2005

ARCADY & PICADY
2 day Training Course at TRL
18th -19th October 2005

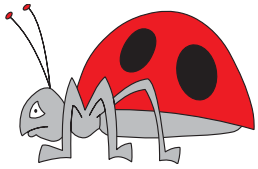
ARCADY & PICADY
2 day Training Course
13th -14th June 2005
in DUBLIN

SCOOT
2 day Training Course at TRL
Autumn 2005

Places are limited (9 delegates for each course) so if you are interested please register now to avoid disappointment

Contact the Software Bureau

BUG BOX



See article on new TRANSYT 12 maintenance release

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BUNDLE v3.1 on Palm OS (Version 5.x) devices is out !

The forthcoming release of TRL's Traffic Engineering software 'BUNDLE' for use on Palm OS devices will work on most Palm OS devices. This product, until now, only worked on Palm OS devices with the v4.x operating system. The new release comes with separate versions to work on both older v4.x devices such as the PalmOne m500™ series and the newer Palm OS v5.x devices such as the palmOne™ Zire™ series and Tungsten™ series.

The new release for Palm OS v5 devices also includes a number of improvements:

- MOVASPEED:
  Determining factor (85th Percentile) for CompactMova added
  Raw speed data stored and presented in the output file for the first 50 vehicles
  Vehicle type selection screen suppressed when recording only one vehicle type
  Revised indication that enough data has been recorded
- SATFLOW:
  Vehicle composition data (counts and percentages) provided
- All BUNDLE PROGRAMS:
  Beeping sounds added to data-entry buttons to provide feedback to the enumerator during recording. N.B. loud enough to hear over most traffic noise
  Coloured devices benefit from coloured screens.

A further announcement will be made when the product is available. Generous discounts will be available to those wishing to upgrade to this latest version of BUNDLE. Watch this space!

Jim Binning
Software Product Manager

CURRENT PROGRAM VERSIONS

ARCADY 6	V6.0 AB/2
PICADY 4	V4.1 AN/4
OSCADY 5	V5.0 AB/2
TRANSYT 12	V12.0 AD/4

(All above have Right/Left capability)

TPM	V2.1
STM	V4.4
BUNDLE 3	V3.0 Issue 2
MOVASETUP	M5.0.0
CONTRAM 8	V 8.2b
MAAP *for Windows*	4.30
*Safe*NET	1.03
PERS	1.1
MTV	V 2.0

Who's Who in Traffic Software

Dr Xiaoyan Zhang

Dr. Xiaoyan Zhang is a member of the Traffic, Software, and Modelling Group in the Transportation Division. She has a PhD in traffic dynamics, a MSc in traffic engineering, and a BSc in highway engineering. She joined TRL in 2000 as a senior transport modeller and was made a TRL Research Fellow in 2004. Xiaoyan's recent work includes multi-modal strategic transport modelling, the design of optimal transport strategies using the TPM and a land-use model newly developed at TRL and the EPSRC DISTILLATE project.

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