

## Innovative Application of TRL SafeNet by Devon County Council

**SafeNet is an innovative and interactive tool developed at the Transport Research Laboratory (TRL) Limited. It is based on extensively researched accident-risk models developed to estimate accident frequency on the road network. The more traditional use of SafeNet is to provide the scope to 'benchmark' the safety of different routes and areas, thus improving predictions of the benefits that would result from targeting remedial work. However, SafeNet can also be applied in other novel ways, for example:**

**Modelling planned developments** – When SafeNet is combined with a traffic assignment program, it can be used to determine the safety implications of changes to a network brought about by a new development. In addition, SafeNET can be used to determine the effect on safety of increased traffic flows brought about by the development.

**Targeting route improvements** – SafeNET can be used to model different route improvement strategies. For example, if there is an existing rural traffic signal junction, SafeNET can determine the benefits of improving the general design of the traffic signals as opposed to replacing the junction with a roundabout. The expected improvement in accident frequency can be calculated and used to work out the cost effectiveness of the improvements. In this way SafeNET can be used to determine what improvements should be made to which junctions and in what order the improvements should be implemented.

### Application of SafeNet by Devon County Council

– A practical application of SafeNet to assess planning applications has recently been used by Devon County Council. Tim Hipwell, Accident Investigation Officer, Devon County Council explains his experience in using SafeNet.

"I have been using SafeNet on large planning applications to ensure that as part of the safety audit process the most appropriate form of junction control is used where the development meets the existing highway interface. Developers always want to spend as little as possible and are loathe to provide new high grade junctions or improve existing junctions."

"I use SafeNet to predict the accident generation and back up my audit comments by showing for example that rather than providing a new T junction close to an existing roundabout it would be "safer" to redesign the existing roundabout (one heavily used junction is safer than two lightly used ones). I consider this approach entirely logical as it is using SafeNet as a comparison tool. As TRL is a highly respected and well known organisation most planning inspectors are content with the findings."

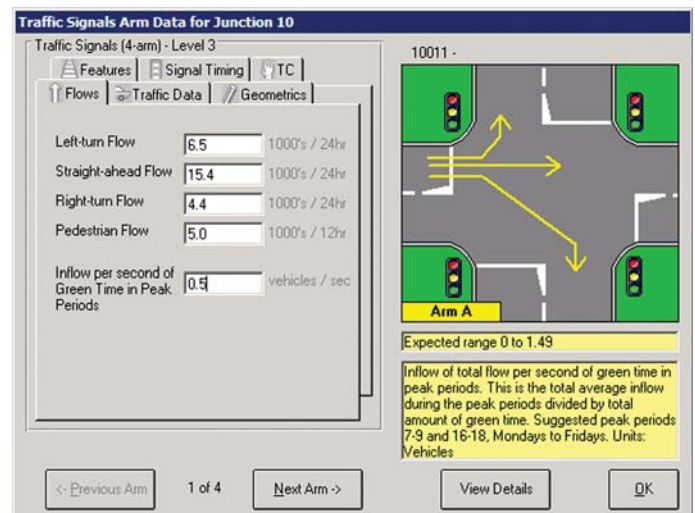
"One of the problems I have however is that a lot of applications only come with peak hour traffic flows and SafeNet requires 24 hour flows. I get over this by using nearby traffic counts and then using a peak hour - 24 hour factor. As SafeNet is only a comparison predictive tool I again consider this a logical and justified approach."

**Tim Hipwell;**

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**Dave Savage; dsavage@trl.co.uk**



4-arm Traffic Signal Junction

## Editorial

**Welcome to this issue of Traffic Software News (TSN). TSN is published by the Transportation Software Development (TSD) Unit at TRL and distributed to over 800 customers. Its key objective is to communicate to you the customer about our software products/services and technical issues, and to give you the opportunity to tell us about your experience in using our products within your organisation. In this issue, I would like to draw your attention to two points:**

The first is about the services offered by TSD. In addition to our software products, we also offer a number of consultancy services. Graham Burtenshaw's article on page 2 details some of these services.

The second point is a new customer focused initiative. To demonstrate TSD's commitment to developing and delivering customer focused products and services, we recently commissioned an independent market survey. Thanks to all who took part in the survey and we hope to report the results in the next issue of TSN.

Meanwhile, if you have any general comments regarding the articles in this issue of TSN or you would like to tell us how you are using our products in exploring particular problems, please send an e-mail to adumbuya@trl.co.uk or tel. 01344 770140. Hope you like and enjoy reading TSN.

**Abs Dumbuya**  
**adumbuya@trl.co.uk**



# Customer Focused Product Development and Software Solutions



The **Transportation Software Development (TSD) Group** is part of the **Transportation Division** at **TRL**. **TSD** is responsible for designing, developing and marketing many of **TRL's** world renowned software products such as **ARCADY, TRANSYT and MOVA**. These products are based on extensive research carried out across different Divisions at **TRL**. The distribution of our products is undertaken by our **Software Bureau**. As well as developing and maintaining these products **TSD** offer a range of consultancy services primarily based on the use of our software expertise, but also covering the wider area of traffic and transportation issues. Where necessary we can utilise the expertise of our colleagues at **TRL**, covering fields as diverse as aviation, rail, freight & logistics, infrastructure, accident investigation and many more, both in the **UK** and internationally.

Projects range from the simple to the very complex. The software component may be the final output, or it may only be used as a tool along the way. Some examples are:

- **Junction and network analyses**, using **ARCADY, PICADY, OSCADY, TRANSYT** or other appropriate tools. We can carry out the whole process, starting from a junction/network plan and traffic flows, and can provide results from different scenarios and supply recommendations and conclusions.
- **Ordnance Survey Accredited** advice and other digital mapping products (including aerial photos, satellite imagery and the new OS Integrated Transport Network).
- **GIS** advice and product development on platforms such as **MapInfo, ESRI (ArcGIS, ArcView), Microsoft MapPoint .NET** and more.
- We can use any of our software products on your behalf, to save you time and to give objective, independent results.
- Advice on and setting-up of **signal control systems** such as **MOVA** and **SCOOT**.
- Advice and consultancy on **Strategic Transportation Modelling**, including model development, operation and maintenance.
- **Customisation** of existing products to cater for local needs. For example, **PERS** is subject to continual development in order to add features requested by various local authorities.
- Development of software to **store, analyse and visualise data**.
- Data validation services e.g. **STATS19** data validation
- Design and construction of **websites** and on-line questionnaires and services.
- Marketing and distribution of (or advice regarding) software products.
- Development **of bespoke software solutions** for individual projects.
- Research and development of new models, data or methodologies e.g. the application of **micro-simulation** techniques to model realistic road traffic scenarios and understand the complex interaction between drivers, vehicles, the environment, climate and the road infrastructure.

On the software side, we offer a range of services - from specifying and developing software to meet your project requirements, through guidance in meeting QA requirements, to marketing/selling software products and providing first line support/maintenance. Our expertise lies mainly in software products related to transport fields, but is just as applicable to other areas. Services include:

- The complete **software development life cycle**, from analysis, specification and design, through implementation and testing, to ongoing maintenance.
- Specification, implementation, and application of **mathematical models** in a range of software languages.

We can also use our mathematical expertise to advise on algorithm development/problem solving.

- **QA advice and support** throughout the software development life cycle.
- **Database design and construction**, with development of associated browsing and data input software systems.
- PDA software development.
- **Visualisation** techniques enabling 2D/3D graphical representation of static or dynamic data.
- Demo production (Demos / Presentations for Websites/CDs).
- Advanced spreadsheet applications.
- **Website** design and development.
- Online questionnaires/surveys; online booking systems.
- Graphical user interface design and implementation.
- Product sales / support through the **TRL Software Bureau**.

For further details of the services that we offer, please see our website **www.trlsoftware.co.uk**.

If you would like to discuss any type of project and how we may be able to help you, please contact Glyn Rhys-Tyler, [grhys-tyler@trl.co.uk](mailto:grhys-tyler@trl.co.uk), Sanjay Vadgama, [svadgama@trl.co.uk](mailto:svadgama@trl.co.uk) and Jim Binning, [jbinning@trl.co.uk](mailto:jbinning@trl.co.uk).

**Graham Burtenshaw, [gburtenshaw@trl.co.uk](mailto:gburtenshaw@trl.co.uk)**

## TRL at the WCTR

**TRL presented several papers at the tenth World Conference on Transport Research (WCTR 2004) in Istanbul which took place at the beginning of July.**

The recently completed EPSRC-funded project on the Design of Optimal Transport Strategies was the subject of a paper presented by Mark Hudson at this event. Entitled 'The design of optimal transport strategies', the paper describes work that has been carried out in partnership with the Institute for Transport Studies at the University of Leeds. This project, which was described in detail in TSN issue 27 (September 2003), made use of **TRL's** Transport Policy Model (TPM) to generate a package of transport policies that maximises an objective function, or achieves a set of predefined targets.

The paper was well-received and will be followed up in October with a partner paper to be presented by Xiaoyan Zhang at the European Transport Conference (ETC 2004) in Strasbourg. This paper will concentrate on the impacts of land-use/transport interactions.

Further papers on the work carried out in this project are anticipated for journal publication in the near future.

**Mark Hudson, [mhudson@trl.co.uk](mailto:mhudson@trl.co.uk)**

# New Release of COBA

**COBA (COst Benefit Analysis) is a Department for Transport sponsored computer program maintained and distributed by TRL. It estimates the effects of highway improvements, in terms of time, vehicle operating and accident costs on the users of the road system. These user cost changes are compared with the construction and maintenance costs over the appraisal period.**

A new version of COBA, COBA 11 R6, was released in August. The main differences in COBA 11 R6 are:

- the inclusion of three (previously two) time modes (the default modes are WORK, COMMUTE, and OTHER)
- price base year updated from 1998 to 2002
- the extension of the appraisal period to 60 years (yearly results are grouped in blocks of 10 beyond the 30 year period)
- the ability to specify up to 10 flow groups (5 for weekdays and 5 for weekends- the "balancing" procedure used to obtain proportions of each flow group in each vehicle category is done separately for weekdays and weekends)
- the ability to specify traffic growth by flow group
- the user can allocate costs to Central or Local Government
- additional user specified output

The additional output feature allows the user to select a year, and a number of quantities from a predefined list. The value of these quantities is then written out for each link and for the chosen year in a form which allows easy loading into Excel spreadsheets.

The latest release also includes a new batch file – CobaBatch.bat – which allows the user to perform multiple COBA runs without re-launching the program every time (in earlier releases of COBA the DOS box would close after one COBA run had been performed).

## New Release of QUADRO

QUADRO (**Q**ueues and **D**elays at **R**oadworks) is another Department for Transport sponsored computer program maintained and distributed by TRL. Its primary use is in rural areas. It estimates the effects of roadworks in terms of time, vehicle operating and accident costs on the users of the road.

An updated version of QUADRO – QUADRO 4 R3 – was also released in August. The main changes were:

- the inclusion of three (previously two) time modes (the default modes are WORK, COMMUTE, and OTHER),
- price base year updated from 1998 to 2002,
- the ability to specify traffic growth by flow group.

**David Mustard, dmustard@trl.co.uk**

## Modelling a lane gain for minor road right-turners in PICADY

**Although PICADY was not designed with the junction shown in Figure 1 in mind, this kind of arrangement CAN be modelled reasonably well. The situation is as follows: The major road is two way, but Arm B traffic must only give way to the traffic travelling from A→C as B→A traffic enters a segregated lane and is separated from C→A traffic initially. Right turning traffic from the main carriageway into the minor arm (C→B) is prohibited. The presence of the additional offside lane on the main carriageway allows the right-turners from the minor arm to have their own lane (more or less – some weaving may take place downstream of the junction).**

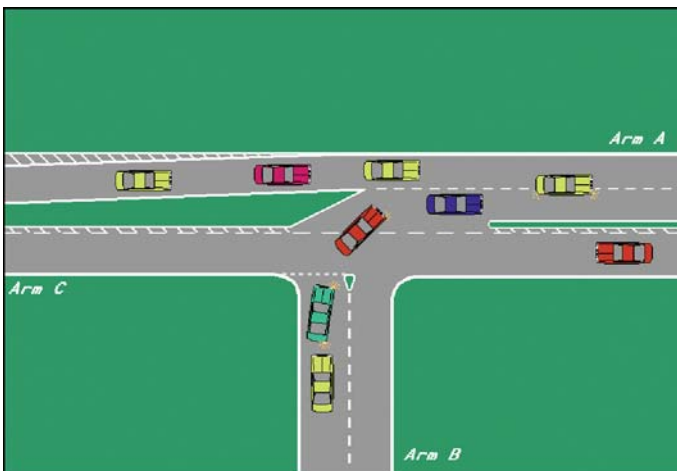


Figure 1: Lane gain for minor arm right-turners

The junction can be modelled by specifying the minor road (Arm B) demand flows and the measured geometry as normal. The main carriageway demand for arm A (both A→C and A→B) should also be specified as normal, but the demand on Arm C should be set to zero flow. The main carriageway width should be measured in the usual way except for the width on arm A which should exclude the width of the nearside lane which is in effect being ignored, e.g. if the widths are as follows: offside exit lane on Arm A = 3m; entry lane on Arm A = 3.2m; exit lane on Arm C = 2.8m; entry on arm C = 3.1m then the approach road half width, **W = (3 + 3.2 + 2.8 + 3.1) / 2.**

Note: PICADY may tend to underestimate the capacity of the minor arm as drivers KNOW they do not have to give way to traffic travelling along the main carriageway from C→A. Specifying zero flows on the main carriageway is not the same, as there IS a difference between giving way to zero flows and not having to give way at all. On the other hand, the merging effect on the main carriageway downstream of the junction is likely to have a detrimental effect on the minor road capacity and hence the two effects MAY cancel each other out. If concerned about these effects, the best option is to carry out site observations (if possible) and use them to calculate site-specific adjustment factors.

**Contact: Jim Binning  
jbinning@trl.co.uk**

### CAN WE HELP YOU?

#### TRL Traffic Consultancy Services

- Traffic Impact Assessment
- Review TIA
- Junction/Network Modelling
- Traffic Signal Design
- MOVA Verification Service, design and installation

#### TRL Safety Consultancy Services

- Accident Prediction Models
- Route Treatment
- Safe Route to Schools
- Safety Audit
- Speed Management
- Traffic Calming
- Accident investigation and Litigation

# Safety of MOVA traffic signal control at 'High Speed' junctions

TRL has been commissioned by the DfT to further investigate the safety of MOVA (Microprocessor Optimised Vehicle Actuation) traffic signal control at 'High Speed' junctions (where the 85<sup>th</sup> percentile speed exceeds 35 mph). The work is now in the final stages and a published report is expected to be available from Autumn 2004.



The MOVA strategy has been developed at TRL over many years and has proven to be significantly better than standard Vehicle Actuation (VA) traffic signal control in terms of efficiency, capacity and delays. Early studies also showed that MOVA can reduce red-running substantially, and an improvement in safety was also indicated at high speed sites compared with traditional method of control - VA with speed assessment (SA) or speed discrimination (SDE). For some years now, MOVA has been the standard control strategy for new and refurbished trunk road sites and has found favour with many other highway authorities.

A later MOVA safety study, completed in 2001, looked at the accident records of 31 high speed sites that had been converted to MOVA from VA with SA/SDE. MOVA was found to be as safe as VA with SA/SDE, but no more than that. Better was expected, and a new study was commissioned to consider the reasons for the lack of improvement. The main consideration was whether or not the quality of the MOVA configuration data had an influence on safety.

Of the 31 sites in the original study 25 were used in this. The others had undergone changes that prevented their inclusion. At each, a sample of the data required to configure MOVA was measured. The

measured data was compared with the MOVA data in use at each site and a score was deduced based on the comparison. In addition, the link-lane structure, detector configuration and bonus data were all considered by TRL experts and formed a further part of the assessment.

The overall results for personal injury accident frequency again showed no significant difference between VA with SA/SDE and MOVA at the signal junctions studied i.e. the result states that MOVA is at least as safe as the traditional method of control.

The sites were then split into low and higher scoring sites. The group with the highest scores for MOVA configuration had a lower accident frequency under MOVA than under VA. The difference was statistically significant at the 5% level for junction accidents and for non-single vehicle accidents. The differences were 19% for all accidents within 100m of the junction, 26% for junction accidents and 29% for non-single vehicle accidents.

The remaining group of lower scoring sites showed an increase in accident frequency compared with VA, of 20% for all accidents within 100m of the junction, 15% for junction accidents and 3% for non-single vehicle accidents at the junction. The increase for 'All accidents' was statistically significant at the 5% level.

A check was made on the accuracy of the individual MOVA data items to see which (if any) had the greatest bearing on the safety record. Cruise speed had the strongest bearing, but with no better discriminatory power than the overall score.

The results thus indicated that poor quality configuration data has a deleterious effect on the safety of MOVA controlled junctions.

The most important recommendation is to take steps to reduce the incidence of poor MOVA configuration data. This includes dissemination of the results of this study; recommending that MOVA data is checked on high speed sites; pushing the planned development of the online measuring facilities for saturation flow and cruise speed; and promoting the need for MOVA training.

Any views expressed are those of the Authors and they do not necessarily reflect the views of the Department for Transport.

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## Buying TRL Software Online: E-Commerce takes off

Since the relaunch of [trlsoftware.co.uk](http://trlsoftware.co.uk) we are now experiencing an increase in customers purchasing TRL products online. Our secure online payment methods streamlines the previous paper order forms by allowing you to select the type of licence you require from our range of options and automatically calculates any discounts that are available for educational or bulk purchases.

A screenshot of a web browser showing the 'Payment details' page for TRL software. The page includes the TRL logo, a 'Home' link, and the text 'Your TRL Software Bureau order reference number is: 1019'. The total amount is listed as '£2,514.50'. Below this, there are logos for Visa, Mastercard, and American Express, along with a 'thawte SECURE SITE' logo. A form for card payment is visible, with fields for 'Card type' (set to Visa/Delta), 'Card number', 'Start Date (mm/yy) / Issue no:', 'Expiry Date (mm/yy)', and 'Name on card:'. At the bottom, there are 'Make payment' and 'Cancel purchase' buttons. A note at the bottom states: 'NB: The invoice address entered on the previous pages will be used as the billing address. NB: To pay by bank transfer (or other means), or to arrange to be invoiced when the goods are sent, please contact the Software Bureau quoting the order number shown above. Pressing the Cancel Purchase button below will close this page but will not delete the details of your order.'

A comprehensive help page will guide you through all aspects of your purchase from helping you to decide which type of licence is right for you, giving you an overview of our maintenance agreement and the help and support you can expect from TRL's technical staff. This page also calculates the correct postage and packing based on your delivery location and gives you helpful advice and tips through all aspects of your purchase. If however, you prefer the human element to your purchase, our helpful sales staff in our Software Bureau are only a phone call away and they will be happy to guide you through the purchase process or offer any further help and advice you may require.

If you haven't already seen our new website, why not check it out today? As well as e-commerce, it provides a detailed description of all our software products, downloads of trial software, help and advice on technical aspects, archived newsletter and publications and helpful contact details for getting in touch with the relevant people at TRL.

**Chris Edge, [cedge@trl.co.uk](mailto:cedge@trl.co.uk)**

# CONTRAM is being used in the ATM motorway control project

A CONTRAM model of the West Midlands strategic road network is being developed for the Highways Agency by TRL Limited, supported by Mott MacDonald. The model will enable the establishment of a Network Active Traffic Management (ATM) Supervisory Subsystem (NASS) to provide decision support to operators controlling the section of M42, west of Birmingham.

NASS is expected to become fully operational in 2006 on a section of M42 between junctions 3A and 7. It will use the model in three ways:

- To enable NASS to predict congestion between junction 3a and 7 of the M42 at least one hour in advance.
- To enable NASS to predict and assess the effect of any ATM Traffic Controls (Ramp Metering, Hard Shoulder Running and Variable Speed Limits) plus Roadworks and Incidents.
- To return predicted results within reasonably short runtimes so they can be used in the 'real time' applications.

CONTRAM has benefited from a large amount of development work in recent years on modelling Intelligent Transport Systems (ITS), including the work funded by the Swedish National Roads Administration on modelling incidents. The latest version of CONTRAM includes features for representing network tactical control systems as well as modelling the dynamic nature of incidents.

CONTRAM models will be developed to represent traffic levels for different days of the week and times of the year so that control systems can be used by operators to optimize network performance.



## New Version 8.2b

The new version of CONTRAM was released in April 2004 as part of a continuing development path of updating and adding new facilities. The new version includes new dongle checking routines to avoid interruptions caused on some Windows XP installations and also supports USB dongles. New features include a batch facility for select link route analysis and a new 'Find Node' routine that finds and highlights a node on the network. Various other changes to presenting results and minor bug fixes have been included in this latest version.

[www.contram.com](http://www.contram.com)

**Chris White**

**Email: [christopher.white@mottmac.com](mailto:christopher.white@mottmac.com)**

## Training Courses and User Groups at Crowthorne House

**This year, TRL is proud to hold our training courses and user groups at our brand new offices.**

We'd like to celebrate our move to Crowthorne House by inviting you to our user groups in the Autumn. We are holding the following one day user groups and seminars at Crowthorne House:

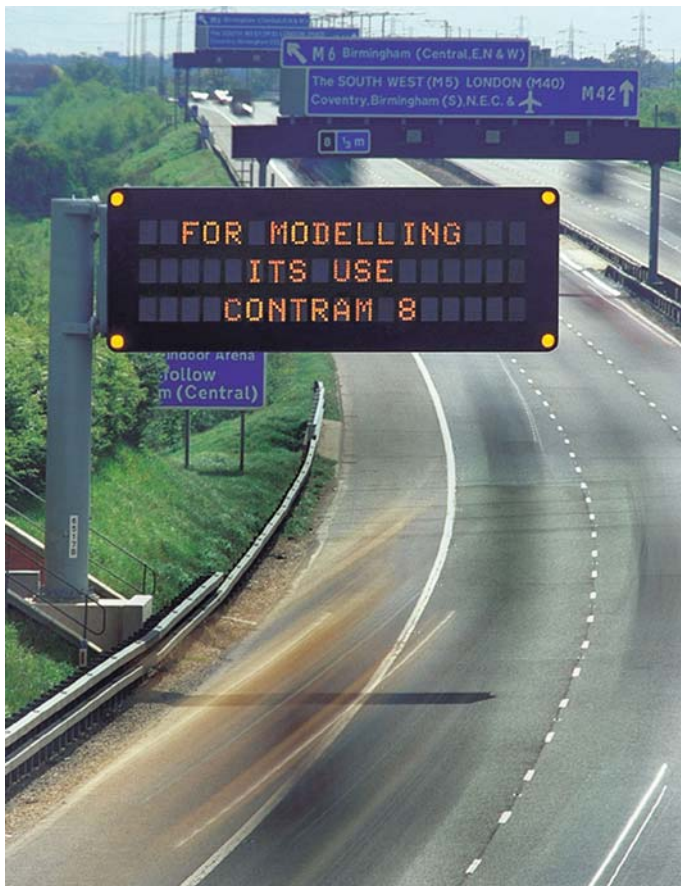
- TRANSYT user group – 2<sup>nd</sup> November 2004
- ARCADY, PICADY and OSCADY user groups – 3<sup>rd</sup> November 2004
- Strategic Transport Modelling Seminar – 4<sup>th</sup> November 2004
- CONTRAM Forum – 15<sup>th</sup> November 2004

Please come along and have a look at our new headquarters, and learn more about our software, new features, planned developments, and how best you can use them. Please find booking forms enclosed.

As well as the user groups we will be running our training courses, in the new state of the art IT room. The courses are filling up fast, so for any last minute bookings, please get in touch with the software bureau or see the booking form enclosed. See back page for details.

If you have any other training needs or would like more information, please contact the Software Bureau.

**Kathryn Smith, [kasmith@trl.co.uk](mailto:kasmith@trl.co.uk)**



## Coming Soon

**With the relaunch of [trlsoftware.co.uk](http://trlsoftware.co.uk) and a raise in the profile of TRL's Internet consultancy services we are currently putting the final touches to our Internet consultancy service which we are hoping to launch in the Autumn. Available through [trlsoftware.co.uk](http://trlsoftware.co.uk), TRL will be able to provide a host of Internet Services including:**

- Website development
- Internet consultancy
- Windows and Linux hosting
- E-Commerce
- Search Engine Optimisation
- SMS services

We will be launching details of this in the near future via our website and Traffic Software News but if you would like to discuss this further please contact Chris Edge on 01344 770511.

**Chris Edge, [cedge@trl.co.uk](mailto:cedge@trl.co.uk)**

## TRAINING COURSES, SEMINARS & USER GROUPS 2004

### TRANSYT 11

A 2 DAY TRAINING COURSE  
13th -14th September 04  
Course Fee £500  
(£450 Maintenance Holders)  
if first fully booked, the 2nd  
course will be held on  
15th - 16th September 2004

### ARCADY 5 & PICADY 4

A 2 DAY TRAINING COURSE  
11th-12th October 04  
Course Fee £500  
(£450 Maintenance Holders)  
if first fully booked, the 2nd  
course will be held on  
13th - 14th October 2004

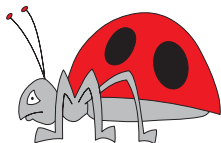
### SCOOT

A 2 DAY TRAINING COURSE  
20th -21st September 04  
Course Fee £700  
All prices exclude VAT

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



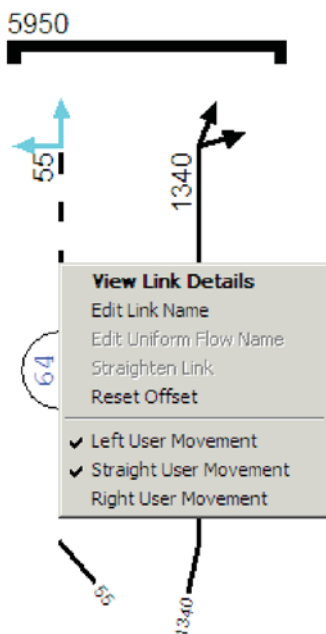
**OSCADY 5:** The program will crash if any line in the Run Information description field is longer than 60 characters. This fault will be corrected in a future release.

**TRANSYT 12:** See article (back page) on latest issue of TRANSYT 12. This release corrects a number of previously reported bugs.

## TRANSYT 12 Re-issue (Release 12.0 AC/3)

**TRANSYT 12 Release 12.0 AC/3 is now available and has been sent out to all users who have software maintenance. Within the graphical interface (Release AC) specific work was carried out on the emissions data after a number of problems were identified. One of the Vehicle Emissions tables now shows the emissions per km per vehicle per hour in micrograms instead of milligrams. Besides various other bug fixes, several important new features have been added to NetCon:**

- Representation of links which feed into the back of other links which all have the same controlling node now works by showing a sub-node (e.g. Node 1a) into which the upstream links feed
- The font sizes of various text items can now be manually set
- A useful new feature allows you to add additional flow direction arrows (coloured turquoise) to any link to indicate the direction of flows leaving the network (see diagram below).



The analysis program (Release 3) has also been updated, with a number of bug fixes, including a fix to the LINCAL error associated with large networks.

An updated Help Tips file with the latest help tips and updated with TRL's new postal address is also supplied with this release.

All users will benefit from the changes in this release, therefore we recommend that ALL users should start using this release as soon as they receive it.

**Contact: Jim Binning  
jbinning@trl.co.uk**

## CURRENT PROGRAM VERSIONS

ARCADY 5	V5.0 AE/1.1
PICADY 4	V4.1 AN/4
OSCADY 5	V5.0 AB/2
TRANSYT 12	V12.0 AC/3

(All above have Right/Left capability)

TPM	V2.1
STM	V4.4
BUNDLE 3	V3.0 Issue 2
MOVASETUP	V 4.0c
CONTRAM 8	V 8.2b
MAAP for Windows	4.20
SafeNET	1.03
PERS	1.1
MTV	V1.2.9

## Who's Who in Traffic Software



### David Mustard

David Mustard joined TRL in 1997 and is now a member of the Software Development Group. He has a BSc in Mathematics/Physics from Glasgow University and an MSc in Computational Mathematics from Teesside University. His main programming skills are FORTRAN and Visual Basic.

David has worked on many software products including CONTRAM, MOLA, TRANSYT, OSCADY and ARCADY. He has just finished working on the release of the latest version of COBA 11, and is currently preparing a similar new release of QUADRO 4.



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