



## SATURN TEN – Version 10.9.24

**First of all, I wish you a warm welcome to the fourth, and final, full release of SATURN 10.9, 10.9.24.**

SATURN 10.9 is the successor to all previous versions of SATURN. It represents a direct evolution from its predecessors whilst offering significant enhancements from the strong existing base. The first internal release of SATURN 10.9 was in December 2008 (denoted by purely temporary version numbers 10.9.01 through to 10.9.11) with the first full release 10.9.12 in December 2009, albeit with certain new (non-default) options effectively still in Beta form. The second full release was Version 10.9.17 in June 2010 whilst the third was Version 10.9.22 in January 2011.

The latest version, 10.9.24, is now available (June 2011) in order to correct a handful of minor bugs which had been found in 10.9.22 (summarized below with the full list reproduced in Appendix E.6) as well as updating a number of new features introduced with 10.9.17/22 (see below and also described in Appendix D.18). Note that, as with 10.9.22, some of the more recent features are still effectively in Beta form but are complete and awaiting user feedback.

In particular, 10.9.22 introduced full simulation of flared lanes (see 6.4.9.3 and 8.2.6) to all users and further enhancements have been made to the 'internal' calculations with 10.9.24; as such, the results from 10.9.24 may be significantly different from 10.9.22 (but **only if** flares were coded; otherwise they should be virtually identical).

As previously noted, a word of caution is still required: the modelling of flares is still at a relatively early stage of development compared to the rest of the suite and further changes may be expected in the future. Thus, while the added impact of flared lanes seems to be "sensible" in the majority of situations tested to date, there will almost certainly be unlikely combinations of circumstances arising at some point in the future which will lead to unrealistic results and which will necessitate changes to the modelling. Users are strongly encouraged to include flares in their data coding – but with care and we welcome your continued feedback.

### **1. New General Features with SATURN v10.9.12**

SATURN 10.9 adds many new features affecting simulation-assignment functions and network displays and editing. This section primarily highlights those that were first available in 10.9.12 whereas the next section describes the most recent additions in 10.9.17, 10.9.22 and 10.9.24.

- Various updates to the **SATWIN** Interface with the option to link the various files used by SATURN to their respective programs (i.e. executables) with Windows Explorer (see 3.6.6) as well as re-running previous events (see 3.6.5);
- A new command line parameter **QUICK** in the key programs, if used, artificially reduces all loop etc. counters such as MASL, NITA, NITS etc. to minimal values so that the program runs in minimal CPU. This is very useful for checking if long batch files have been set up correctly (see 14.10). The QUICK option may also be set globally (along with the existing **QUIET** option) via **SATWIN** (see 15.55);
- A significant number of further 'error' checks in **SATNET**, coupled with the extension of the **WRIGHT** parameter that converts certain existing warnings, serious warnings and/or non-fatal errors into semi-fatal errors (NAFF) on the basis that there is no conceivable reason that could explain these errors. The removal of

these coding errors will improve the convergence in the assignment and reduce CPU time;

- A new parameter FLAREX was added in **SATNET** to model explicit flares for X-turns at signals (see 8.2.5.2). (A similar option for priority junctions is now included in 10.9.22 and 10.9.24.) In conjunction with these changes, MONACO and AUTNUC now default to TRUE;
- There are two significant revisions to the modelling of blocking back within **SATALL** namely:
  - ◆ The network coding practice of sub-dividing a link into a short series of two-arm “artificial” nodes (e.g., to give it “shape”) has now been formally identified as a “chain” of nodes with applications to blocking back, random delays, etc. etc. where we expect the series of links to function as a single link in some respects. This will improve the performance of SATURN, the convergence and the presentation of the model outputs (see 5.1.12 and 8.5.5)
  - ◆ Blocking back may also now be “phased in” when the queue on the link is only slightly smaller than the stacking capacity by setting  $BB109 = T$  and  $BBKING < 1.0$  (see 8.5.6). This is released in **BETA** form so it should be used for **research** purposes and we will be interested in feedback
- A new option UFC109 in **SATALL**, if used, will: (a) store the multiple user class link times per iteration as opposed to link (generalized) costs by both iteration and user class and (b) store the costs/times as a rolling summation of **all** Frank-Wolfe iterations over **all** simulation-assignment loops instead of re-creating the assigned route flows by an extra SAVEIT assignment. Point (a) means that the MUC .UFC files produced under UFC109 are reduced in size by a factor of 1/NOMADS while (b) guarantees that any secondary analysis, e.g., skimming, based on routes is exact, not an approximation. However, there may be a dis-benefit under (b) in that there may be many more rolling iterations in total than there would be in a SAVEIT assignment which means that: (i) the .UFC files become larger and ii) any secondary analyses take longer (see 15.23.3)
- The method for calculating random delays upstream of links which block back has been modified so that the capacity used in the formula is the capacity **before** blocking back was applied. This removes a possible discontinuity when the link downstream goes from a state of blocking back to not blocking back or vice versa. See 8.6.5. In addition random delays are **not** included on links which are part of “internal” chains of 2-arm “artificial” nodes. See 8.6.4. Taken together these may produce significant differences in delay calculations (but clearly only if LRTP > 0)
- Within **P1X** the differences in network coding of individual simulation nodes between networks 1 and 2 may now be “highlighted” and node graphics loops over those nodes that differ may be initiated. This is a very useful option for discovering the variations between two networks. A complete table of differences per node is printed out automatically to the .LPP file (see 11.6.5.4)
- An option (SKIM\_ALL) to skim O-D time, distance and tolls simultaneously from a forest (as opposed to carrying out 2 or 3 separate skims in order to reduce CPU time by a factor of roughly 2 or 3) has been added in **SATLOOK** (see 15.27.7). (It has since been extended to allow a fourth matrix of time penalties to be included.)
- A new program called **CASSINI** has been added to enable the network parameters to be adjusted between external demand loops dependent on the level of convergence reported by the demand model (e.g. DIADEM). This may significantly reduce the SATURN assignment times for the earlier loops depending on the settings used (see 15.54)

Note that from 10.8.17 onwards, a new upper limit of **2000** zones in the *standard* version was introduced to reduce excessive memory requirements. Whilst the overall limit remains, the internal limits have been increased to provide more 'headroom' for stacked matrices and matrix estimation. With 10.9.22, a new intermediate 2750 zones size was introduced in autumn 2010 to cater for all the London HAMS. As always, all three versions permitted within the licence are freely available upon request without additional charge. If users receive an error message stating that the 2000 zone limit has been exceeded, please contact us and we will supply an appropriate update.

## 2. Latest Additions in 10.9.17/22/24

This section reviews the most important changes which have been made from 10.9.12 up to and including 10.9.24 (i.e., between December 2009 and May 2011).

References to the relevant sections in the Manual are given.

- Network Aggregation (Spider Web Networks) (15.56). A very simple but very powerful idea it works by combining links in series prior to carrying out a network assignment and empirically reduces assignment CPU times by factors of between 4 and 10 or, in certain cases, even more. It can equally reduce CPU times for post-assignment analyses such as cost skims. Note that it does not reduce simulation CPU time by similar amounts so that the overall reductions in CPU time are somewhat less – but still comparable to using multi-core. N.B. Still in **Beta form** but development work completed.
- Tighter SATNET error checking with WRIGHT = T (6.12.2). A significant additional number of Serious Warnings and Non-Fatal Errors have been upgraded to Semi-Fatal Errors under WRIGHT = T in order to better reflect what we feel current practice should be. Most previously coded networks are liable to fail under the latest criteria although by a judicious use of ERRYES exemptions and/or setting WRIGHT = F it is quite feasible to continue to run old networks. But not necessarily recommended! No further changes have been made post-10.9.17
- Changes to TOPUP in SATNET (6.15.3) which make it easier to over-write simulation node coding with \$INCLUDE files.
- An accelerated version of AUTOK (9.3.2) may reduce the number of repeated simulations necessary to average assignments and therefore reduce overall CPU time.
- A new “topological” order of node simulation (8.3.4) has been introduced with a view to speeding up simulation and activated by setting SIM109 = T.
- Extra link etc. data items added to standard lists in P1X
- A “Resume” option in P1X (11.4.4) allows users to carry on using P1X with exactly the same set of parameters and window definitions as at the conclusion of the previous run of P1X.
- ERL files (15.58) are an attempt to make it easier to identify coding errors which have previously been checked (therefore part of an “audit trail”) as well as to distinguish newly added errors. Still under development but enhancements introduced with 10.9.24 significantly improve its functionality.
- UFC109 (See 15.23.3) Introduced in 10.9.12 it caused problems, particularly in conjunction with SATPIJA, but all known problems were corrected under 10.9.17.
- FLAREX/FLAREF (See 8.2.5.2). The original function of FLAREX as Introduced in 10.9.17, i.e., to allow extra straight ahead traffic in a shared lane



with blocked X-turners at signals, was extended in 10.9.22 to model priority junctions and inner lanes (FLAREF) as well. Major development work in 10.9.24 with significant revisions made to the internal calculations has improved the stability of the simulation routines

- Multi-Core versions of SATPIJA and SATLOOK to complement the existing SATALL capability (see 15.53) were introduced in 10.9.22 and extended to SATCH and SATUFO in 10.9.24. The multi-core operations are undertaken using two different techniques: SATALL and SATLOOK are undertaken internally by the programs, controlled by the MULTIC parameter, whilst SATPIJA, SATCH and SATUFO use a distributed form controlled by new batch files (again, see 15.53 for further details).
- (available to all users that have purchased the Multi-Core Add-on module). N.B. The latter are still in **Beta** form but major development work has been completed
- Multi-Core version of SATALL Network Aggregation released to existing Multi-Core users. It is released in Beta form with 10.9.24 but major development work has also been completed.

### 3. *Compatibility with Previous Versions*

In terms of compatibility with previous releases, there are a number of points that users need to be aware of:

- There have been no changes to the format of binary matrix (.ufm) files so that matrix files from previous releases (within reason!) may still be used within 10.9.24 and, conversely, previous releases of programs such as MX should be able to happily read and process .ufm files produced under 10.9.24.
- The formats of network ASCII data files (.dat) and (a few) control files have evolved marginally (e.g., new &PARAM parameters and/or options have been added) such that there is no absolute guarantee that a file created under 10.9.24 “rules” will be backwards compatible for programs issued under previous releases. However 10.9.24 programs should be able to correctly read all data and binary .ufs files created by previous SATURN releases – with the caveat that the defaults for certain missing parameters in .dat files may have changed,
- The number of error checks, both fatal and non-fatal, remain broadly unchanged from 10.9.17. It is therefore likely that network data files which previously “passed” the more stringent checks introduced, under the WRIGHT=T parameter in SATNET 10.9.17, will continue to ‘pass’ in SATNET. However, it is **probable** that networks from 10.9.12 or earlier, will fail and the necessary corrections will need to be made before that network will run under 10.9. Alternatively, the user may turn this ‘off’ by setting WRIGHT=F.
- Given the changes introduced into some of the simulation and assignment routines (e.g., to prevent program crashes, hard-coding Q106 and RB106 to TRUE and setting the defaults for RTP108, MONACO, AUTONA, AUTOK and AUTNUC to TRUE) SATURN 10.9.12 will almost certainly produce different answers, given the same inputs, from previous releases, e.g. 10.8.22. Equally 10.9.17 will give different results to 10.9.12 as will 10.9.22 to 10.9.17, particularly for those models using new FLAREX/F options.
- On the other hand 10.9.22 and 10.9.24 should give virtually identical results **except** if flares have been coded since, as noted earlier, the modeling of flared lanes has evolved significantly between the two releases. (Indeed users with 10.9.22 happily installed may not feel any great pressure to upgrade to 10.9.24



**unless** they are liable to experience any of the “significant” bugs detected in 10.9.22 and listed in Appendix E.6, notes 31) onwards; principally, flares, use of SATSUMA and use of P1X for buffer-only networks. On the other hand there are four months worth of extra “features” within 10.9.24 as well as the correction of “minor” bugs.)

- If users wish to try out the phased-in Blocking Back (BBKING) option then the differences are likely to be much larger. To a certain extent older results may be reproduced by using the parameter NFT = 108 (say) to exclude the most recent changes but, unfortunately, some of the changes have had to be “hard wired” into the code and cannot be avoided. Remember that they have all been introduced for very good reasons!

#### **4. Compatibility with Windows 7 & 64-bit**

SATURN v10.9 is also fully compatible with the latest release of Windows 7. Whilst SATURN continues as a 32-bit application, it will run equally well in either the 32-bit or 64-bit versions.

#### **5. Future Releases of 10.9 and Beyond**

10.9.24 will be the last full release of version of 10.9. We envisage moving to a release of **SATURN 11.1**, provisionally scheduled for summer 2011, to include further modifications to the network aggregation routines (including its extension to Origin Based Assignment), extensions to multi-core (e.g. Select Link Analysis), revisions to the recent FLAREX/FLAREF options based on user-feedback and more work on SATNET .ERL files. There will also be some changes to the ‘look’ and ‘feel’ of SATURN but more anon.

In the meantime, and whether or not there is a full release of 10.9.24+ or whether it is overtaken by 11.1, we propose to issue updated versions of **P1X** and **MX**, i.e., **P1XB** and **MXB**, and the various multi-core extensions at appropriate intervals since they do not need to be part of a full release.

#### **6. Technical Support**

All our enquires and support are now handled by our new Customer Relationship Management System with e-mails sent though our common e-mail address – [saturnsoftware@atkinsglobal.com](mailto:saturnsoftware@atkinsglobal.com). Our existing individual e-mail addresses will continue to be available but the common e-mail address will enable us to improve communications with our users.

If you have any suggestions for what you would like to see in future versions of SATURN and SATWIN, please let us know. We rely on you, as users, to move forward. How can you help? Let us know – preferably via the Software Forum ([www.saturnsoftware.co.uk/forum](http://www.saturnsoftware.co.uk/forum)) - of any problems you have or features you would like and we will look into them.

In the meantime, I wish you a successful continuation with SATURN 10.9.24 and thank you for your support over the last 12 months.

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**A. Summary of Latest Bug Fixes (Extract from Appendix E.6)**

- 31) **SATSUMA** is likely to crash with the most recent .ufs files. Corrected in 10.9.23 (unfortunately just too late for the release of 10.9.22). 22/01/11.
- 32) **SATPIJA** may run extremely slowly under OBA for user classes which (a) have (relatively) high numbers and (b) may have a large proportion of “missing” origins (i.e., with zero trips which have therefore not been analysed for best routes within OBA). The problem is due to having to rewind and reread the .UFO file each time such an origin is encountered. N.B. There are no problems with the output .UFP file, just the time it takes to correct it. Corrected in 10.9.23. 21/01/11.
- 33) **SATALL**: The use of the offset optimiser SATOFF = T coupled with the use of a fixed reference offset node MANOFF **may** (but not necessarily) cause the program to hang if the signalled nodes do not all have a common cycle time. Corrected in 10.9.23. 30/01/11.
- 34) **P1X**: The complete list of link variables that may be annotated and which is displayed as a “selection box” is not long enough to hold the **maximum** set of variables which occurs when there 3 or more user classes, fixed flows, bus flows, etc. etc. Thus certain variables such as BBF may “fall off the end”. The problem does not occur with sub-lists such as flows, times etc. etc. Corrected in 10.9.23. 30/01/11.
- 35) **SATALL** may (possibly) give seriously incorrect results if the input .UFN file was created by a **later** release version of **SATNET**; i.e., the two programs are not backwards compatible. In particular 10.9.17 **SATALL** does not work properly with .UFN files produced by 10.9.23 **SATNET**. Previously this was a non-fatal error 127 in **SATALL** but it has now been upgraded to a Fatal Error. Corrected. 31/01/11.
- 36) **SATALL** will not output a correct .UFC file with UFC109 = T and elastic assignment. Corrected in 10.9.23. 14/02/11.
- 37) **P1X** The banner menu may **temporarily** disappear during Node Graphics Editing if the mouse is clicked “incorrectly”, i.e., not on a valid item in the banner or a valid “box” within the node plot. Running the mouse over where the banner should be will reveal the available option lines but none of the “supplementary” lines. Corrected in 10.9.23. 15/02/11.
- 38) **SATNET**. The FILERL option to read in an existing .ERL file is likely to fail if the file has had an extra “title line” inserted at the top of the file. Since the title line is now always included on output .ERL files this means that the program will only work if (a) the title line is deleted or (b) the .ERL file is from a much earlier version of **SATNET**. Corrected in 10.9.23. 25/02/11.
- 39) **P1X**. The option within PMAKE to “split” a link does not work if the link is between an external and an internal simulation node. A long-standing problem. Corrected in 10.9.23. 05/03/11.



- 40) **P1X.** There may be certain problems in deleting multiple simulation zones from the 22222 data set under Network Editing / PMAKE. A long-standing problem. Corrected in 10.9.23. 05/03/11.
- 41) **P1X.** Dumping .dat files from .ufs files may run into problems in the 88888 dumped records with a \$ toll charge multiplier for a KNOBS record which is numerically greater than 10.00 since the field gets dumped as \$\*\*\*\*. Corrected in 10.9.23. 07/03/11.
- 42) **P1X.** A “glitch” has been corrected whereby, at present, if you select an option from a pull-down menu from the Window Bar and that option “sits on top of” one of the green arrows then the arrow is obeyed rather than the pull down option. The pull down menu item now takes precedence. Corrected in 10.9.24. 18/03/11.
- 43) **SATALL.** The program may crash under MUC OBA with a Divide By Zero error (which may actually appear on the screen as something else) if one of the user classes has zero trips in total in the stacked .UFM matrix. Corrected in 10.9.23. 15/03/11.
- 44) **SATALL.** A modelling “glitch” has been detected in the modelling of flared lanes at priority junctions whereby, if the queue in either the flared lane or the lane from which it originates is near the flare length, then it is possible for two apparently stable solutions to exist which, inter alia, can badly affect simulation-assignment convergence. Basically with an identical set of flows if the simulation assumes initially that the lane is “blocking back” (queue exceeds flare) then the outcome is that it does but if the initial assumption is that it doesn’t then the outcome is that it doesn’t. A small change in flows may cause the model to flip-flop between the two alternative solutions. Corrected in 10.9.23. 16/03/11.
- 45) **P1X.** The program will not run for buffer only networks (it reports an error for a missing DA code 1993). Corrected in 10.9.23. 12/04/11.
- 46) **PMAKE.** Deleting nodes and/or links where there were comment cards **before** the initial node record in the .dat file may lead to errors. Corrected in 10.9.24. 20/05/11.
- 47) **SATCH.** It is possible that if the original network contained very high 4-digit zone numbers, e.g., up to 9901, then the newly created zone numbers at cordon points will be 5-digit starting with 10001. While 5-digit zones may be OK with simulation 22222 connectors, they do create problems with 33333 buffer networks if DUTCH = F. Detected as an error in 10.9.24. 20/05/11.



## **B. Summary of Latest Features (Extract from Appendix D.18)**

### **SATNET**

- 41) ERL files which contain a full list of errors found within **SATNET** and sorted by node order are automatically output and may be subsequently processed by users. They may also be used to help identify “new” error messages. See 15.58.
- 42) Timing point routes which have a frequency of zero (as is normal) are now always modelled as beginning at the first coded (simulation) node and terminating at the final coded node as if, in effect, UPBUS = T, independent of the actual value of UPBUS. This is a more “natural” assumption but means that the modelled timing points may differ within, e.g., Validation statistics in **P1X**. However it also means that timing points defined at the **final** node are always accepted. See 6.9.5 and 11.7.2.2. 10.9.24. 28/04/11.

### **SATALL**

- 17) New rules are applied to the use of SATOFF = T coupled with MANOFF (a fixed master node to define relative offsets) such that all signalised nodes that do **not** have the same cycle time as MANOFF do not have their offsets adjusted. 10.9.23. 01/02/11.
- 18) If the input network .UF file was created by a program (i.e., **SATNET**) which is from a **later** release version of **SATURN** then **SATALL** will fail with a fatal error in order to avoid any possible problems of non-upwards compatibility. 10.9.23. 01/02/11.
- 19) The printing of simulation summary statistics to the .LPT file has been reduced so that statistics disaggregated by, e.g., capacity index, are not included. 10.9.23. 15/02/11.
- 20) The “sub-procedure” within **SATALL** which creates a .UFO after an assignment has already been run has been extended for multiple user classes so that a single user class .UFO file may be created. In particular this option may be invoked by a distributed multiple processor procedure SATUFO\_MC which creates separate .UFO sub-files using separate processors before merging them all into a single .UFO file. See 15.23.7 and 15.53.2.7. 10.9.24. 22/04/11.
- 21) A Multi-Core version of Network Aggregation (SPIDER=T) released to all existing Multi-Core users as part of the standard **SATALL** release. 10.9.24 31/05.11

### **Simulation**

- 10) The rules for the reductions in capacity due to weaving on links **between** “motorway” junctions (see Section 15.40) have been extended such that if there is more than one link between the entry and exit ramps (as illustrated in Fig 15.3) than the reduction factor is applied to **all** those links; previously it was only applied to the last link. 10.9.23. 20/02/11.

- 11) The rules for applying an additional delay at Q-turns (App. Q) have been modified such that if the Q-marker is within a link weaving section then the saturation flow used in equation (Q.1) is reduced by the weaving factor in order to produce a larger delay. See also 15.40.4.5. 10.9.23. 20/02/11.
- 12) Post 10.9.23 the rules for modelling flared lanes (either X or F) at priority junctions have been upgraded, basically increasing the capacity, in particular when queues are near to or greater than flare lengths, and correcting a potential instability (see note 44 in Appendix E-6). Equally other modifications, possibly less extreme, have been made to the modelling of flares at traffic signals. 10.9.23. 16/03/11.

## **SATME2/SATPIJA**

- 13) A new multi-core batch file SATPIJA\_MC has been created in order to use the “segmented” application of **SATPIJA** (see 12) above) in order to calculate a .UFP file using multiple processors with a consequent reduction in CPU time. See 15.53.2.2. 10.9.24. 20/04/11.

## **P1X**

- 41) The option to annotate bus flows on (nearside and/or offside) bus lanes has been extended to include flows on bus-only links. 10.9.23. 24/01/11.
- 42) All bus flows may be optionally displayed in units of either vehicles (i.e., buses) per hour or PCUs per hour – provided, for the moment that all buses have a common BUSPCU factor. 10.9.23. 25/01/11.
- 43) A “quick toggle” switch to swap between numerical and geometrical (e.g., bandwidth) link annotation is now provided. In most cases this will mean either numbers on links or bandwidths but if, say, the option to print numerical boxes was selected most recently from the full set of display options then that becomes the default “numerical” toggle. Ditto with alternative geometrical options such as variable intensity etc. 10.9.23. 19/02/11.
- 44) An option to temporarily “suspend” link selection has been added. Thus if there is a link selection rule in force it can be turned “inactive” without losing all the select information and therefore turned “active” at a later stage. 10.9.23. 20/02/11.
- 45) A number of “toggle options” have been added to the pull-down menus under Display and Windows on the menu bar. For example both the switches noted above under 43) and 44) are included under Display. Equally, for example, the option to print node numbers offset is also available under Display. 10.9.23. 19/02/11. The set of options available from the pull-down menus has been further extended under 10.9.24.
- 46) New options have been introduced to process .ERL files in which the two extra data fields have been used to distinguish, e.g., recently introduced errors from older ones. Development is ongoing but the basic idea is to allow a “selective” highlighting of various errors using information from the .ERL files rather than the complete list of errors as detected by **SATNET** and stored on the .UFS file. 10.9.23. 25/02/11.

- 47) Simulation zones which have identical centroid connectors may be aggregated into single zones under network editing / PMAKE using the lowest zone numbers. Common examples are multiple external zones all of which are connected onto a single external simulation node. See 11.9.4.1. 10.9.23. 09/03/11.
- 48) The batch file procedure SIGOPT (15.31.6) which makes use of **P1X** now edits stage times and/or offsets of those simulation nodes which have been coded within \$INCLUDE files by explicitly incorporating all such files within the new output .dat file. At the same time the sigopt.bat file itself has been upgraded to make it easier for the user to define the name of the new .dat file. 10.9.24. 30/03/11.
- 49) Data contained in .ERL (Error Listing) files may now be used to highlight those nodes that satisfy certain criteria based on the values in either of the two “extra” fields which may be manipulated by the users. For example, it is possible to externally assign different numerical values in the second field (e.g., using Excel) to indicate the degree of “urgency” associated with each particular error and to highlight these using different colours in **P1X**. See 11.6.5.4 and 15.58.2. 10.9.24. 22/04/11.
- 50) A command line such as “P1X network 485” causes the initial network window to be opened with node 485 in the middle. The option is invoked whenever a pure numerical value is input on the command line. 10.9.24. 27/05/11.

## **MX**

- 13) The procedures by which a .ufm matrix may be updated using text data read from a CSV file now allow the text file to be in fixed column format with spaces between each numerical entry rather than commas. In particular this applies to the batch file CSV2UFM. Note that UFM2CSV creates a text file which is “true” CSV (commas between values rather than spaces) so not a problem currently for re-input via CSV2UFM but that format might be altered if the file is processed and re-gurgitated by, say, Excel. 10.9.24. 17/03/11.
- 14) In addition, when updating a .UFM file from a CSV file, the row/zone names are now taken from the original input .ufm file rather than defaulting to sequential names as at present. 10.9.24. 16/03/11.

## **SATCH**

- 3) The batch file has been extended so that a single user class output trip matrix may be requested via the command line by including, eg., NOMAD 2 at the end of the line. Its primary function is to be used as part of a new multi-core distributed batch file SATCH\_MC described next. 10.9.24. 15/04/11.
- 4) Multiple user class matrices may now be produced “in parallel” using multiple processors via the batch file SATCH\_MC which allocates one user class per processor to produce a series of individual user class (square) trip matrices and then stacks them into the required multi-level trip matrix. (Yet to be finalised). See 12.1.6 and 15.23.2.6. 10.9.24. 22/04/11



## **SATPIG**

- 3) A option to output all path data in CSV format with all numbers on a single record has been introduced. Set the new Namelist Parameter CSVFOR = T.  
10.9.24. 19/03/11

## **SATWIN**

- 8) Labels added to the SATWIN Module menu and dialogue boxes to aid identification, re-grouping of modules into new 'application' groups and review of supplied batch files and modules. 10.9.24 31/05/11
- 9) Multi-core options available (as indicated by '+MC' suffix) within the SATWIN modules for SATPIJA, SATUFO and SATCH operations. 10.9.24 31/05/11.
- 10) Settings option to manually select P1X0.DAT version (e.g. v10.9.17) for the appropriate \$P1X.EXE being used. This resolves a problem with backward compatibility between the P1X0.DAT and the \$P1X.EXE introduced with 10.9.17. P1X may crash with a Runtime Error 52: 'Invalid character in field'. Users are able to select the DAT file to use from the 'Settings' menu. (NB: an automated system will be introduced at a later date) 10.9.24 31/05/11.