E. SATURN Bugs

E.1 SATURN 10.4 Bugs

Date of last update: 5th October 2004

The following "problems" have been identified in **SATURN** Version 10.4.10 as released in November 2003 and corrected in Version 10.4.11. (Although in certain cases more comprehensive "fixes" have been added into 10.5 which users may wish to "test drive"; all requests to DVV.)

1) **P1X** – Matrix cordoning in either **P1X** or **SATCH may** cause crashes or illogical terminations. I say "may" rather than "will" since the problems involve undefined variables in logical checks which may or may not yield the correct results. Problems are worse with multiple user classes and/or stacked matrices.

2) **P1X** – The 10.4 versions of GRAF.DAT included for the first time entry fields for the "rotational shift" parameter for each device. Unfortunately the value for device 1 (the terminal) over-writes all subsequent values (e.g., hard copy outputs) so that choosing a different value for hard copy outputs still requires an interactive change.

3) **P1X** – There is a problem in creating key files from any operation that involves **PMAKE** setting node co-ordinates (e.g., creating a new node, changing node co-ordinates, etc.) However the problem was also in 10.3 and is clearly not the sort of operation that users are likely to use.

4) **P1X** – The window created for node screen editing (17 lines by 64 columns) is not large enough to deal with some nodes, in particular signalised nodes with many arms and./ or signal stages.

5) **P1X/PMAKE** – When adding buffer links to networks where KNOBS > 0 and the KNOBS data is input as one extra record per buffer link on the 33333 data set only a **single** new record is added to the 33333 data records by **PMAKE**, i.e., an extra KNOBS record is not created. This means that every second new buffer link is incorrectly read as the KNOBS record for the previous link so roughly half the added (directional) links are missing. This can be corrected manually by editing in blank records after each new buffer link record. Corrected in 10.5 only.

6) **P1X/PMAKE** – Screen editing a "chunk" of the complete network file may lead to errors if : (a), the section selected (as a first line plus number of lines) extends beyond the end of the file (in which case it wraps back to the start of the file); or, (b), extra lines are added via screen editing.

7) **P1X/PMAKE** – The frequency of a newly added bus route always defaults to 1 independent of the user's input. Now corrected..

8) **SATALL** – The array 4053 which sets “average” link speeds including flow-weighted delays at junctions for simulation links is incorrect for simulation links which have a capacity – restraint or speed-flow curve included. Basically the contribution to the delay from the speed-flow component was double counted resulting in speeds that were too low. However the problem does not occur in the equivalent speeds reported by **P1X** which were calculated correctly.

9) **SATALL** – The ROSIE option does not work - at all! Basically the problem lies in transferring speed-flow curves from the simulation to the assignment (one of the very clever improvements in 10.4 that works very well for ROSIE = F is decidedly not very clever for ROSIE = T) and results in very poor convergence. Fortunately the poor convergence is extremely evident so the problem should be difficult to miss.

10) **SATALL** – The option to reproduce results as per 10.3 by setting NFT = 103 mostly does not work; i.e., most of the new facilities introduced in 10.4 are “hard wired” in and cannot be by-passed by setting NFT = 103. Some **will** be by-passable in 10.4.11 but the majority, mostly relatively minor, are extremely difficult to exclude given the way in which they are programmed and most likely never will be. Users are reminded, however, that the best way to reproduce 10.3 runs is to use 10.3 SATALL! If you want the advantages of 10.4 you have to be using 10.4.

11) **SATALL** – An error has been found with links which (a) have simulation centroid connectors attached, (b) block back and (c) have flows which enter at the upstream end (e.g., from bus routes starting under UPBUS = T or bus lanes terminating on the previous link). It is not yet clear exactly what impact the error has, possibly it may affect the assignment-simulation convergence, but it is corrected in 10.5.

12) **SATSIM** – Problems may occur when printing bus summary statistics if there are no capacity-restrained links in the simulation network; i.e., it may crash or it may just print silly numbers or no numbers (a problem of bus flows being undefined).

13) **SATBUF** – The essential key file satbuf.key was omitted from the install cd and may be obtained by direct request to DVV and/or downloaded from the SATURN website.

14) **MX** – Undefined cells on the right hand side of the matrix display when the “zero point” is very near the maximum column have been corrected.

15) **SATALL / P1X** – The values of ‘g’ (the “speed-flow elasticity as used by VaDMA) have been overestimated since they were based on variable time components only, i.e., the fixed time components were excluded. Including them (correctly) reduces g values by, say, a factor of 2.

16) **SATLOOK/MX** – The maximum output length for a single record of CSV output is 8192 bytes but the maximum input is only 4096. Hence **SATLOOK**

can produce CSV cost skins (as in **SATTUBA**) which **MX** cannot read. Corrected.

17) **P1X (Cordoning)** - The option to produce a cordoned (i.e., sub-area) network .dat file directly within **P1X** will not work if the cut links include a link which joins two external simulation nodes but is itself part of the buffer network. There are, however, no problems with doing exactly the same cordon in **SATCH.** The soluton is therefore to create a control file for **SATCH** and run that program to cordon the network instead.

18) **SATCH (Multiple User Class Matrix Cordoning)** – There may be problems cordoning actual (i.e., DEMAND = F) trip matrices from networks with ALLUC = T, several multiple user classes and/or a relatively large number of links. The program may crash due to an array dimension being exceeded by the product of classes times links. Corrected in 10.5 only.

19) **SATED –** Optimising signal green times leads to a crash with a message saying "Missing segment UNPACK_STAGL_GREENS". This is due to the installed version of **SATED** not being correctly compiled. Atkins will supply a replacement .exe.

20) **SATEASY** – As with 17 above **SATEASY** may also crash due to a missing segment on compilation. Again Atkins will supply a replacement .exe.

21) **P1X (Select Link Analysis)** – If you have multiple user classes and request that the SLA be carried out with ALL user classes and the exit from SLA you may not be able to get back into SLA.

22) **P1X (Edit External Simulation Nodes)** – External simulation nodes may be selected for editing as simulation nodes within network editing but not if selected by number; i.e., you can point to them with the mouse but not enter them numerically.

23) **SATLOOK –** The "Totals" line on the Lane Choice display for simulation nodes was printing data for the last turn, not the totals. Corrected in 10.4.12.

24) **SIMULATION (SATALL/SATSIM) –** The lane choice mechanism has been observed to misbehave when an even spread of traffic between all available lanes leaves a shared lane over capacity and its (unshared) neighbours under capacity. An over-enthusiastic re-allocation of traffic can leave the shared lane empty. This results in an over-estimate of **turn** capacities used in the cost-flow curves for assignment but link and road capacities as well as all delays are virtually unaffected. However the incorrect capacity may add marginally to convergence problems in the simulation – assignment loops (along with lots and lots of other "correct" effects). A message saying "FUNNY IN MIXLIN …" may also appear in the .lpt file. Corrected in 10.4.12.

25) **SATNET –** A slight inconsistency with FIFO = F (not its default) has been corrected. Thus when a link to an external simulation node is assigned a link speed-flow curve under the 11111 records and again under the 33333

records its capacity - if FIFO = F - should equal that from the 33333 record. There are two DA codes in **SATURN** which store this information; one was correctly set but not the other. They are now both correctly set.

To be honest I'm not sure whether this affects any of the simulation outputs although it does affect the information output for that link. However it needs to be stressed that the onus should be on the user in such situations to remove one or the other of the conflicting data records in order to avoid any possible ambiguity rather than relying on setting FIFO = F to do the job automatically.

26) **SATALL –** Using the FREEZE keyword on the command line to set a frozen trip matrix does not work when ICING = T. The program does not open the file and proceeds with the full matrix elastic as though ICING = F. The option to set the file through FILICE in the network .dat file however works – and in fact this is the recommended method anyway.

27) **SPATULA –** If the network is relatively large so that the o-d paths contained in the .trp files as passed to **DRACULA** occupy more than one line then **SPATULA** produces a fist-full of errors.

28) **SATALL –** Doing extra continuation loops using the MASL parameter on the command line does not do exactly what it is meant to do when ROSIE = T. Thus the first extra assignment does not use ROSIE, it does a normal assignment, but subsequent assignments use ROSIE. The end effect is small. This is not really a proper error, just another (possibly less good) way of doing extra loops. Corrected in 10.5.

29) **SATALL –** Using the command option "MASL n" in the command line effectively terminates the command line; any following options are ignored. If MASL n comes at the end of the command line there is no problem. N.B. This problem does not affect the **SATWIN** Module run of **SATALL** since MASL is not available there in the first place!

30) **SATALL** – The table which lists the 10 biggest differences between "assigned" and "saveit" flows has the two sets of flows reversed.

31) **SATALL** – The comparison statistics between "assigned" and "saveit" flows (see #30) are also incorrect for a number of different assignment techniques. They are correct for basic Wardrop Equilibrium, fixed trip matrix and 1 user class, but are certainly wrong for multiple user classes at least. They make the SAVEIT flows look more different from the assigned than they really are. However all the SAVEIT calculations themselves and any further calculations based on them are otherwise correct, it is only the printed numbers which are wrong. Corrected in 10.5 only.

32) **SATALL (and SATLOOK) –** The text names by capacity index (as set by CINAME) as given in the tables of simulation summary statistics are out of order if there are some indices which are only used by buffer links. The numerical indices and all the tabulated data are correct. (30/06/04)

33) **SATALL –** An error has been spotted in the PASSQ flows passed from one time period to the next if: (a) the first two nodes on a bus route are from an internal simulation node to an external simulation node (and thence into the buffer network) and (b) UPBUS = T. The full bus flow is incorrectly passed whereas (unless there is capacity restraint on the link) the passed flow should be zero. (06/07/04)

34) **DALOAD -**. Matrix zone sequential numbers and names are not carried through to an output .ufm file. (9/07/04)

35) **P1X –** Forests calculated using the second network are incorrect in that they (correctly) use the costs from the second network but (incorrectly) weight them according to the first network. This may also result in fatal errors with a DA code not found. (30/09/04)

36) **P1X (Cordoning) –** Using a cordon to select simulation turns either inside or outside the cordon does not necessarily pick all such turns. (05/10/04)

E.2 SATURN 10.5 Bugs

Date of last update: 7th March 2006

The following "problems" have been identified in **SATURN** Version 10.5.12 as released in December 2004. Unless otherwise stated they have all been corrected in the most recent version of 10.5 (as opposed to being corrected in 10.6 if they are more complex).

Many of these pre-date 10.5 and were also present in 10.4 or earlier releases.

1) **MX** – Data dumped from multi-level matrices under Tuba Format 3 always gives the level (i.e., user class) as 1 for all levels. Corrected 04/01/05

2) **P1X** – Matrix desire lines plotted sector to sector for selected O-D sectors: If you, say, wish to select origin sectors 3 through 5 and destination sectors 13 through 15 then the destination sectors incorrectly use the origin limits as well so that, in the above case, you would get the desire lines from origin sectors 3-5 to destination sectors 3-5. This also means that if you select a single origin, say 3, you get no desire lines displayed at all since the only selected cell, 3 to 3, is an "intra". Also in 10.4. Corrected 20/02/05

3) **P1X** – The choice of whether to display matrix data by sector or cell is sometimes missing, particularly if more than one network file is input. Also in 10.4. Corrected 20/02/05

4) **P1X** and **SATCH** – Cordoning problems may possibly occur with very large release Levels, e.g. levels N1, N2 etc. The program doesn't crash but the results look extremely weird. However what happens exactly may be a bit unpredictable. One possibility is that having defined the cordon and then an inner node nothing further happens. Possibly only in 10.4. Corrected 24/02/05

5) **P1X** and/or **SATLOOK** – The combined statistics for simulation and buffer networks (e.g., PCU-HRS) have an error with multiple user classes and elastic assignment. The buffer totals – and therefore also the simulation plus buffer totals – for user classes greater than one are all those for user class 1. Also in all previous releases of **SATURN**, presumably back to the point where multiple user class elastic assignment was introduced. For all other conditions, e.g., fixed trip matrix, single user class, etc., it works fine. Corrected 27/02/05.

6) **SATALL** – In my enthusiasm to convert users to the use of AUTOK in place of KOMBI it appears that AUTOK is automatically set to .TRUE. whenever KOMBI > 0 (so both options to average assignment-simulation loop flows are applied together and it is not possible to use just KOMBI on its own as done in the past). In some respects this is not a bad thing and I would hope that it will improve convergence but it does make it difficult to reproduce previous results with 10.5. Corrected 27/02/05.

My advice would be to set KOMBI = 0 and AUTOK = T in order to use AUTOK "properly". In fact, with 10.5.13, a extra check has been added such that if AUTOK = T and KOMBI > 0 then KOMBI is re-set to zero.

In order to see what is happening in 10.5.12 users should view the column headed "A/S Step" in Table 1 of the Convergence Statistics either in the .lpt files or interactively via **SATLOOK** or **P1X.** If KOMBI is set to, say, 10, then the first 10 loops should give 1.000/1 followed by 0.500/1 for subsequent loops. If AUTOK is having an impact then these values will differ.

The problem may be partially circumvented by setting a (otherwise undocumented) namelist parameter AKMIN = 1.0 under &PARAM. This sets a lower step length of 1.0, i.e., no averaging of flows at all under AUTOK. Therefore **SATALL** effectively ignores the fact the AUTOK = T up until the KOMBI loop so that those initial loops are equivalent to the old methods. The downside is that on later loops the averaging of 0.5 under KOMBI may in fact not take place so therefore in this range KOMBI is being ignored.

7) **P1X** and/or **SATLOOK** – There is a potential problem created by assessing errors at simulation nodes whereby, having requested a simulation node numerically via **SATLOOK** or via Node Graphics in **P1X**, the program hangs. The error only occurs with some priority junctions (in fact probably not very many). Corrected 26/02/05.

8) **SATNET** – The use of ATLAS = T (or, strictly speaking, having ATLAS = T and extra nodes being set under 55555 which are not connected to links) may: (1) possibly cause problems in running **SATNET** by referencing undefined variables (although empirically, it doesn't seem very likely); and (2) cause more serious problems in **SATCH** and (possibly) **P1X** (see below). You will of course recall that ATLAS is a useful option in creating networks from scratch using **PMAKE** but, once the networks are created, it should probably be removed. Also present in 10.4. Corrected 02/03/05, partially in 10.5 and more fully in 10.6.

9) **SATCH** - The use of ATLAS = T (or, strictly speaking, having ATLAS = T and extra nodes being set under 55555 in **SATNET**) creates serious problems in cordoning a trip matrix in **SATCH**. Basically it fails completely. Best advice: as under 8, do not use ATLAS with final networks. N.B. The same problems may or may not occur with cordoning matrices in **P1X**. Also present in 10.4. Corrected in 10.6 02/03/05.

10) **P1X** – Network parameters reported for networks other than the primary network (as requested under Information) all refer to the primary network. Correct parameters may however be obtained within the Files option in SATLOOK. Only corrected in 10.6 02/03/05.

11) **SATALL** – Roundabouts which have been defined with circulating capacities of 99999 (five 9's) – or indeed any value greater than 16384 – will cause a floating point error in the first simulation.(NAOMI networks please note.) Corrected 05/03/05.

12) **SATNET** – The test as to whether an input pre-load file is a binary .UFS file or otherwise a text file is based on the file extension and is, incorrectly, case sensitive. Thus .UFS is correctly identified as a binary file extension but not .ufs. Trying to read a binary file as though it were text results in a very large number of non-fatal errors. Also present in 10.4. Corrected 09/03/05.

    N.B. The problem should not occur when using PLOD on the command line since the extension should be correctly added with an upper case extension .UFS by default; it is much more likely when using the Namelist parameter PLDFIL under &OPTION (as you are recommended to do!).

13) **SATALL** – Although path-based assignment methods are now documented (Section 21) the necessary array dimensions have not been increased in line with other array dimensions per release level (on the assumption that, since no one was using it, there was no point in increasing the RAM requirements.). Hence it is only really possible to run path-based assignment on relatively small networks (e.g., 80 zones or less) independent of the Level. Users wishing to try out path-based methods on larger networks should contact DVV. 16/03/05.

14) **P1X** – The option to select "Options" from the Choice of Link Display menu is not available for buffer-only networks. Options is not always useful but is, for example, if you have multiple user classes. Also in 10.4. Corrected 19/03/05.

15) **MX** – An error occurs when building a .ufm from an input text (.dat, .txt, etc.) file if:

    (i) the text file has a single line per cell (as described in 10.5.3);

    (ii) each record references zone names (with or without the equivalent sequential numbers);

    (iii) the number of zones (N) is set before the records are pre-read in order to establish the complete set of zone names.

    Basically the program adds the zone names that it reads in to the input number of rows N so that the matrix winds up with twice the number of rows and columns desired with the first set of 'N' rows and columns all being numbered as zone 0. Corrected 13/04/05.

    The problem may be avoided by not setting the number of rows before entering pre-read, in which case the program winds up with the correct number of rows and columns.

16) **SATSUMA** – The program crashes with networks which contain either: bus flows, pre-load flows or multiple user classes. Corrected in 10.5.14. 28/04/05.

17) **SATLOOK/P1X –** The simulation summary statistics which compare either more than one input network or multiple user classes may contain some

numbers which are “undefined” and get printed as, for example, ??????? or ******. The numbers which are printed should, however, all be correct. Corrected in 10.5.14. 28/04/05.

18) **P1X –** If you use the link-based Choice of Annotation to create and display a data array such as **actual** user class flows it appears correctly on link plots. However if you then look at the same data as **turn** flows in node graphics or in **SATDB** screen displays the flows are not factored down from demand flows. Corrected in 10.5.14. 02/05/05.

19) **SATNET –** Yet another problem with ATLAS = T! If your 55555 X,Y data records define new zones which did not appear under either the simulation 11111 or buffer 33333 data sets then the zones in the assignment network and the map network are incompatible which creates severe problems. In addition the trip matrix may well have the wrong number of zones and/or be based on the “wrong” system; in either case the assignment will be highly problematic. To be safe this now becomes a semi-fatal error. Corrected in 10.5.15. 12/06/05.

ADVICE: Avoid using ATLAS = T with networks where it is no longer needed to help build the network and where you are ready to go on to do the assignment.

20) **P1X –** GIS files that contain a very large number of curved link records (specifically if the total number of X,Y points exceeds 9999) give rise to spurious lines heading off the screen to the “origin” lower left for all those links beyond the point where the array dimension was exceeded. Corrected in 10.5.15. 15/06/05.

21) **SATALL –** Capacity reduction factors due to “weaving” on motorways are set incorrectly when: (a) there is more than one link coded between the relevant entry and exit ramps, say nodes A-B-C; and (b) the node number B is greater than C. In this case the weaving factor is only applied to link B-C (independent of whether B > or < C), not A-B. Corrected in 10.5.15. 21/06/05

22) **P1X etc. –** Analysis options such as Select Link Analysis which make use of .ufc files may crash if very large values of NITA_S were used to create the .ufc file in **SATALL.** Specifically a message appears saying that DA code 10003 cannot be found. The problem only occurs if NITA_S x NOMADS > 900 (so that mostly it will occur with multiple user classes). Corrected in 10.6. 23/06/05

23) **SATALL –** A “divide by zero” crash may occur within the simulation if an X-turn at signals has been coded such that it overlaps with the adjacent straight-ahead turns in 2 or more lanes **and** the X-turn is over capacity. For example, straight-ahead traffic uses lanes 1 to 3 and the X-turners use lanes 2 and 3.

Since this is probably a traffic engineering no-no – since, in the above example, turning traffic from lane 2 would have to cross straight-ahead traffic from lane 3 – it should never happen in the first place. However, there

is, at the moment, no error check in **SATNET** to detect the possibility. Corrected in 10.5.15. 30/06/05.

24) **SATCH –** The program **may** get stuck in an infinite loop when processing bus route data if:

(iv) EZBUS = T,

(v) A $include file is being used,

(vi) The final record in the file does **not** have a <return> character (carriage control/line feed) at the end of the record.

To correct simply add <return> at the end of the last record. Corrected in 10.6 only. 03/06/05.

25) **SATALL –** The total pcu-hrs for transient queues in the "next time period" as printed in the .lpt file or via **SATLOOK, P1X,** etc. are inconsistent if your network includes Q-markers (see Appendix Q). Basically the delays are correctly included in the disaggregate statistics (e.g., by user class, bus flows, etc.) but are **not** included in the aggregate ("total flows") statistics which are therefore lower than the sum of the disaggregate totals.

Conversely, if any of the Q-turns are over-capacity, then the queued times "in the next time period" are double-counted on the Q-turns but correctly calculated for the aggregate statistics.

Overall both effects are generally small – and clearly zero if you have no Q-turns in your network. Corrected in 10.5.15. 05/07/05.

26) **SATCH –** The "interpolation" of non-adjacent nodes in bus routes is less "clever" than in **SATNET** so that, for example, a network .dat file produced by **SATCH** may send bus routes through a banned turn. This results in semi-fatal (NAFF) errors in **SATNET.** Corrected in 10.5.15. 05/07/05.

27) **P1X –** The option to transplant stage timings via .rgs files works OK if the .rgs file was produced **pre** 10.5 but, perversely, will not work if the .rgs file has been produced by the latest (10.5) version of **P1X.** Corrected in 10.5.16. 09/09/05.

28) **SATALL –** If UPBUS = T errors can occur in calculating the queued up flows (and therefore the difference between demand and actual flows) on links where **both** bus routes terminate **and** there are other exit centroid connectors. The effects are not expected to be appreciable except possibly in very heavily congested networks. Corrected in 10.5.16. 10/09/05.

29) **SATCH –** The program may crash with a divide-by-zero (or equivalent) in subroutine SATCH_MATRIX_FLOWS message if certain cordon crossings

links have been assigned zero flows in the matrix cordoning but had positive flow in the full network. Corrected in 10.5.16. 17/09/05

30) **MX –** If a .ufm matrix is built from a text file in CSV format with the zone numbers given as the first entry in each row no check is made that the zone numbers are in sequential order. Therefore the output matrix may "fall over" under certain matrix operations – but not all. Corrected in 10.6. 02/10/05

31) **SATCH / P1X (Cordoning) –** The treatment of unidentified nodes in a bus route differs between **SATNET** and cordoning routines. In **SATNET** an unidentified node is treated as a non-fatal error and ignored; within cordoning it is treated as, in effect, a fatal error and further processing of the route is terminated whenever such a node is detected.

If the unidentified node occurs **before** the route enters the cordoned network (or within the cordoned network) the route is not included in the cordoned network. However, if the node occurs **after** the route has entered and exited from the cordon network, it will be included (since processing of routes terminates at the point of exit).

The end effect is that the cordoned network may contain fewer buses than the full network.

Corrected in 10.6.12. 03/12/05

32) **SATCH / P1X (Cordoning) –** The use of either GONZO or factors within the 88888 records to factor all or part of the input trip matrix can lead to problems with the cordoned network and trip matrices. Basically, it is possible for the factoring to be "double counted" within the cordon. See 12.1.6 and 12.1.7 of the Manual for a more complete explanation of what has been done within 10.6 to correct the problem. 13/12/05

33) **P1X –** The standard dimensions for A3 and A4 plotters are wrong in that 290.0 is used rather than (as everyone, of course, knows!) 297.0 mm. Similarly the standard version graf.dat uses 290.0 as well. What effect this has on the output plots I'm not entirely sure but it's probably pretty small, e.g. one dimension may be plotted at a slightly different scale than the other. 30/12/05.

34) **SATNET –** The use of the symbol £ to denote toll charges within the 44444 data records does not always work but $ seems much safer; both are meant to be acceptable. Stick to the dollar (Canadian, of course!). 19/01/06.

35) **SATME2 –** Reading in frozen cell records from the control file, data segment 55555, will give incorrect frozen cells if the records for one origin pair occupy more than one line. The problem was that the first set of 6 destination pairs were being read from the first 60 columns of the initial record instead of columns 16-75 (so that it would read the origin zones and number of destination pairs from columns 1-15 as though they were destination

numbers). With luck this would have produced a fatal error but not necessarily. 21/01/06.

The error would also have occurred in previous **SATURN** releases back to about 2002 when the option for multiple input lines was first introduced.

Any users who have used this facility had better re-check their previous runs. Apologies.

36) **SATLOOK –** The option to "skim forests" over multiple user classes automatically does not work as (presumably) intended by the user if the commodity being skimmed, strictly speaking, depends upon the user class. Thus there is no problem in skimming, say, distance or time which are independent of user class. However skimming generalised cost, which may differ between user classes due to different definitions of PPM or PPK, or tolls or 44444 penalties, which may also be user-class specific, does not necessarily work as the user might expect. In these cases the commodity skimmed is the **specific** commodity from user class one and it does not change with user class. (Although the paths skimmed **do**, correctly change with user class).

The problem does **not** occur if each user class is skimmed individually and the skimmed commodity is re-set each time. (Although clearly doing it this way is more long-winded and the resulting skimmed matrices may need to be stacked at the end of the process.)

IN addition the problem does **not** occur if the standard batch files to skim forests such as SATC_AV, SKIMTOLL and SKIMPEN, etc. are employed. Indeed, their use is generally recommended over the more DIY application of **SATLOOK.**

Finally the problem does not occur either with Option 14 – skim from a single tree – where there is not an option to skim automatically over multiple user classes.

The problem is corrected only in release 10.6.14. 29/01/06

37) **SATALL –** The program may crash with a message that talks about "illegal floating point operation" or "divide by zero" or words to that effect, possibly in a segment FLODEL_105. The root cause is a roundabout that somehow gets stuck in a loop during simulation and winds up with one arm with zero capacity; hence the eventual divide by zero. In principle CAPMIN is meant to prevent this happening but it is not foolproof as it turns out.

The problem is corrected in 10.6 by setting a parameter RB106 = T which prevents capacities going to zero in the first place by using CAPMIN correctly. It is also corrected less satisfactorily in 10.5.19 by having an absolute lower limit of 1.0 pcu/hr capacity on all roundabout arms. 07/03/06

38) **SATALL –** The program may also crash with messages similar to bug 37 above (but in a segment SETSSS more likely) due to junctions with Q priority markers having **zero** total assigned flows. Corrected in 10.5.19 and 10.6.15 07/03/06..

E.3 SATURN 10.6 Bugs

Date of last update: 4th March 2007

The following "problems" have been identified in **SATURN** Version 10.6.14 as released in February 2006 and/or in subsequent 10.6 releases. Unless otherwise stated they have all been corrected in the most recent version of 10.6 and all are corrected in 10.7.09.

Some of these (potentially) may pre-date 10.6 and would also have been present in 10.5 or earlier releases.

1) **SATPIJA** – The program crashes with an unidentified channel number 0 if ALLIJ is set to .TRUE. (The default is .FALSE.). The problem did not occur previously in 10.5 etc. Corrected in 10.6.15 07/03/06.

2) **P1X –** Analysing Arboreta in very large networks may cause a crash due, e.g., to the length of an O-D path exceeding a fixed (and unchecked) array dimension in the program. Present in previous releases, 10.5 etc. Corrected in 10.6.15 07/03/06.

3) **P1X** - .XYB files (which give the co-ordinates for bitmap files) are incorrectly output by the program in that it writes the 4 values on 4 separate records rather than on a single line; they are therefore not read correctly on input. .XYB files created by previous versions are fine. Corrected in 10.6.15 08/03/06.

4) **P1X** – Flows disaggregated by both user class **and** time period (in the case of .uft input files) always appear as average user class flows. Corrected in 10.6.15 18/03/06.

5) **SATNET –** It appears that data which is to be added to link generalised costs via a KNOBS entry (e.g., tolls) will **not** be added if the conversion factor entered under the 88888 data records (e.g., in columns 26-30) is too small.

   More specifically, the input value F which is in units of "pence per knob" is converted into units of "seconds per knob" via the formula 60F/PPM; if that value is less than 1.0 then the KNOB data is ignored. Or, strictly speaking, the data is ignored if the sum of **four** successive converted factors is less than 1.0. So if F = 1 and PPM < 60 (£36/hr) then you should be OK.

   The error has come up at least once in practice but whether it has occurred more widely is very hard to say. Hopefully it hasn't since, if it had, it should have been relatively easy to spot in that the KNOB (toll?) would have had no affect whatsoever on the assignment.

   The same error occurred on previous release versions as far back as I can easily trace. 05/04/06

6) **SATNET –** Another error related to the translation of KNOBS data into link generalised costs occurs in the somewhat unlikely situation where the value of time (PPM) is zero but the value of distance (PPK) is not and one or more KNOBS data need to be combined with the distance. The problem was that the distance components were being converted into metres (the original intention) but the KNOBS data were converted into pence. Both are now (post 10.6.15) correctly converted into metres.

   Whether this situation has ever occurred in real-life is difficult to say. The resulting assignment would be an all-or-nothing assignment to the minimum generalised "distance" paths since there is no variable time component to consider. With multiple user classes the problem could occur with any individual user class where PPM = 0, PPK > 0 and KNOBS data were included.

   The same error occurred on previous release versions as far back as I can easily trace. 07/04/06

7) **SATALL –** The warm start option (WSTART = T) does not work under a number of possible scenarios as listed below. In effect WSTART should be thought of as still being under Beta-test, although it does seem to work properly and highly effectively in the most basic situations (e.g., single user class, minimal fixed flows, etc.).

   (i) Multiple user classes with changes to either the network or trip matrix from the "update" network. Basically the resulting total flows and delays are grossly underestimated.

   (ii) Any differences in fixed flows (e.g., bus flows, pre-loads, etc.) between the current network and its update network.

   (iii) MUC, changed network and/or matrix and **any** fixed flows

   All known bugs have been corrected in 10.6.15. 07/04/06.

   In addition the documentation (Section 22) in the 10.6.14 release was very much work-in-progress and not a great deal of use but this will be completed ASAP and available through the website.

8) **SATNET –** The program may crash with a Floating Point Error (Divide by zero) if (a) AUTOX = T and (b) ALEX = 0.0. The source of the problem is trying to set a default stacking capacity at links to/from newly created external simulation nodes by dividing a link length by ALEX. (Previously the stacking capacity was just set to zero.) Corrected in 10.6.15 10/04/06

9) **SATNET –** Reading 44444 penalty/toll records with 21 user classes (so that three input lines per link are needed) causes a program crash. 20 or 22 should be OK. The same problem might occur with 31 user classes. Corrected in 10.6.15 11/04/06

10) **SATALL –** Using CLICKS with elastic multiple user classes causes **SATALL** to crash with a reference to a device out of range. Corrected in 10.6.15 19/04/06

11) **SATALL –** The program may **potentially** crash with a floating point error in the simulation due to a problem in the lane choice sub-model. It would appear that the problem is very rare (and has been around in 10.5 at least and possibly earlier releases) and may be triggered by a lane choice allocation which would have been flagged as a Serious Warning within **SATNET.** Corrected in 10.6.15 29/04/06

12) **SATALL –** The link weaving mechanisms (as described in section 15.40 of the Manual) have not been fully activated under elastic multiple user class assignment. Corrected in 10.6.15 29/04/06

13) **SATTUBA –** Not so much a bug but an omission, the definition of skimmed times excludes: (a) any possible time penalties entered under 44444 and (b) any extra times due to CLICKS. Both are now included optionally via logical parameters USETP and CLICKY in the preferences file satlook0.dat. Both default to .TRUE. Added in 10.6.16 05/05/06.

14) **SATNET –** A further problem with CLICKS: if you have more than 4 user classes then the fixed penalties added for CLICKS(n) where n > 4 are calculated for n modulo 4. In other words CLICKS(1) is used in place of CLICKS(5) to calculate the extra time penalties (if any) for user class 5, CLICKS(2) in place of CLICKS(6) for user class 6, etc. etc.

    Note, however, that this error only affects the **assignment** and that, once assigned, the extra pcu-hrs per user class due to any reduced maximum speed are correctly calculated per user class and printed correctly in the tables in the .lpt file. If, therefore, you have a network with limited route choice the errors may be minimal. Corrected in 10.6.16 08/05/06

15) **SATALL –** The program may get stuck in an infinite loop if SATOFF and SIGOPT are both .TRUE. and MANOFF is being used. This can occur if the offset for the “master node” is reduced sufficiently such that start/end times of a stage go negative. The problem was also present in previous releases. . Corrected in 10.6.16 11/05/06

16) **MXM5 –** Terminating the list of zone correspondence records with a blank record as opposed to a 99999 record does not work, although the manual, Appendix W.3, says it does. Stick to 99999. Equally Appendix W gives the default of CSV as T - it is, in fact, F. Corrected in 10.6.17 02/06/06

17) **SATNET –** Reading default speed-flow curves under 33333 with DUTCH = T requires that the relevant data is contained in columns 21 to 55, not 11 to 45 as when (normally) DUTCH = F. However, if the data **is** in columns 11-45 with DUTCH = T then it is very likely that the data will **not** be processed at all, no default speed-flow curves are created and, most importantly, no error messages result. Corrected in 10.7.1 09/06/06. N.B. This problem has been

around as long as default speed-flow curves have been around so it is not a 10.6 problem specifically.

18) **SATNET –** The parameter ILOVEU which controls whether U-turns are "discouraged" at external nodes which lie between the buffer and simulation networks (se 18.9) has been described in the documentation the wrong way round. Thus the original documentation stated that, in order to discourage U-turns, ILOVEU had to be set to F and that this was the (recommended) default. The correct version is that ILOVEU has to be set to T to discourage turns and this is the default. Hence, unless a user has explicitly set ILOVEU to F in a network .dat file, the end effect will have been that U-turns have been banned as generally recommended. Thus there have been no program changes, only corrections to the Manual. This problem has been there ever since ILOVEU was introduced in version 10.4.

19) **VDU Option with KEY files –** Interactive programs such as **P1X, SATDB,** etc. which are run "in batch mode" using the VDU + KEY options on the command line were "improved" in 10.6 so that any commands which were entered under the Windows Bar, e.g., commands to move a display screen up or down, were ignored on the assumption that all such commands were not essential under VDU since all they did was to change a screen display which was never viewed anyway. However, it turns out that this is not always the case since commands such as &Order in **SATDB** displays may actually be an integral part of a KEY file. The option has therefore been removed under 10.6.17. 10/07/06.

20) **P1X –** Actual and/or queued upstream flows as displayed are potentially miscalculated for: (a) networks other than the base network which (b) have a different topology from the base network. For the base network or identical topology there is no problem. The basic problem is that the queue reduction factors for a link in network 2 may pick up an additional factor from a turn with the same number in network 1. Not all link data is therefore affected. The problem was created in release 10.5.15. Corrected in 10.7.2 15/07/06.

21) **P1X –** Various relatively minor problems have been corrected in banner displays of the link quantities being annotated. Mostly it was a question of the banner being blank instead of displaying the correct data title. Corrected in 10.7.2 15/07/06.

22) **MX –** Building a .ufm file from ascii data input of the form "Name(I), Name(J), Tij" fails to detect if either zone name is zero and therefore erroneously adds a zone zero. (If I and J are sequential zeroes are ignored.) Corrected in 10.7.2. 27/07/06.

23) **Matrix Stacking** – If **MX** is used (either internally or with an external batch file such as mxstack) to stack matrices which are **themselves** stacked the number of levels in the output .ufm file is incorrectly specified. For example, if you stack 4 square matrices into a fileM4A.ufm and another 4 square matrices into M4B.ufm an then jointly stack M4A and M4B into M8.ufm – so that M8 contains 8 square matrices – then M8 only registers 2 levels. This has

implications if M8.ufm is then used as a trip matrix for a network with 8 user classes since **SATALL** may require a trip matrix with 8 levels specified. (N.B. The number of rows and columns in M8.ufm would be fine; it is the only the presumed number of levels which is wrong.) Corrected in 10.7.3 15/08/06

24) **SATCOBA** – Various problems have surfaced when running **SATCOBA,** in particular with networks with 5-digit node numbers which are automatically forced to use **sequential** node numbers (NAMES = F) due to the fact that COBA only allows a maximum of 4 columns for input node numbers. Firstly, the "towards node" in columns 47-50 COBA Key 056 was always output as the "real" node number, not sequential, so failed whenever NAMES = F (i.e., definitely with 5-digit nodes). This has been corrected in 10.7.5. However if SATCOBA is being used to output data from **two** input files which are structurally different then it is not possible to match the networks based on sequential node numbers since these will differ between the two networks. At the moment there is no way around this problem; a solution could undoubtedly be found within **SATURN** but the obvious solution is to change COBA to accept 5-digit node numbers. So push them! 15/10/06

25) **P1X –** A long-standing problem with has been found with the reporting of flows on links from an internal simulation node (I) to an external simulation node (E) when PASSQ is being used. Basically any PASSQ (fixed) flows on I-E are effectively removed immediately **before** they arrive at E so that the reported downstream stop-line arrival flows (both demand and actual) do **not** include PASSQ flows and therefore under-report the **true** arrivals. However the "normal" annotation of (demand/actual) flows **on** the link are unaffected and there is no affect on delays, total pcu-hours etc. etc. The problem only really came to light in 10.6 when an option to annotate downstream arrivals was added. Corrected in 10.7.5 14/11/06

26) **SATALL –** Quantities such as total pcu-hours, total pcu-kms etc. etc. calculated within the simulation network may **double-count** the inputs from bus flows which start upstream on simulation links E-I where E is an external simulation node and I is internal. On the other hand the same quantities calculated directly within **SATLOOK** are correct. N.B. the problem has no effect whatsoever on assigned flows, calculated times, etc. etc., only summary statistics. Corrected in 10.7.5 14/11/06

27) **P1X –** Creating a SLA trip matrix without having an input .ufm trip matrix but using the option to run with a **flat** trip matrix crashes with a message about accessing channel 0. Corrected in 10.7.6. 30/11/06

28) **SATNET –** Crashes if both BUSKER and FREDDY are .TRUE. since the program attempts to output **both** a bus and a signals data file on the same channel without closing the first file before going on to the second. Generates a miscellaneous Fatal Error with parameters 0 and 7. A bug from way back. Corrected in 10.7.6. 01/12/06

29) **SATNET –** Not so much a bug, more a possibly undesired outcome of using crow-fly distances to define buffer-link distances if the input value on the

33333 records is zero **and** SHANDY = T. The problem is that this correction is applied to **all** buffer links including centroid connectors. While it may be sensible and highly desirable to calculate "correct" distances for "real" links it may quite acceptable to have zero-length centroid connectors (in the same way that they may quite legitimately have zero times). Therefore a new logical parameter CROWCC has been introduced in 10.7 such that a distance of zero for a buffer centroid connector is **only** replaced by its crow-fly distance if SHANDY = T **and** CROWCC = T. The default value of CROWCC = T maintains the status quo. Added in 10.7.6. See 15.10.3. 03/12/06.

30) **MX –** Dumping SATURN .UFM files to EMME-2 formatted text files currently excludes any output for matrix rows which contain **all** zeros (as well as excluding any non-zero cells in rows which otherwise contain one or more positive cells). Whether or not EMME-2 can accept files with such missing rows I do not know, but 10.7 adds a text record consisting of only the row origin in the case of all-zero rows. 18/12/06.

31) **P1X –** Errors can occur while editing nodes under Node Graphics (i.e., temporary editing, not permanent editing as under PMAKE) if, after having either added or deleted signal stages, you call **both** the options to Simulate and to Process the new signal data. The errors only appear if you then move on to edit further signalised nodes with **higher** node numbers. Corrected in 10.7.7 19/12/06.

32) **SATALL –** The combination of setting RAGS = T, LRTP > 0 and a roundabout with junction type 5 causes extremely high random delays to be calculated at the roundabout such that, in all probability, the assigned flows will be zero. Note that the default is RAGS = F and LRTP = 0 so unless you have specifically changed both these parameters the problem will not occur. Corrected in 10.6.18 and 10.7.7. 18/01/07

33) **SATME2 –** The Namelist parameter that specifies the file to be used to set frozen cells under FRODO = T is listed in the manual as FILICE but the program looks for either parameter names ME2ICE or ICEME2 instead. 10.7 has been corrected to accept either FILICE or ME2ICE etc. but with current 10.6 versions you will need to use ME2ICE or ICEME2. Corrected in 10.6.18 and 10.7.7. 24/01/07

34) **P1X –** Creating %Green Time link annotation data for networks other than network 1 may result in errors if the structure of that network differs materially from that in network 1; e.g., if it has a different number of simulation nodes or different signalised nodes, etc. etc. On the other hand it is perfectly possible to compare two networks if, say, the second network has had its signal settings optimised from the first network. Corrected in 10.7.7, 31/01/07.

35) **MX –** Editing zone structure (e.g., adding zones, deleting zones, aggregating zones, etc.) with stacked (MUC) matrices causes a problem with the zone (row) names for levels 3 and beyond in that it retains the old names. However the new **cell** values should all be correct. Corrected in 10.6.18 and 10.7.8 05/02/07.

36) **SATPIG –** The program may crash with a Fatal Error 29 for: (a) multiple user classes with (b) either a large number of SAVEIT iterations and/or a large number of links. Corrected in 10.6.18 and 10.7.8. 06/02/07

37) **P1X/SATDB –** It is possible that, if simulation-based data is selected through the **P1X** link annotation menu and subsequently displayed via **SATDB**, that **turn** data may not be defined as expected. For example, the "delay" calculated for simulation turns corresponds to the buffer link definition of actual time less free flow time rather than total turn time. There may be one or two other examples. (The basic reason is that the P1X link annotation menu was originally created purely to set link data, turn data were a bit of an after thought.) Corrected in 10.7.8. 16/02/07.

38) **P1X/SATDB –** When selecting "All" user class flows using the "numerical" **P1X** menu in **SATDB** (i.e., where you use option 91 to select all user classes), it is possible that one or more of the higher user classes may be created as columns of zeros. The error **only** occurs in (larger) networks where the number of assignment links multiplied by the number of user classes is greater than twice the maximum number of assignment links. Corrected in 10.7.8. 21/02/07.

E.4 SATURN 10.7 Bugs

Date of last update: 20th March 2008

The following "problems" have been identified in **SATURN** Version 10.7.09 as released in March 2007. Those up to and including 12) have all been corrected in the most recent version of 10.7, 10.7.10, released in June 2007. Errors 13) and beyond have mostly been corrected in 10.8 only but some have been added to a version 10.7.11 which has not been made available as a general release but which could be made available to users who encounter the specific problems noted below.

Some of these (potentially) may pre-date 10.7 and would also have been present in 10.6 or even much earlier releases.

1) **SATALL** – It is possible, with elastic assignment and a single user class, that the program may either crash or print silly cell values when reporting the 10 worst converged elastic O-D pairs. Or it may work perfectly well depending on the value used for an otherwise undefined variable. The same problem should have occurred in 10.6. Corrected in 10.7.10 29/03/07.

2) **SATALL/SATSIM Simulation** – An error **may** occur in calculating the extra "TAX" capacity of an X-turn at the end of a green phase at signals if it shares a single lane with another turning flow which is extremely small (e.g., 0.0001 pcu/hr) but not yet zero. The extra added capacity will be very near zero as well, possibly leading to very high V>C delays. The problem has been around for at least three years without being spotted so is hopefully extremely rare. Corrected in 10.7.10 29/03/07.

3) **P1X** – The choice of Validation in the Master Menu is greyed out when there are counts available for validation studies but no timed routes. If both occur or just timed routes Validation is available. Corrected in 10.7.10. 21/03/07.

4) **SATALL** – The use of AUTOK under multiple user class assignment has been either improved in 10.7.10 or a bug corrected depending on your point of view. A problem which has been around for a very long time. 30/03/07.

5) **SATEASY** – Multiple user class elastic assignment does not work correctly due to a double counting of minimum link travel times. The problem has been there for quite a long time. However MUC elastic assignment works perfectly well in **SATALL** which is what we strongly recommend using anyway. And is what the batch procedure **SATURN** runs by default Corrected in 10.7.10. 30/03/07

6) **SATALL/SATSIM Simulation** – The program may crash (Illegal operation in MIXUP2_105) under extremely rare circumstances which are detected in **SATNET** by Non-Fatal error 226 but not prevented. So logically 226 should be a Semi-Fatal Error and probably will be very soon. (It occurs when two turning

movements share a lane but neither has green in the same stage so that both block one another.) Corrected in 10.7.10.10/04/07.

7) **SATNET** – The error summary by all data segments which appears very near the end of the .LPN file (and which may also be printed within **P1X**) incorrectly reverses Warnings and Non-Fatal Errors. At all other points they are correctly given. Corrected in 10.7.10.10/04/07.

8) **SATSTAT** - May not generate a full report if the network does not include any links with Capacity Indices. Corrected in 10.7.10. 12/04/07.

9) **P1Viewer/MXViewer –** The initial release version only provided access to the maintained level rather than Level 'N3'. Fixed in Release Patch #1 (21/03/07) and included in all v10.7.9 released post 21/03/07.

10) **SATWIN -** Fortran File Opening Error 9016 may be generated when accessing data files located outside the Working Folder with long path names and/or embedded blanks. Corrected in 10.7.10. 14/04/07.

11) **SATTUBA/MX etc.** – There is a problem when producing skims for very large matrices under Tuba Format 1 or any other format mechanism that produces a full CSV record per origin in that the maximum record length is 8192 characters. If the required length exceeds this it may either cause a crash or else simply truncate the output record to 8192 characters. The latter produces a Non-Fatal Error message in the .LP file which may escape your notice. The dimension has been doubled to 16384 in 10.8 but you will also need a similarly extended version of TUBA. The same problem may also occur when outputting large CSV files in **MX.** See 10.15.1. 14/05/07.

12) **SATALL/SATSIM Simulation –** Turning movements coded with a turn Priority Marker M for merge may give unintended results with certain junction geometries.

    The basic intention of the M marker is to model merges, e.g., entry ramps onto motorways. These would be coded as a 3-arm priority junction with two one-way in-bound entry arms, the motorway and the ramp, one one-way out-bound arm, the exit motorway, and two turns: ramp to motorway coded M and motorway through to motorway. The assumption is that the outer lane of the ramp-motorway turn would merge with the inside lane of the motorway-motorway turn which would, by definition, be lane 1 on the motorway entry.

    Problems occur if the ramp is, effectively, coded as two-way such that there is an additional permitted left-hand turn off the motorway onto the ramp and that turn has the exclusive use of the inside lane. In this situation there is no traffic defined in lane 1 for the entry ramp traffic to merge with and the estimation of gap acceptance for ramp entry traffic becomes ill defined and essentially arbitrary. Most of the time there will be no reduction in the ramp entry capacity below its saturation flow but it is also possible that the capacity will be reduced to zero/CAPMIN with, consequently, very large delays.

In 10.8 this situation is: (a) detected as a Non-Fatal Error in **SATNET** but (b) corrected in the simulation by merging the ramp entry traffic into the **inside** lane as used by the motorway through traffic, not exclusively lane 1. With 10.7 the only solution – and probably the best solution in 10.8 as well - is simply not to use M markers with such a geometry or, if you do, allow the motorway through traffic to share lane 1 with the exit traffic from the motorway, in which case the entry traffic has something to merge with.

Hopefully the coding as described above is fairly infrequent in practice.

The same problem occurs with junctions with more than 3 arms and/or with merges "from the offside". See 6.4.2.3. 03/05/07.

13) Using **SATUFC** to produce .UFC files post assignment may not allow procedures such as forest skims to work subsequently since programs such as **SATLOOK** or **SATCH** automatically think that there is no .UFC file in existence. Corrected initially in 10.8.5 by letting the programs look for the relevant .UFC files but more comprehensively in 10.8.6 (see point 2 in Appendix D17.7) by automatically upgrading the .UFS files to register SAVEIT = T etc. 07/06/07

14) **SATALL/SATSIM/Simulation**. It is possible – though probably extremely rare – for roundabouts where one or more arms have link speed-flow curves which do restrict arm capacities for the internal give-way calculations and the "choking" from mid-link capacities to get locked into some form of positive feedback loop which results in very extreme capacities and/or delays. Corrected in 10.8.5. 17/07/07.

15) **SATPIG/SATPIJA** If the produce of NOMADS times NITER_S exceeds 999 an array dimension will be exceeded and the program will crash. The correction dimension (as in all other programs) should be 4001. Note as well that there is also an upper limit of 1001 on NITA_S for a **single** user class. Corrected in 10.7.11 and 10.8.6. 20/07/07.

16) **P1X, SATDB, etc.** Various problems have been identified performing Select Link Analysis based on .UFO files. Thus, (1), with MUC networks the user class flows printed for UC > 1 are incorrect (To be more precise they show the **differences** from the previous values.) (2) Screen line SLAs do not account for the possibility of paths crossing 2 or more links in the screen line; if they do their flows are double counted; (3) Spurious "CANT FIND …" messages in the LP files have been removed. (1) has been corrected in 10.8.6, (2) is still under review. 21/07/07

17) **SATALL (Simulation) –** It is possible – but highly unlikely – to generate an Invalid Floating Point Operation (divide by zero) in SET BB TARGET_AVERQ. Corrected in 10.8.6. 01/08/07.

18) **SATALL (Simulation) –** It is possible to generate a crash (undefined variable in subroutine BBLIST) if QUEEN = T, but not consistently. The error has been

in existence for several years without ever being spotted. Corrected in 10.7.11 and 10.8.9. 27/09/07.

19) **SATNET –** Problems can occur if capacity-restraint speed-flow curves and/or capacity indices are included in **both** the 11111 simulation data and the 33333 buffer data. The intention was that, if they differ, the initial 11111 would always be used in preference to the buffer data but this is not always the case. In particular this applies to speed-flow curves on simulation links from an internal node to an external simulation node. Setting FIFO = F should help. Corrected in 10.8.9. 27/09/07

20) **SATALL/SATSIM/Simulation**. It is possible for the program to terminate prematurely with a Miscellaneous Fatal Error 29 message. The cause of the problem is that described under 10) in Appendix D.17.3, Non-Fatal Error 273 (10.8 releases only). However it is not the case that **all** occurrences of NFE 273 inevitably cause the crash; in fact relatively few of them do. However correcting all such errors should remove the problem. Corrected in 10.7.11 28/10/07.

21) **SATNET**. If KNOBS data is being read with KONAL = T, i.e, with all the data included at the **end** of each 33333 link data record, the data is incorrectly read if DUTCH = T. Thus, rather than reading the data from column 56 onwards (since with DUTCH = T the normal capacity index is in columns 53-55) it reads it from column 46 onwards as it would normally do if DUTCH = F. Corrected in 10.7.11. 23/11/07.

22) **Simulation**. If a filter (Priority Marker F) has been coded at signals in, presumably, lane 1 and another turn has also been allocated to lane 1 then the simulation gives very strange results. This situation is detected as Serious Warning 105 in **SATNET** but, arguably, it should be converted to a Semi-Fatal error under WRIGHT = T. Corrected in 10.8.12 only. 17/12/07.

23) **SATNET/Simulation.** Any roundabout which has been coded with a circle time of **greater than** 64 seconds will have its circle time taken modulo 64 – which, if it is between 64 and 128 seconds, it will be reduced by 64. The problem has been there since the year dot apparently. Note that there is an upper limit of LCY set on the circle time so that the error cannot only occur if LCY > 64. Corrected in 10.8.13. 10/01/08

24) **SATME2 –** If the input prior trip matrix contains **negative** cells (pretty unusual but it has happened!) then those cells get confused with frozen cells and wind up being output as a positive value. Another error that has been there forever. Correct in 10.8.14. 06/02/08.

25) **MX –** Errors occur when reading in a stacked matrix which contains multiple levels from a text file of the form: NI NJ Level Cell; i.e., the “zone names” of the origin and destination, the level and the cell value. Basically the level is ignored and the matrix created will be square. In particular this affects the input of stacked matrix under TUBA Format 3. Corrected in 10.8.14. 10/02/08.

26) **SATNET –** The program crashes with KLUNK = 1 and more than 5 user classes (NOMADS > 5) with an “end of file” message. Corrected in 10.7.11 and 10.8.15. 18/02/08

27) **SATALL –** One of the assumptions made in the calculation of total pcu-hrs to come in **later** time periods is inconsistent with the assumptions normally made in skimming average O-D times. The differences occur specifically on links which: (a) block back and (b) are “spanned” by centroid connectors. The assumption made in calculating skimmed times is that any trips queued on the centroid connector will experience the **maximum** queue on the link in the future whereas in the calculation of total pcu-hrs the queue to be experienced is factored by AFTERS (whose default value is 0.5). If AFTERS = 1 the differences are zero for these particular links but, equally, setting AFTERS = 1 leads to inconsistencies elsewhere. The problem only arises in very highly congested networks where it is likely to be a few percent at most. The skimmed times are currently “correct” (in so far as any assumptions made about what happens to queues in later time periods can be thought of as “correct”); the calculation of total pcu-hrs has been corrected in 10.8.16. 11/03/08.

28) **SATNET/P1X –** If a $INCLUDE file is terminated by a 99999 record that record will **not** be treated as an end of data segment by **SATNET;** only a 99999 record in the “main” .dat file counts. However, if you subsequently edit the network in **P1X** and ask for the $include file to be copied into the main .dat file, the 99999 record is copied so that the data segment will be terminated by **two** 99999 records which are interpreted as an end of file by **SATNET**. In the corrected version of **P1X** 99999 is **not** copied. 10.8.16. 17/03/08.

29) **MX –** If the control file used to define trip ends for matrix Furnessing – see Section 10.7.5 – does **not** contain &PARAM namelist parameters the file will not be read and, possibly, the program will hang. The documentation states that the Namelist is optional; in fact it is – or was – mandatory. Corrected in 10.8.16 where it now becomes optional. 20/03/08.

E.5 SATURN 10.8 Bugs

Date of last update: 1th May 2010

The following "problems" have been identified in **SATURN** Version 10.8.15 as released in March 2008 and/or in later 10.8 releases up to and including 10.8.22.

Some of these (potentially) may pre-date 10.8 and would also have been present in 10.7 or even much earlier releases.

1) **SATNET** – Although the manual states that multiple bus lanes may be defined on network .dat files by, e.g., BB2 it actually generates a fatal read error. Corrected in 10.8.16 9/04/08.

2) **P1X** – Calculating SLA Actual (as opposed to Demand) flows ignores any possible reductions on the **first** simulation turn immediately after an OD route leaves the origin; subsequent reductions at over-capacity turns are correctly treated. The end result is that the Actual flows may be over-estimated. The bug has been there in all previous versions. Corrected in 10.8.16. 16/04/08.

3) **SATCH/P1X** – Cordoning a network with KNOBS > 0 and where the KNOBS data appears as a second line after the link data lines within 33333 (so that KONAL = F and a knobs file is not being used) **and** the extra lines can be entirely blank can create errors. What happens is that the blank line is ignored and the **next** record which should be a genuine buffer link record is skipped instead. The error has been around for several releases. Note that we now strongly recommend inputting KNOBS data via a separate "knobs file", not within the 333333 data, in which case the error can never occur. Corrected in 10.8.16. 16/04/08.

4) **P1X** – Network Editing has problems dealing with blank records within the 33333 data used as a "second record" containing KNOBS data. Basically the editor re-writes them as a comment and they will then be ignored in any output .dat file. A long-standing error, not just in 10.8. Corrected in 10.8.16. 18/04/08.

5) **P1X** – If a log/key file contains an integer X/Y co-ordinate with **6** (or more) digits, e.g., as used to define the corner of a Window box, the co-ordinate is output as an integer but incorrectly read within a key file as a real. For example, a value of 123456 will be read as 1234.56 and hence totally "misplaced" by the key file. 5-digit co-ordinates are not a problem. The error can be corrected by manually editing the key files to add a decimal place to 6-digit numbers but keeping within the requisite 8-column field; e.g., replace 'bb123456' by 'b123456.' (where 'b' represents a blank). The affected lines are those that are terminated by (Mouse pixels/status/X,Y). This is a new problem in 10.8 which is a consequence of including network co-ordinates in addition to pixels in key files in order to make key files less dependent on device resolution. Corrected in 10.8.16. 22/04/08.

6) **Simulation** – The new parameter RTP108 is unreliable and can generate incorrect random delays. Its use is therefore not recommended and it should be set to .FALSE. (its default) under &PARAM in network .dat files. Corrected in 10.8.16. 24/04/08.

7) **SATNET** – A bus route which executes a U-turn at a simulation node which is **not** a Type 5 roundabout may possibly (but not always) lead to a crash. Corrected in 10.8.16. 26/04/08

8) **SATALL/Simulation** – An explosive cocktail may be created by having two X-turners in the same exclusive lane with one or more of the X's entering a link which is blocking back. This may cause the computer either to crash, hang or to generate negative capacities – or it may only slightly misrepresent the extra post-green capacity "TAX". Corrected in 10.8.16 27/04/08.

9) **SATALL** – It is possible for the program to crash (Floating Point Error within subroutine DEL_107), caused by the "major turning movement" in a merge having zero flow (i.e., not the turn with a priority marker M but the turn into which it merges). In addition the new 10.8 "funnelling" rules must be turned on, so that FUNNEL = T (its default) plus RTP108 must be T as well (default F). A simple work-around, should the problem arise, is, therefore, to set FUNNEL = F and/or RTP108 = F. Corrected in 10.8.16 04/05/08.

10) **SATALL** – A similar crash (Floating point stack fault in MIXRIV) may also occur (but extremely rarely) with RTP108 = T. Corrected in 10.8.16 04/05/08.

11) **SATNET** – If UPDATE = T and the arrays containing either the IN or OUT simulation profiles are greater than 75% of the maximum limits then problems may arise with the update addressing memory outside the allocated space. In general this does not seem to be a problem, except in so far as the update process is not as efficient as it might be, but it may also cause the program to crash, in which case you'll know about it! Corrected in 10.8.16. 07/05/08.

12) **MX** – The output of a sector-sector .UFM matrix file may omit certain cells. The bug is not new and has been present for a long time. Corrected in 10.8.17. 24/06/08.

13) **SATNET and others** – Input from a free format text file with data of the form "…1.0 , 2.0 …", i.e., with the two data fields separated by both blanks and a comma, will not be read correctly. Specifically the problem surfaced while reading CLICKS data under KLUNK = 1 but it could happen anywhere. Note that "1.0,2.0" (comma, no blank) works correctly (and which is what is produced by CSV files output by **SATURN**) as does "1.0, 2.0" (blank after the comma) and "1.0 2.0" (blank, no comma). Corrected in 10.8.18. 14/07/08

14) **SATALL** – The simulation of the effect of funnelling on **offside** merges (with M108 = T and FUNNEL = T) may identify the "major" merging turn incorrectly and thereby – most probably but not necessarily – underestimate the capacity reductions. Corrected in 10.8.17 as released. 16/07/08

15) **SATPIJA & SATME2** – The use of the parameter SUBPQ = T to subtract PASSQ flows from the input count does not work correctly for MUC assignment in that it subtracts the **total** PASSQ flow from the counts rather than the user-class specific PASSQ flows. Corrected in 10.8.19. 24/07/08

16) **TBA22UFM and TBA32UFM** – The batch files for converting Tuba-2/3 text files back into .UFM do not re-create all the original zones in the input .ufm file if a zone does not appear at all as either an origin or a destination in the text file. Not a problem for "full" matrices. Corrected in 10.8.19. 25/07/08

17) **SATNET** – You can get a crash – Divide by Zero in CHECK_IGL_NUC – if you have a stage length of zero which would otherwise produce Semi-Fatal Error 227. It may be caused by having an incorrect number of stage definition records / an incorrect value of the number of stages in the Node Record. Corrected in 10.8.19. 04/08/08.

18) **P1X** – PMAKE fails when a new link is connected to a traffic signals node. Corrected in 10.8.19. 22/08/08.

19) **SATNET** – The use of < or > symbols to set explicit upper and lower limits on stage green times in network .dat files (see 6.4.13 in the Manual) has several problems. Firstly, **SATNET** may crash with certain inputs. Secondly, various analysis programs such as **P1X** may fail to read the limits correctly from .ufs files (although they should be OK in **SATALL).** Corrected in 10.8.19. 04/09/08.

20) **SATNET** - Reading in an ascii file of pre-load flows under free format (PLODFF) implicitly assumes that the data file consists of link records only, i.e., A-node, B-node, flow. Hence pre-load flows on turns cannot be read and, if your data records do consist of A,B,C,flow, A,B will be read as a link and C will be incorrectly read as a flow. Corrected in 10.8.20 by adding a new &OPTION logical parameter PLFF3. 20/10/09.

21) **P1X** – Certain semi-fatal errors detected in **SATNET,** in particular references to otherwise undefined simulation nodes as a link A-node, may cause a crash if the node in question is viewed using node graphics. Corrected in 10.8.20. 06/11/08.

22) **P1X** – Errors occur in node .dat file editing if you try to add more than one extra speed-flow records at a single node; e.g., if you create new capacity indices on two links. It tends to overwrite existing records rather than creating new records. Corrected in 10.8.21 and 10.9. 23/12/08.

23) **P1X, SATDB, SATLOOK, etc**.– If a network has been through a multiple user class elastic assignment in which not all user classes are elastic, and in particular if the **last** user class was assumed to have a fixed trip matrix, then the default trip matrix input to **P1X** etc. will be the reference trip matrix, not the output trip matrix. (**P1X** "thinks" that the whole assignment was based on a fixed trip matrix, not just the final user class. The error is actually in **SATALL** which outputs an incorrect "global value of MCGILL = 0 in the .ufs file.) This affects all options that make use of a trip matrix, for example Select Link

Analysis which will, by default, be based on an incorrect matrix. There is a simple work-around: redefine the trip matrix to be assigned to be the correct one. Corrected in 10.8.20 and 10.9.2. 27/12/08

24) **P1X.** A problem can occur with network editing. Thus if two external simulation nodes A and B are joined by a link in the buffer network and A, say, is converted to an internal simulation node then node B should have an extra arm added from A in the 11111 data file. Currently this does not happen and semi-fatal errors occur in SATNET with the updated network .dat file. Corrected in 10.8.21 and 10.9. 28/01/09.

25) **P1X.** Node selection does not work for nodal data annotated as “boxes” within the main network plots. Corrected in 10.8.21 and 10.9. 30/01/09.

26) **SATLOOK.** The batch file procedure SKIMTIME is meant to either include or exclude 4444 penalty times in the definition of link times depending on whether a parameter USETP is set T or F in SATLOOK0.DAT (See Section 15.27.7 in the Manual). However penalty times are **always** excluded independent of USETP. Note that this problem does not occur with SATTUBA or with forest skims carried out interactively/via a KEY file. Corrected in 10.8.21 and 10.9. 30/01/09.

27) **SATALL/SATSIM.** Messages may appear in the .LPT/.LPS files advising that negative random delays have been calculated. These may be ignored and the negative values have no effect on the simulation. The problem is due to rounding errors in the calculations of random delay which may occur if a turn saturation flow has been assigned an artificially high value such as 99999 but not with “normal” saturation flows. Corrected in 10.9. 10/02/09.

28) **SATALL.** It is possible for the simulation to “hang” (i.e., to go into an infinite loop internally) due to a calculation associated with blocking back. However the bug has been there for over 20 years and, to the best of our knowledge, has only “gone off” once. Corrected in 10.9 (N.B. **not** in 10.8 since the correction may lead to differences in blocking back, possibly significant if the blocking back is very “sensitive”.) 10/02/09.

29) **SATPIG.** The program can start to produce silly outputs and/or crash if a (relatively) very large output file is produced due to an array dimension being exceeded. This is most likely to happen with a large number of zones since the array required increases in proportion to the number of zones squared whereas the array dimension provided increases more like linearly with network size. Correct in 10.8.21. 12/02/09.

30) **SATALL.** Warm starts (WSTART = T) do not work for: (a) Frank-Wolfe assignment where either the network and/or trip matrix is changed and . UFO file is used, (b) a single user class, and (c) some fixed flows present (e.g., bus flows, PASSQ, etc.) Corrected in 10.8.22. 12/03/09.

31) **SATNET.** The logical &OPTION parameter DIADEM which is meant to permit UPDATE and/or WSTART = T when there is no file to update does not work when just UPDATE = T. And possibly not at all. Corrected in 10.8.22. 14/03/09

32) **SATALL.** It is possible for the program to crash at a very early stage if the number of user classes (NOMADS) is relatively large. The problem occurs while writing a list of all &PARAM REAL parameter values to .LPT when an array dimension is exceeded. The critical maximum value of NOMADS is probably about 14. The same error can occur in **P1X** under Information/&PARAM Lists. Corrected in 10.8.22. 14/03/09.

33) **SATCH.** An error of long-standing may occur in cordoning a network .dat file if: (a) the network .dat file set AUTOX = T; (b) a centroid connector of the form Z A B is defined within the 22222 records where link A,B is inside the cordon; and (c) A (or B) is an external simulation node which has not been explicitly set within 11111 but only defined by AUTOX. I.e., A had been defined only as an in-bound arm at B and then AUTOX assumes that it must be an external simulation node. The error is that A will **not** now be identified by SATCH as a node inside the cordon and the centroid connector will not be included in the output cordoned .dat file. Warning messages (though not highly explicit) appear in the .LPC file; search for “BOSS”. Corrected in 10.8.22 and 10.9. 19/03/09.

34) **SATLOOK.** Another long-standing error: the network summary statistics (e.g., total pcu-hrs/hr) comparing several different network files give certain misleading statistics when the networks have been run with different values of LTP. Basically the program assumes that the value of LTP for network 1 applies to all networks so that when converting rates to absolute totals or vice versa (e.g., this is done for fuel consumption) errors result. Corrected in 10.9. 26/03/09.

35) **SATPIJA.** The combination of choosing IVC > 0 and ALLIJ = T leads to nonsensical results – no Pija matches are identified and any subsequent runs of **SATME2** will not do anything. Generally speaking there is very little reason to set ALLIJ = T so the obvious correction is to set it F. Corrected in 10.8.22. 25/04/09.

36) **SATNET.** Using the CLICKS option with the data defined in an external .VSD file (i.e., disaggregated by vehicle class and capacity index) fails if the number of vehicle classes in the network exceeds 5. This is now a semi-fatal (NAFF) error. Corrected in 10.8.22 and 10.9. 16/05/09

37) **SATSTAT.** Erroneous reporting of User Class 1 summary statistics rather than correct values for ALL User Classes combined. Corrected in 10.8.22. 25/06/09

38) **SATCOBA.** The user-class flows output from a single input network with MUC = T are output in the wrong order and (for two-way links) with directional flows only. Corrected in 10.8.22 and 10.9.8. 26/06/09.

39) **SATSTAT.** Limited reporting undertaken for simulation only networks. Corrected in SATSTAT V3.1 (as part of later 10.8.22 releases and 10.9.10. 27/07/09

40) **SATALL.** The program may hang under multiple user class elastic assignment in a network which makes use of both CLICKS and CLIMAX. Corrected in 10.8.23 and 10.9.13. 01/11/09.

41) **SATALL.** The multicore version does work for networks which include either elastic assignment and/or weaving movements and no warning messages appear. This has been corrected in 10.9 such that attempting either of the above assignment methods with MULTIC = T results in a semi-fatal error. Corrected in 10.9.16. 01/05/10

E.6 SATURN 10.9 Bugs

Date of last update: 27th October 2011

The following "problems" have been identified in **SATURN** Version 10.9.12 as released in November 2009 and/or in later 10.9 releases up to and including 10.9.22 as released in January 2011 and 10.9.24 as released in May 2011.

Some of these (potentially) may pre-date 10.9 and would also have been present in 10.8 or even much earlier releases.

1) **SATALL** – Errors may occur when running a warm start option within MUC OBA causing the program to abort at the first assignment stage, particularly if there are banned turns under 44444. Corrected in 10.9.13. 01/12/09.

2) **SATPIJA** – The program may crash with Fatal Error 34 if the cost data contained on the .UFC file is too large to be copied into internal memory and therefore an external scratch file has to be created on channel 29. It may also require that UFC109 = T. Corrected in 10.9.15. 23/02/10.

3) **SATPIJA** – The program may hang when run in conjunction with OBA – but not always. Corrected in 10.9.15. 12/03/10.

4) **P1X and/or SATCH** – Cordoning off a network .dat file suitable for input to **SATNET** may run into problems with bus routes which have a single digit name/number written in column 5 (i.e., columns 1 to 4 are blank) in the original network .dat file since the cordon program only checks for non-blanks in columns 1 to 4. The error has probably been around for a long time. Corrected in 10.9.16. 17/03/10.

5) **SATALL** – A floating point error may occur if the total number of assignment-simulation loops exceeds 401. Normally MASL is limited to a maximum of 401 but it is possible that if one includes up to NIPS repetitions for signal optimisations that MASL * NIPS > 401 and the error occurs. One solution is to optimise the signals externally, another is to improve the network coding so that you don't need so many loops to converge. The error has probably been around for a long time. Corrected in 10.9.16. 17/03/10.

6) **SATLOOK** – The option "-1 - SKIM TIME, DISTANCE AND TOLLS ALTOGETHER" within the Forest Skimming Menu will crash with an error message of non-increasing DA codes with multiple user classes networks if you have explicitly selected a single user class (under menu choice 3). Corrected in 10.9.16 and later versions of 10.9.12. 28/03/10.

7) **SATALL** – A crash may occur under elastic assignment, referencing routine PRINT_TOP_TEN. This happens if, when the program calculates the ten worst O-D pairs in terms of convergence to the demand model, one of the origins is the highest numbered zone. So if you have, say, 1,000 zones the chances of

the last zone being amongst the top ten is only 1 in 100, hence the error does not always occur. Corrected in 10.9.16. 14/04/10.

8) **SKIM_ALL (SATLOOK)**. The program may terminate with a SATURN Fatal Error to the effect that an output DA code exceeds 99,993 if the number of zones times user classes exceeds (approximately) 9,900. Corrected in 10.9.16. 28/04/10.

9) **SATPIJA** – The program gives highly unreliable PIJA data whenever UFC109 = T, It is recommended that any users wishing to use **SATPIJA** with UFC109 = T switch to a very recent (10.9.17+) version or, alternatively, make sure that UFC109 = F in their network files. Corrected in 10.9.17. 14/05/10.

10) **SATPIG** – The same problem as above with UFC109 = T also applies to **SATPIG.** Corrected in 10.9.17. 18/05/10.

11) **MX** – Stacking matrices where the **total** number of matrix rows, i.e., the number of zones times the number of levels, exceeds the maximum number of zones permissible in your release version (e.g., 2,000 in the largest versions) may result in (some of) the zone names on the output .ufm file being set to zero. The error does not however affect the matrix cells themselves so that the stacked matrices may be used happily enough for assignment purposes. It also only appears to occur in exe's produced under FTN95 (the norm) rather than FTN77. This is a long-standing error. Corrected in 10.9.17. 21/05/10.

12) **SATNET** – Inputting pre-load flows from a text file with PLODFF = T along with the various sub-options provided by PLFF3 = T or F should be used with great caution; basically it works with some combinations of data formats and options but not others. Corrected in 10.9.17. 11/06/10.

13) **P1X** – Actual vehicle class flows are the calculated the same as demand vehicle flows for annotation. N.B. User class flows are correct. Corrected in 10.9.17. 14/06/10.

14) **SATSTAT** – The embedded macros within the Excel Spreadsheet do not function in Excel 2007. Corrected in 10.9.17. 22/06/10.

15) **SATSTAT** – The executable is not compatible with long filenames using "." As part of the filename. Corrected in 10.9.17. 22/06/10.

16) **P1X** – The subscripted namelist variables included within the "re-create a .dat file" option may contain unwanted spaces within the brackets; e.g., MCGILL(1) might well be written as MCGILL(1) with a blank between (and 1. This may cause the namelist data to be misinterpreted on input to **SATNET**. Corrected in 10.9.18. 24/06/10.

17) **SATNET** – Subscripted namelist variables which contain a space – see the example above – were not correctly interpreted as subscripted variables. Corrected in 10.9.18. 24/06/10.

18) **P1X** – GIS-based crow-fly distances as calculated along curved links defined in .GIS files and used in link annotation are correct in one direction (the direction coded in the 77777 .GIS data file) but not the other. Equally the data variable which is the difference between crow-fly and coded distances is calculated as coded minus crow-fly, not the other way around as documented. Corrected in 10.9.18. 19/07/10.

19) The simulation routines in **SATALL** and/or **SATSIM** in release 10.9.17 fail with certain network geometries containing dummy nodes. The problem is associated with the new "trick" introduced in 10.9.17 of treating simulation nodes in a form of topological ordering rather than purely numerical. An extra logical parameter, SIM109, has now been added such that if SIM109 = T then the new (improved?) topological order is adopted whereas with SIM109 = F the old (safe) numerical order is used. Full runs with 10.9.17 are therefore **not** recommended – which was effectively the same advice, though for slightly different reasons, as given at the time of the release. All 10.9.17 analysis programs are however still recommended for use. Corrected in 10.9.20. 06/09/10.

20) SKIM_ALL in 10.9.17 fails if the network contains 44444 time penalties (as opposed to monetary tolls) which are output as the 4th matrix. A crash message appears to the effect that a DA code 93 is being output and is less than 103. Corrected in 10.9.20. 07/09/10.

21) **SATALL** (and/or **SATSIM**) may hang under certain fairly obscure circumstances, most probably associated with simulation links with stacking capacities in excess of, say, 100 PCUs and possibly after a large number of loops as the run nears convergence. Corrected in 10.9.20. 07/09/10.

22) The batch procedures **STACK** and **UNSTACK** which use **MX** to stack /unstack matrices may fail with the most recent versions of **MX**. Alternative procedures such as **MXSTACK** or **UFMUNSTACK** are not affected. Corrected in 10.9.20. 28/09/10.

23) If **MX** is used to create an internal **stacked** matrix from an input .csv data file where the zone names are included in the data file then the name for the **last (highest)** zone is set equal to its sequential number, not its zone name. While this does not affect the cell values, so that a matrix so created may be used perfectly happily for assignment purposes, it does invalidate certain **MX** options where a row or column has to be identified by its name as opposed to its sequential position. N.B. The problem does not occur when the .CSV file is used to update cell values in an existing .ufm matrix, e.g., in the batch file CSV2UFM. Corrected in 10.9.21. 05/10/10.

24) Producing SLA matrices for **all** user classes in **P1X** using OBA does not work – basically the option had not been included. Added in 10.9.21. 09/10/10.

25) Cordoning a stacked trip matrix for multiple user classes in **P1X** using OBA **only** works correctly for user class 1. Corrected in 10.9.21. 13/10/10.

26) The latest version of SKIM_ALL based on 10.9.17 **SATLOOK** does not correctly skim time penalties if: (a) there are no monetary tolls and (b) the parameter NUSKIM on the preferences file = T (its default). In these circumstances the output matrix is all zero. The problem can be corrected by setting NUSKIM = F in the default preferences file SATLOOK0.DAT. Alternatively, though not documented, a "temporary" alternative preferences file may be defined by using a keyword KR on the command line, as in SKIM_ALL net mat KR mylook0, where mylook0.dat sets NUSKIM = F. There are no problems with any of the other three skimmed matrices. N.B. The same problem occurs with SATTUBA which uses the same basic subroutines. Corrected in 10.9.21. 31/10/10.

27) **MX** may crash when printing row and column totals for stacked matrices if one or more totals are less than 1.0. Corrected in 10.9.22. 06/12/10.

28) **SATLOOK**: skimming forests for, e.g., time using the interactive options for OBA plus multiple user classes fails in that it only skims the first user class. However batch procedures such as skimtime work perfectly well in these situations. Corrected in 10.9.22. 06/12/10.

29) **MX**: The new option to print all zone names from within the Files menu has been assigned the fixed option number 9 which may conflict with the option number to open the 9th input matrix. It has therefore been changed in 10.9.22 to option 14. 06/12/10.

30) Offset optimisation (**SATOFF** or **SATALL** with SATOFF = T) fails (possibly crashes) if any signalised nodes have cycle times in excess of 256 seconds. Corrected in 10.9.22. 13/01/11.

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 signalised 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.

48) **MX.** When building stacked matrices from “one record per cell” input files which contain: (a) sequential O-D numbers, (b) not their names, (c) the level and (d) the cell value the level values are in fact ignored. Thus **MX** interprets the sequential origin number as being the “stacked” value; i.e., if a record refers to sequential origin, say, 5 cell in level 2 MX expects the input origin to be Nzones + 5, **not** a sequential number in the range 1 to Nzones. Whether level is input as 1 or 2 is irrelevant. This is probably counter-intuitive although it is the rule that is adopted when a ufm matrix is dumped to text with one record per cell. The simplest work-around is to keep the level defined but interpret the O-D inputs as zone “names” in the range 1 to Nzones rather than sequential, in which case the level is applied correctly. This is a long-standing problem, no change has yet been applied. 16/06/11.

49) **P1X.** Select Link Analysis fails in release 10.9.24 if two or more networks are currently defined. The problem is that a box that requires a Yes/No return after a link has been defined does not have enough space to include all the printed data so the Yes/No boxes don’t appear and the program crashes. Corrected in 10.9.25. 17/06/11. N.B. A corrected **P1B** exe will be released.

50) **P1X.** The program crashes with a SATURN Fatal Error 29 when performing a Joy Ride if the route goes through a banned turn. Corrected in 10.9.25. 23/06/11.

51) **P1X.** Editing 55555 network co-ordinates runs into a problem, essentially an infinite loop trying to create an infinitely big data file, if the 55555 data includes an **old** $include record commented out as *$INCLUDE (i.e., with * (correctly) in

column 1). So if you need to comment out a $INCLUDE record use, say, ** instead of *, delete it entirely, etc. The same problem may possibly, but not necessarily, occur in other data segments as well. This is a long standing problem corrected in 10.9.25. 24/06/11.

52) **P1X**. Further to 51) **P1X** editing of 55555 records may also get stuck in an infinite loop if $INCLUDE is entered in **lower case**, i.e., $include. So use upper case $INCLUDE throughout – although the problem is probably only related to 55555 co-ordinate inputs. This is also a long standing problem corrected in 10.9.25. 24/06/11.

53) **MX.** When using a network .ufs file to rename, say, sequential row names in a stacked (multiple level) .ufm matrix with, say, non-sequential zone names from the network the transformation is only applied to the base level, **not** the higher levels. In practical terms this may make very little difference, e.g., it does not affect the assignment, but in some circumstances it might. It has therefore been corrected in 11.1. A long standing error. See 10.3.3. 01/07/11.

54) **P1X**. Editing signal settings at simulation nodes does not work if applied **after** extra lines have been added to the main body of the node .dat file by either screen editing (add comment lines) or by adding second link records (e.g., by defining flares). Basically internal pointers are not correctly updated. You may however update signals **prior** to adding extra records. Corrected in 10.9.25. 17/07/11.

55) **P1X**. The 10.9.24 as-supplied preferences file P1X0.dat may contain a misleading value for the parameter XYFORM = '2F10.1'. Ideally this should be the same value as that used by **SATNET** when building networks, for which the default is 2I5 although, in terms of values to be recommended as defaults, 2F10.1 is preferable. If the values of XYFORM differ between that used to build a network and that used by default within **P1X** then problem arise in editing X,Y co-ordinates and dumping them to a new .dat file in that the new 55555 entries will be in a different format I(i.e., 2F10.1) from the old (e.g.,2I5) The simplest solution is simply to edit P1X0.DAT and replace 2F10.1 by a a more appropriate local value. 17/07/11.

56) **P1X**. Joy rides which start at an external "spigot" node (i.e., a node which has only one arm leading to a mid-link node plus one or more zone connectors) and for which the second node selected is the mid-link node will fail to identify that first link correctly. Instead the joy ride finds the second node correctly but then adds an illegal U-turn at an adjacent node so that it creates three links rather than one. There is a simple workaround which is to define the second node further away than the mid-link node, in which case the joy ride will correctly interpolate through second node. Corrected in 10.9.25. 25/07/11.

57) **SATLOOK.** The option to print turning flows at buffer nodes does not work at all in release 10.9.24 (and possibly some slightly earlier releases). The numbers printed are essentially random, probably zeros. Corrected in 10.9.25. 25/07/11.

58) **P1X/SATDB**. The input of actual link flows (e.g., user class flows based on the 3808 convention) from alternative networks may assign an incorrect data column **title,** probably "Queue Reduction Factor". This only affects the title, not the content of the data read in. Corrected in 10.9.25. 02/08/11.

59) **SATNET**. The default value of NITA_S, documented as 99 in the Manual, is actually 25. Upgraded to 99 in release 11.1 and in 10.9.25. 05/08/11.

60) **SATALL**. The combination of QUIET and REFFUB = T gives rise to a fatal error of writing to an unopened file. Corrected in 10.9.25. 05/08/11.

61) **SATLOOK**. Incorrect skim matrices are produced with SKIM_TIME, SKIM_DIST, SKIM_PEN and/or SKIM_TOLL batch files when both SPIDER **and** Multi-core are used together. Skim matrices from SKIM_ALL.bat are not affected. Corrected in 10.9.25. 13/08/11. N.B. Also available in SATLOOK Beta within 10.9.24 as released 08/11.

62) **SATNET**. Spurious error messages may be generated for links which have had flared lanes – either offside or nearside – coded. More specifically Warning 91, Serious Warning 130 and Non-Fatal Error 226, all which involve various levels of incompatibility between the lane allocation and the stage definitions per turning movement, do not take account of the fact that the flared lanes effectively provide an extra lane for certain turns which "corrects" the incompatibility. Thus there is no problem in the simulation modelling of these configuration and the errors should therefore be ignored. Or, alternatively, suppressed by setting, e.g., ERRYES(91) = F (although this may also suppress genuine examples of Warning 91. Corrected in 10.9.25. 25/08/11.

63) **SATNET**. Similarly Serious Warning 105 – a filter movement at signals should have the exclusive use of lane 1 – is also spurious if a filter lane has been coded. Since this is normally upgraded to a Semi-Fatal NAFF Error under WRIGHT = T it is slightly more annoying than 62) above but again may be suppressed by setting ERRYES(105) = F. Corrected in 10.9.25. 25/08/11.

64) **P1X**. Spurious error messages as reported above under notes 62) and 63) are also reported within node graphics. Corrections here are only included in release 11.1. 25/08/11

65) **SATPIJA_MC**. The listing of error messages as generated by the first (partial) run of **SATPIJA** is **not i**ncluded within the combined output .UFP file nor is it printed within the final output .LPJ file. Corrected in 10.9.25 and 11.1.2. 05/09/11.

66) **SATALL**. If an origin has only one possible connected destination and that OD pair has positive trips in the trip matrix and SPIDER = T then those trips are not assigned. With SPIDER = F it is not a problem. Corrected in 10.9.25 and 11.1. 22/09/11.

67) **P1X**. Mid-link simulation capacities in excess of 9,999 are not currently annotated (or are annotated as zero). They should, however, appear correctly in print-outs of node data. Corrected in 11.1.2. 25/09/11.

68) **SATNET**. Similar to 67, input mid-link capacities in excess of 9,999 may, in certain circumstances, be treated, effectively, as infinity and therefore printed as either zero or blank. They should, however, be correctly recorded within the .UFN file and therefore correctly used within all subsequent stages (e.g., within the simulation) although it is probably worth checking the print-outs of node data in P1X to see that they have been correctly recorded. Corrected in 11.1.2. 25/09/11.

69) **P1X**. A very, very longstanding problem. If a simulation zone Z has two or more centroid connectors to the same simulation node A (this happens if Z has connections to links A-B, A-C...) then each of these connectors becomes a separate link in the map network. These are then plotted directly on top of one another which, visually, is not a problem. However, if one tries to annotate, say, flows the centroid connectors will display only the flow from a **single** connector (which is clearly less than the total) or will display them **all** but over-written. Corrected in 11.1.2 such that the **total** flow from all connectors is now annotated. 28/09/11.

70) **SATALL.** The program may crash with an Illegal Operation (Divide by zero) message in FLODEL in Simlib if a link with a flare coded (either nearside or offside) has two additional turns in shared lanes which have **both** been assigned zero flows. Corrected in 10.9.26 and 11.1.2. 02/10/11.

71) **SATALL.** If an offside flared lane at signals with an X-turn has its green times in a totally separate and non-overlapping stage from the straight ahead traffic then the resulting delays and capacities may be unreliable. N.B. This is also an example of Non Fatal Error 226. Corrected in 11.1.3. 24/10/11.

72) **MXM5.** The matrix editing procedures may give incorrect results if the total number of “transformations” (e,g., converting zones into sub-zones) exceeds the maximum number of matrix zones permitted. Corrected in 11.1.3. 27/10/11.

E.7 Version Control

JOB NUMBER: 5101396		DOCUMENT REF: App E.doc				
Revision	Purpose / Description					
		Originated	Checked	Reviewed	Authorised	Date
1	Re-formatted (Final to DVV)	TF / BG	NS	IW	IW	06/05/06
3	Upgrade to V2 Template	DVV	IW	DVV	IW	28/06/06
3.1	Additions to 10.6.17	DVV				10/07/06
3.2	Web release – Sept 06	DVV	NP	IW	IW	08/09/06
3.3	Web release – Jan 07	DVV	NP	IW	IW	04/01/07
3.4	SATURN v10.7 Release	DVV	NP	IW	IW	12/03/07
3.5	Web Release for Jul 07	DVV	NP	IW	IW	20/07/07
3.6	SATURN v10.8 Release	DVV	NP	IW	IW	25/03/08
	E.6 started for 10.8 bugs	DVV				26/04/08
3.7	Web Release for Jul 08	DVV	NP	IW	IW	07/07/08
3.8	Web release – Dec 08	DVV	NP	IW	IW	12/12/08
3.8.21	Web release – Feb 09	DVV	NP	IW	IW	16/02/09
3.8.22	Web release – Jun 09	DVV	NP	IW	IW	16/06/09
10.9.10	SATURN v10.9 Release	DVV	DG	IW	IW	04/09/09
10.9.12	SATURN v10.9 Release (Full)	DVV	DG	IW	IW	22/10/09
10.9.17	Web release – Jun 10 Bugs v10.3.9 removed	DVV	NP	IW	IW	22/06/10
10.9.22	Web release – Dec 10	DVV	AG	IW	IW	07/12/10
10.9.24	Web release – Dec 10	DVV	AG	IW	IW	24/05/11