SATURN 11.5 Release Notes (11.5.05N)

This SATURN 11.5.05N, released in October 2021, replaces 11.5.05H.

SATURN 11.5.05N is the second <u>full</u> 11.5 release superseding the last full release in July 2020 (11.5.05H) and all intermediate beta versions made available under the SATURNnext programme.

The simulation is unchanged from 11.5.05H and produces assignment results **identical** to 11.5.05H in all the testing that we have undertaken[1].

IMPORTANT warnings re Select Link Analyses (SLA) in 11.5

While introducing multi-core versions of SLA, an internal storage error was discovered. This means that SLA outputs with 11.5.05H could be unrepresentative, especially in large models and for higher user-classes (which may be missed by cursory checks on the first user-class). Though this has been corrected, the correction also brought to light further problems in some SLA options and combinations of options. We have focussed on ensuring that in this 11.5.05N release, the common SLA routines for generating link and/or matrix-based outputs for a single link, node or turn using demand are consistent and replicate the main assignment results using either single or multi-core routines. The testing work suggests that the outputs based on **unfactored demand** flows are now generally correct (note, this is **not** the default selection which is factored. However, to resolve some of the problems requires a more extensive rationalisation of the code which is forming part of 11.6.

Therefore, users are strongly advised not to rely on any other Select Link Analysis outputs unless additional independent verification checks are undertaken.

IMPORTANT to use 11.5.05N instead of 11.5.05H

We recommend that all users who have been running 11.5.05H should re-run at least one sample assignment in 11.5.05N to confirm that they are getting identical assignment results, and, if not, that they check that their networks do not have zero distances coded on real links. In cases of minor differences, we strongly recommend migrating to 11.5.05N anyway, and preferably correcting the coding. If you find substantial differences, please report the occurrence to us as soon as possible. Note that our first response to any future problems raised from the continued use of 11.5.05H will be to ask you to re-run in 11.5.05N.

Main changes from the first release of 11.5

The main changes with this release are:

1. **Area Charging Zones** – SATNET has been updated to allow Area Charging Zones to straddle simulation and buffer network areas. Handling of the area charging zones when creating cordon networks in SATCH and P1X has also been improved.

2. **P1X Multi-Core** – First steps have been made in speeding up the secondary analysis by multi-coring some P1X routines (for users with the multi-core add-on). It requires the assignments to have been run with SPIDER=T and is only available for UFC files (ie not UFO files). The items currently sped up this way are:
   a. OSTTTOA (One Song To The Tune Of Another)
   b. Select Link Analysis – for the generation of either matrices or flows for single LINKS and TURNS

   Note that P1X Multi-Core continues to be in-development and users should remain vigilant and continue to undertake logic checks on the latest outputs.

3. **Select Link Analysis** – As already noted above, while developing P1X multi-core several bugs have been corrected hence 11.5.05N must replace 11.5.05H. There is also the addition of a new batch file P1X_SLA (available from the Experimental tab of the latest SatWin) which enables easy creation of select link analysis UFS files for display using SatView. As always, invoking the batch file with no parameters will list the simple user-documentation.

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[1] *Note: There was one test where we, on first pass, did appear to get different results – however, on further investigation it was discovered that this was NOT due to a change in the simulation methodology, but due to a change in the network, arising from the correction made to SATNET (Bug ID 164, case #18021). A link had been coded with a zero length which was auto-corrected to the crow-fly distance – but of course that was the one case in the network that had the coordinates for one of its nodes coded twice and differently! The correction meant that the link was now given the crow-fly length (based on the "correct" node coordinates following the FIFO=T rule) of 138 metres, rather than the previous value of 49 metres. Satisfying to know that we picked up this small change!*

4. **Compatibility with DIADEM v7** – As part of the move to 11.5 last year, the skimming routines were rationalised leading to the loss of the superfluous '.UCA' suffixes in the file names. Unfortunately, these names are incompatible with the current DIADEM software as it calls the SATURN programs directly and the output files must have the '.UCA' extensions to function. Until DIADEM is upgraded, SATURN 11.5.05N has a backward compatibility option, via the environmental variable DIADEM, to force the creation of old-style filenames (as well as forcing non-zero matrix cells to be exported – see (5) below).

   The backward compatibility option may be invoked by using 'set DIADEM=OLD' before opening DIADEM (or National Highways' HEIDI application). If you wish to run from the DIADEM or HEIDI GUIs, you must open them from a command line, and not the default icon, eg by running:

   ```
   set DIADEM=OLD
   "C:\Program Files\DfT\DIADEM 64bit\v7.0\DIADEM.EXE"
   ```

   or equivalent according to your system.

5. **Export of Zero Cells using UFM2TBA2/3** – The handling of zero cells in UFM2TBA2 and UFM2TBA3 is now consistent, with the default option (NOPKZ) not to export them. The update completes the partial changes introduced in 11.5.05H with the new KPZ/NOKPZ command line options now available. Further information on these settings is available in the updated batch files and also accessible via the updated SatWin modules.

6. **SKIMTAC output file names changed** – The output file names have been changed to make them consistent with names output by SKIM_ALL etc applied to non-TAC networks. The more detailed blocked files are now labelled with a final "_BYTAC" extension (instead of no extension), and the files that were previously "_AVER" now have NO extension (hence structurally matching the equivalent SKIM_ALL files with no extension). Also, as well as _TIJ_BYTAC matrices showing trips by the TAC regimes, SKIMTAC ALL (and SKIM_ALL) outputs a full trip matrix _TIJ, the trips broken down by user class matching the skim cost matrices. This, in many cases, may replicate the trips matrix input, but ensures that where users have used factors and input matrix selection in the 88888 cards, a structurally consistent version of the trip matrix is available. The matrices created are such that when passed through UFM2OMX they use the User Class names for the OMX layers. It is strongly recommended that users set UCNAME() parameters in the network.dat files. It's surprising how many networks we see without UCNAMEs (or VCNAMEs for vehicle classes) not defined to the network, but with comments containing the information in the 88888 cards!

7. **New SATSKIM batch file** - The standardisation of filenames above has enabled us to provide a single batch file to provide average skims that will run whether the network has, or has not, Area Charges defined. It works in a similar manner to SKIMTAC but is generalised so that it copes with both TAC and non-TAC networks, and is now the one stop shop for average path skimming.

   So, where you previously had:

   ```
   SKIMTAC ALL network network
   ```

   or (for non-TAC):

   ```
   SKIM_ALL network network
   ```

   we suggest you change to:

   ```
   SATSKIM ALL network
   ```

   The default is for the output skims to have the same basename as the assigned network, with the suggestion that the alternative of giving a different name is exceptional.

   For more details, as always, simply run without parameters:

   ```
   SATSKIM
   ```

   It is recommended that this should be used in future. The SatWin 'Home' tab now contains SATSKIM, though SATSKIM is also on the 'Post Assignment' together with all the old average skim routines.

8. **OMX files** – Though the matrix conversion utilities OMX2UFM and UFM2OMX remain the same, the internal processing has been re-written. This has enabled us to re-introduce compression when creating OMX files (lost when migrating from OMX version 0.1 to version 0.2 for 11.5.05H). .OMX files output from 11.5.05N will be considerably smaller. Note that some OMX files generated by intermediate beta versions released under SATURNnext may fail to be read by CUBE software (but will be read by TAG-S software ie TUBA and WITA).

9. **Various Bug Fixes** – The usual set of corrections arising from user feedback as detailed in App E-Latest.xlsx available under the Support page, FAQ section on the SATURN Website (http://www.saturnsoftware.co.uk/).

Please note that the 11.5 User Manual published in July 2020 has **not** been updated for the 11.5.05N release.

SatWin

The installer includes a new version of SatWin updated for the 11.5.05N batch file changes.

SatView and UFV files

To allow for additional data, UFS2UFV has been upgraded from previous releases. In parallel to this release, there is a new release of SatView (Version 1.32) which has been updated to match.

IMPORTANT NOTE - UFV files created by older versions of SATURN would not necessarily pass correct information to a newer SatView (though the changes were always in rarely used fields). The correct action was always to use the SatWin "Update UFS2UFV Files" button on older SATURN versions to update the UFS2UFV to match the SatView installed on the same machine, and re-create the UFV files from the source UFS. In practice, this process seems not to have been understood. The new SatView/UFS2UFV now checks for compatibility.

Clarification - Default SIM111 (and RAGS)

The 11.5.05H release notes incorrectly stated that setting the parameter SIM111=F also forces RAGS=F. This is not the case, though of course they are closely coupled and if RAGS=F, SIM111=T will have no effect at give-ways. Let us explain further…

There are three main parameters that control the addition of random delays and queues within the simulation: LRTP, RAGS and SIM111, and we recommend that these should all be set so their effects are included, reflecting actual behaviour. LRTP is the length of the random time period used in calculating random delays, and setting this to 0 minutes would mean the random delays calculated would be zero, and the settings of RAGS and SIM111 become irrelevant (and may be forced 'F' for convenience). Initially, the random delay was added for major junction arms only, but this was subsequently extended in version 10.5 to give-ways as well, controlled by setting RAGS=T, and this is the current default. Logic dictates that these random delays can have associated queueing, and in version 11.1 these random queues were also added to the simulation, controlled by setting SIM111=T though with a default of F but recommended that users set it T. The inclusion of further random delays in the simulation is expected to realistically increase the levels of modelled congestion but not have a significant impact on overall convergence for models with good quality coded networks. We continue to recommend users set SIM111=T to reflect actual behaviour, with the expectation that this will become the default for SATURN 11.6.

Installers

As before, SATURN 11.5.05N is available through separate installers for each: (i) level (eg 'B' or 'N4'); (ii) single or multi-core variant; and (iii) single user (i.e. USB dongle controlled) or multi-user version.

Technical Support

If you require technical support, please do not hesitate to contact us at saturnsoftware@atkinsglobal.com.

If you have any suggestions for what you would like to see in future versions of SATURN, please let us know. Please also let us know quickly of any problems you have, and we will look into them.

In the meantime, we wish you a successful continuation with SATURN 11.5 and thank you for your ongoing support.

SATURN Team

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