SATURN 11.5 Release Notes (11.5.05H)

SATURN 11.5.05H is the first full 11.5 release with the new assignment-based Area Charging functionality, superseding all beta versions made available under the SATURNnext programme as well as the last full release, SATURN 11.4.07H, undertaken in August 2018.

This full release draws to a close the substantial collaborative development exercise undertaken with Transport for London (TfL) and many of our key software users that were brought together under the SATURNnext programme. The collaboration will continue under the current SATURNnext FY20/21 programme with the emphasis on further performance improvements with the secondary analysis.

With the previous SATURN 11.4.07H release undertaken in summer 2018, there have been many changes to the software (with various bug fixes as well) and therefore too many to meaningfully detailed here. Full lists of the changes are provided in Appendix D-Future whilst Appendix E-Latest details the bug fixes. Some of the more important changes are described below:

Data Files

As always, in terms of backwards/forwards compatibility, the 11.5 network .dat files may contain new features (e.g., parameter names) which will not be recognised by pre 11.5 versions of SATNET but will not cause the program to crash; however pre 11.5 .dat files will be read perfectly happily by 11.5 SATNET. Similarly, 11.5 network .ufs files contain new arrays which older version programs will be able to read but not recognise whereas 11.5 programs will be able to read pre 11.5 .ufs files. For non-Area Charging matrices,.ufm files have not fundamentally changed and should be both forward and backward compatible. Output matrices from the use of Area Charging may be in 'blocked' format (as discussed below).

Assignment Results

For users migrating from 11.4.07H, there have many updates to the assignment / simulation algorithms since autumn 2018. For SATURNnext FY20/21 users, there have been some minor changes since the 11.5.05E beta release in May 2020 so the model outputs will be similar but not identical. As always, all users will need to re-run their old models with this latest version to determine the impact on the model outputs.

Area Charging Functionality

The largest changes for SATURN 11.5 relate to the introduction of new Area Charging functionality to enable the more accurate modelling of one or more area charging systems with multiple zones. The functionality was originally developed for TfL to enable the modelling of both the Central London Charging and the Ultra-Low Emission Zone systems but it may be applied to any area-charging system.

A presentation of The Modelling of Area Charging with the new functionality was provided at the 2019 November User Group Meetings and subsequently published on the SATURN website (www.saturnsoftware.co.uk) >> Support >> 2019 UGM Presentations >> Area Charging. The presentation describes the different charging systems available, how they may be coded in SATURN, the extended assignment process, the revised model outputs and how they may be analysed. More detailed information is provided in the section 20.6 of the Manual.

Area charging users should note the following:

- **UFO-based output files** are not available with Area-Charging networks (due to the complexity of storing the different charging paths) and users will need to continue with existing (and slower) UFC-based approaches. The 'QUICK' option has been developed for the secondary analysis, trading off speed versus accuracy (see 'Other Key Changes' below). We are exploring methods to store the full set of paths in a compact form (see Work-In-Progress below)
- Whilst **Compliancy factors** are available to split an existing user class into separate non-compliant (subject to charge) and compliant (exempt from charge) user classes within the assignment, we strongly recommend that they are represented as separate (but adjacent) user classes. Our testing work has shown that even though the calculations are correct, the model outputs are very difficult to understand particularly in larger models.

Other Key Changes

Some of the other key changes are listed below:

- The **Open Matrix Format (OMX)** libraries have been updated to the latest v0.2 standard (see section 10.2.8) and the OMX files should be compatible with those produced by CUBE v6.4.4 or later, VISUM 14 or later and

EMME v4.6.7 or later. The new OMX files will also be able to read-in by the Department for Transport's latest TUBA (v1.9.14) and WITA (v2.1) software applications.

- A new **Level X9** has been introduced to accommodate Transport for London's HAM P4.x series of highway models that uses the latest Area Charging functionality (see 2019 UGM presentation and Section 15.28)
- The **P1X graphics cursor** has been replaced to overcome the problem of 'missing' crosshairs for some multiple display users (as previously discussed in Appendix N.4).
- **CASSINI** has been updated to provide compatibility with DIADEM v7.0 output files used in the Highways England Regional Transport Models (see Section 15.56)
- A new **QUICK** option has been introduced for the skimming (and any other analysis that require the re-creation of paths from the stored link costs) to use fewer paths than generated in the assignment. This enables computation time to be reduced if the corresponding reduction in accuracy is appropriate (eg undertaking a 'quick' screenline SLA). Note that approximation is only intended to aid investigating model outputs and certainly not for the generation of final model results.
- A new **WANDER** parameter (default =T) has been introduced to successively reduce the value of NISTOP if the assignment is close to terminating but is 'wandering' and, thereby, reducing runtimes (see Section 9.27)
- New batch file **MXUNBLOCK** to enable 'blocked' matrices containing output TAC-based demand and skim data to converted into conventional stacked matrices for ease of analysis.
- Filename extensions **.DAT/.TXT/.CSV** are now recognised as acceptable for text files, both on input and output. Note that existing .KEY files may need to be updated as previously using one of these extensions may have required an extra 'Y' confirmation record to accept the then unrecognised extension (see SATBUF.KEY for example).

Work-in-Progress

Whilst 11.5.05H has been released, development work continues across the applications in response to user requests, identified improvements and addressing issues that arise in application. Listed below are some of the current workstreams that are following on from 11.5.05H.

Area Charging Secondary Analysis

Development work continues with expanding secondary analysis for the new area charging options. SATPIJA, SATRAP, SATCH and more SLA options (including SLA matrices) have recently been added and have undergone testing as part of the SATURNnext programme – they are available for use, but if the outputs look 'suspicious', please contact support.

Performance Improvements

The path-building process for user classes with common generalised cost definitions may be readily shared, thereby significant reducing model runtimes (eg user classes that are either 'compliant' or 'non-compliant'). The assignment process will automatically identify these user classes provided they are defined adjacently in the network file.

As noted earlier, UFO files are not available with the Area Charging functionality (but continue to be available for non-TAC networks). We are exploring alternative methods of storing path data in compact, readily accessible format that are compatible for both TAC and non-TAC networks to speed-up secondary analysis. Once available, the existing UFO-based format will be discontinued.

Default SIM111 (and RAGS)

Several old assignment parameters have been phased-out (eg UFC109, UFC111, SIM109, BB111) as it was long over-due that the recommended 'TRUE' defaults were enforced. The same change for SIM111 was also planned to be enforced but, as it has a noticeable impact on the assignment results, it has been held back for 11.6. We strongly recommend that users set SIM111 = T when developing their new models as it will become mandatory. Note: whilst RAGS=T by default, it is forced to 'F' with SIM111=F.

SatView Data Files

UFS2UFV has been updated to take on board the latest changes and an updated SatView (v1.32) release will follow. In the meantime, users will need to upgrade their current SatView with the SATURNelements.dll packaged in the XEXES folder, ie copy it into the "C:\Program Files (x86)\Atkins\SatView" folder (or the equivalent if your IT have installed SatView elsewhere). IMPORTANT NOTE - this will mean that UFV files created by older versions may not pass correct information to SatView.

Installers

SATURN 11.5.05H is available through separate installers for each: (i) level (e.g. 'B' or 'N4'); (ii) single or multi-core variant; and (iii) single user (i.e. USB dongle controlled) or multi-user version. Further details on the Installation process are available from the Installation Notes.

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 investigate them.

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

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