

# SATURN

## SATURN 11.4 Release Notes (11.4.06D)

**SATURN 11.4 is the successor to all previous versions of SATURN. It represents a direct evolution from its predecessors whilst offering significant enhancements from the strong existing base.**

The first internal development version started with v11.4.01 in June 2016 with this first full external release, v11.4.06D, undertaken in January 2018. This full release provides access to the latest development features in the SATURN software. The key highlights were presented at the Autumn 2017 User Group Meetings – with all the presentations and documentation available to download from the support area of our website ([www.saturnsoftware.co.uk](http://www.saturnsoftware.co.uk)). We describe some of these highlights below alongside other important items to note with this release.

### 1. Changes in Output Results in v11.4

In terms of results there have been a large number of both relatively major and minor changes to the simulation so we expect 11.4 to give different – possibly significantly different – results to pre-11.4. As the results are expected to be different anyway, the opportunity has been taken to change the default values of several parameters, typically replacing default historic values for more up-to-date ones as noted in Section 2 below.

As always, our strong advice to both avoid compatibility issues and to ensure that new defaults are adopted, is to re-run old networks ‘from scratch’ starting with your original network .DAT files fed through SATNET, taking corrective action for any of the new warnings/errors reported. (On the other hand matrix .UFM files probably do not need to be re-created.)

We would strongly encourage you to compare output .UFS files from, say, 11.3 with the latest outputs from 11.4 in order spot the differences – and possibly identify any not-so-desirable differences. We certainly do not recommend undertaking evaluation comparisons of different scenarios by mixing outputs from both 11.4 and pre-11.4 releases.

### 2. Key Changes with SATURN v11.4

#### 2.1 New Features

SATURN 11.4 adds many new features affecting network representation, assignment-simulation-assignment functions, visual displays and post-assignment analysis. Some of key changes are outlined below with the full (and more detailed) list available in Appendix D-Latest (see Support section on the [website](#)):

- **SATNET:** several enhancements including:
  - The default is now to use specify the use of spider web networks (SPIDER=T) and where possible to use these also in analysis (USESPI=T).
  - The default values for both GAP acceptance and convergence parameters have been revised to bring them into line with current practice and guidance (App D.22.1.8 and D.22.1.9 respectively).

# SATURN

## SATURN 11.4 Release Notes (11.4.06D)

- Changes to the formatting of the generalized cost weights per KNOB field so that integer inputs are read as integers rather than having assumed decimal places – this may give different results (App D.22.1.7).
- **SATALL:**
  - **Path building:** a new Dijkstra shortest-path algorithm introduced rather than d’Esopo, which should be more CPU efficient for large SPIDER-based networks, and reduce assignment runtimes - for example, assignment runtimes for LoHAM, reduced by more than one third (App D.22.2.3)
  - **Simulation:** a large number of improvements to the modelling of random delays, flares, X-turns at signals, mid-link capacity constraint, blocking back and lane choice culminating in improved convergence, we expect, for most networks (App D.22.3)
  - **Blocking Back:** the rules on blocking back and the allocation of queues between link and zonal entry flows have been updated to reduce its sensitivity and improve convergence for models with large zonal flows entering low capacity links (App D.22.3.14)
- **P1X:** numerous enhancements including:
  - Option to export a single clean .DAT file from multiple input files (App D.22.4.4)
  - Optimize signal timings (via SIGOPT batch procedure) and store the revised timings in the original \$INCLUDE files as the new default (App D.22.4.7)
  - Improved search for bus / timed route (App D.22.4.5)
  - Separate reporting of link and/or turn travel times experienced by buses including those incurred in bus lanes (App D.22.4.11).
- **SATLOOK / Skimming batch files:** updates to enable skimming to be only undertaken for specific user classes if required (App D.22.8)
- **SatWin:** a general overhaul of the User Interface using the Microsoft Ribbon style with changes to the layout, groups, documentation and accessing support. The new interface also provides compatibility with the SatView and SatCoder software (App D.22.9)
- **SATSTAT:** the convergence reports have been extended to provide further information on the stability and proximity of the assignment solution. The changes are not backward compatible so users must also use the latest version of the SATSTAT spreadsheet in the XEXES 11.4.06D folder (App D.22.11). Note that SatWin has the ability to add or replace the appropriate files in older SATURN versions as part using the ‘Update Batch Files’ button – see the Installation Notes for more information.
- **UFS2UFV (and SatView):** updated in line with additional fields available in 11.4, and also enable user-generated select link analysis and data fields to be passed to SatView, (from v1.20 onwards). (App D.22.10). Strictly, the UFS2UFV and SatView have to be compatible (i.e. irrespective of the version of SATURN XEXES being run). SatWin has the ability to add or replace UFS2UFV in older SATURN versions by using the ‘Update UFS2UFV files’ button.

# SATURN

## SATURN 11.4 Release Notes (11.4.06D)

- **OMX files:** We also note that, SATURN supports the binary Open Matrix Format (.OMX) that enables users interchange matrix data with Citilab's CUBE software without recourse to dumping to ASCII files and rebuilding matrices in the alternative system. This significantly reduces the size of data files, compared to ASCII text files, and the time taken to transfer data. Further details on the OMX data format and the OMX2UFM and UFM2OMX batch files is available in section 10.2.8 of the User Manual.

### 2.2 Issues Resolved

In parallel with the new features, a large number of (mostly minor) bugs have been resolved. A full list of bugs is provided in Appendix E-Latest (see Support section on the [website](#)) in a tabular format to enable users to readily identify the specific release version(s) that include the identified corrections.

The SATURN v11.4 release also addresses a long-standing, frustrating but intermittent operating system related problem that would occasionally arise when, at the end of a SATALL run, the network .UFS and .LPT would be corrupted and unusable.

### 2.3 New Installer

A new family of SATURN installers has been produced to simplify the SATURN installation process, removing the need for separate install bundles for SatWin and, if required, dongle drivers and multi-core add-ons.

The new installers contain three components:

- the SatWin User Interface
- the SATURN platform (or system files and documentation)
- the executables, batch files (SATURN version).

There are 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.

The default install location and sub-folder structure have also changed as follows:

- By default, the main installation is undertaken in the Windows *Program Files* folder rather than the historic "C:\SATWIN"
- The executables and batch files are stored in a version specific sub-folder (e.g. "XEXES 11.4.06D MC X7" also indicating whether it is a multicore version and the level) rather than 'XEXES'. This means that we can "over" install different versions easily and avoid situations where users have had a mixture of different versions within one XEXES.
- The SATURN test data sets are contained in the Windows *ProgramData* folder, to remove the need for users to have write access to the Windows *Program Files* folder
- A new 'Reference' folder (REF) has also been introduced to provide a control dataset, as set out in the SATURN User Agreement, to verify that the SATURN has been successful installed.

Further details are provided in the SATURN Installation Note.

# SATURN

SATURN 11.4 Release Notes (11.4.06D)

## 3. Compatibility with Previous Versions

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

- There have been no changes to the format of binary matrix (.UFM) files so that matrix files from previous releases (within reason!) may still be used within 11.4 and, conversely, previous releases of programs such as MX should be able to happily read and process .UFM files produced under 11.4.
- The formats of network ASCII data files (.DAT) and (a few) control files have evolved marginally (e.g., new &PARAM parameters and/or options have been added) such that there is no absolute guarantee that a text file created under 11.4 “rules” will be backwards compatible with pre-11.4 programs nor that 11.4 binary files (e.g., .UFS) will be correctly read by pre 11.4 exe’s. However 11.4 programs should be able to correctly read all data and binary .UFS files created by previous SATURN releases – with the caveat that the defaults for certain missing parameters in .DAT files may have changed.
- In particular, the defaults now are that spider web networks should be used (SPIDER=T) and that analysis will use spider networks when possible(USESPI=T).
- The number of error checks, both fatal and non-fatal, remain broadly unchanged from 11.3. However, it is possible that network data files which previously “passed” in v11.3 may not pass in v11.4 and the ‘new’ errors generated should be resolved.

As previously noted in section 1 (and worth re-iterating again), there have been a number of both relatively major and minor changes to the simulation so that one might expect 11.4 to give different – possibly significantly different – results to pre-11.4.

## 4. Compatibility with Windows 10

SATURN 11.4 is fully compatible with Windows 7, 8.1 and 10 Operating Systems. Whilst SATURN continues as a 32-bit application, it will run equally well in both the Windows 32-bit or 64-bit versions.

## 5. Technical Support

If you require technical support, please do not hesitate to contact us at [saturnsoftware@atkinsglobal.com](mailto: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 11.4 and thank you for your ongoing support.

***Ian Wright***

SATURN Technical Director  
***Atkins Limited***  
[saturnsoftware@atkinsglobal.com](mailto:saturnsoftware@atkinsglobal.com)

***Dirck Van Vliet***

SATURN Developer  
***FVVB Ltd***  
[dirck\\_van\\_vliet@yahoo.co.uk](mailto:dirck_van_vliet@yahoo.co.uk)

30/01/18

11.4.06D Release Notes.docx