

Synchro Studio 9

with **Warrants** and **TripGen 2014**

Version 9 Release Notes

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Introduction

The initial release of **Synchro Studio 9, Warrants 9, and TripGen 2014** occurred in May 2014. Since this time, Trafficware's developers and engineers have continued to enhance both the functionality and capability of **Synchro, SimTraffic, 3D Viewer, Warrants, and TripGen 2014**. This document was created to provide a brief description of the enhancements included within each new release of the software.

Version 9.2

Release 9.2.915: September 28, 2018

This is a minor maintenance release to correct the following issues.

1. *HCM 2010*

- a. Some equations for TWSC intersections have been updated based on guidance from the Highway Capacity and Quality of Service Committee.
 - i. Step 8b has been modified for T-intersections. When calculating v_L , movements 7 and 8 now use v_1+v_{1U} , and v_4+v_{4U} when considering movements 10 and 11.
 - ii. Step 8c has been modified for T-intersections, so that Stage I considers the first major street left and Stage II considers the second major street left. This changes the results of Example 5 from the HCM, and other TWSC intersections with two-stage maneuvers.
- b. A compliance check has been added for HCM 2010 TWSC T-intersections, to prevent displaying results for non-compliant intersections, such as those intersections with a single "major" (free) approach and two "minor" (stop-controlled) approaches.

2. *TripGen*

- a. There is no longer a limit to the number of land uses or time periods that can be entered in a single file.
- b. An issue was fixed in the Edit Pass-By Rates window. The pass-by rates can now be viewed in this window, turned ON or OFF, and custom pass-by rates can be applied.
- c. The NCHRP Internal Capture rate from Office to Residential land uses, for the AM Peak hour, was previously listed as 0.10. This has been corrected to 0.01.
- d. An issue was fixed so that the reports can now be created for all land uses.
- e. An issue was fixed that previously caused an access violation when right-clicking in the project tree before adding any land uses.

Release 9.2.914: October 4, 2017

This is a minor maintenance release to correct the following issues.

1. Bing Maps may again be imported for use as a background image in Synchro. The interface has been updated to comply with Microsoft's new development standards. Learn more: <http://www.trafficware.com/blog/updates-to-bing-maps>
2. Improvements have been made to the TIA module to improve speed and prevent files with multiple developments from crashing.

Release 9.2.913: August 11, 2017

This release includes a replacement of SQL Server database management system with SQLite, providing users with a speed increase of up to 50% during program start-up and up to 20% speed increase when performing network optimization. Additionally, the installer file size has been reduced, reducing installation time by approximately 50%.

The following bug fixes and enhancements are also included with release 9.2.913.

1. **Improved file saving logic**
 - a. Improvements have been made to the logic used to identify unsaved changes, so that users should only be prompted to save Synchro files when the file has changed.
 - b. SimTraffic does not prompt users to rerecord the history (.hst) file if no changes have been made to the Synchro file.
2. **HCM 2010** – Previously, some signalized intersections that didn't strictly follow NEMA phasing (specifically those with through phases assigned counter-clockwise around intersection) reported incorrect results for right-turn overlaps. This issue has been corrected, so that phases may now be assigned clockwise or counter-clockwise without affecting the results.
3. **Reports** – The HCM 2010 AWSC report has been formatted to skip U-turn columns when U-turns are not defined
4. **Bing Maps** – Modified the connection procedures for Bing Maps, in order to prevent some firewalls from erroneously identifying the image download as a virus.

Version 9.1

Release 9.1.912: April 5, 2017

This version is primarily a maintenance release that includes the following improvements and bug fixes in Synchro.

1. A correction was made to the Multi-File Comparison report, to prevent errors some users have experienced when creating this report.
2. HCM 2010 methodology does not support protected-permissive left-turns from a shared lane. A compliance check has been added to prevent Synchro from displaying invalid results for signalized intersections with the affected geometry and phasing.

3. Corrections were made to Synchro's recalculation procedures, ensuring consistent results when inputs are changed or TIA Development Volumes are applied to the network.
4. An improvement was made to the way Synchro stores intersection coordinates, allowing users to add intersections with large coordinate values.

Release 9.1.911: February 13, 2017

It was found that in some cases, computed analysis results changed after saving the file. This issue has been corrected.

Release 9.1.910: December 12, 2016

It was found that in some cases, the TIA volumes were not used for HCM 2010 analysis of signalized intersections. This issue has been corrected.

Release 9.1.909(.20): September 15, 2016

This version is primarily a maintenance release that includes a small number of bug fixes.

1. Due to Windows Security Update #MS16-098 released August 9, some customers had been unable to print multiple reports. This release of Synchro utilizes an alternative printing process as a workaround.
2. **HCM 2010 TWSC** – Time Blocked by Platoon calculation is now supported for metric units, in addition to US Standard units.
3. Improved error logging.

Release 9.1.908(.56): July 5, 2016

This version is primarily a maintenance release that includes a small number of bug fixes.

1. **Synchro** – Improvements have been made to the following area:
 - a. UTDF functionality has been expanded to include the ability to read speed and approach grade from a Lanes .csv file.
 - b. Optimize Network Cycle Lengths function has been improved to perform faster on larger networks.
2. **SimTraffic** – A correction has been made to the SimTraffic reports, allowing you to create an Actuated Timings report using data averaged over multiple runs.

Release 9.1.907(.6): May 1, 2016

This version is primarily a maintenance release that includes a small number of bug fixes.

1. **Synchro** – Improved compatibility for international date formats.
2. **HCM AWSC** – A correction has been made to the HCM 2000 and HCM 2010 analysis of AWSC intersections. This change only effects intersections with one or more movement(s) that is over capacity. Degree of Utilization, x , is calculated following equation 20-14 of HCM 2010. The degree of utilization is set to a maximum value of 1, except for the final iteration.
3. **Reports** – Lane configuration arrows have been added to the HCM 2010 AWSC and TWSC reports.

4. **TripGen** – Driveway Distribution functionality has been improved, to allow you to edit and delete previously created driveways.

Release 9.1.906(.10): March 18, 2016

This version is primarily a maintenance release that includes a small number of bug fixes.

1. **Synchro** – Version 6 and 7 files may be opened in Synchro 9.1.906.
2. **Traffic Impact Analysis (TIA)** – Correction made to assignment of pass-by volumes to the Development Volume, located in the Volumes Settings window of Synchro. This change primarily affects developments with more than one driveway.
3. **SimTraffic** – Improvement made to the behavior of Mandatory and Positioning Distance. This change affects files with Positioning Distances that extend multiple intersections upstream of the decision point.

Release 9.1.905(.293): February 2, 2016

This version is primarily a maintenance release that includes an updated installer and a small number of bug fixes.

1. **Installer** – Installer has been updated to provide improved stability and address installation issues on a wide variety of Windows platforms.
2. **Traffic Impact Analysis (TIA)** – In the previous release, only one Synchro file may be open at a time if one or both files contain TIA data. This limitation has been removed.
3. **Reports** – A correction has been made to the Traffic Impact Analysis>Distribution report, allowing it to include multiple driveways.
4. **HCM 2010 TWSC** – Improvements have been made to the following areas:
 - a. Users may now set unique values for the Number of Vehicles in Median storage for each of the minor street approaches at a TWSC intersection. This change also allows for the median storage to be considered at T-intersections.
 - b. Correction made to the calculation of Conflicting Flow Rate. This change affects TWSC intersections with pedestrians.
 - c. Correction made to the calculation of Critical Headway and Follow-up Headway at T-intersections.
 - d. A modification has been made to HCM 2010 Equation 19-32 for cases with zero volume on a Major approach, thus allowing analysis of the Minor approaches. See the “Working White Paper on the Implementation of the HCM 2010 Highway Capacity Manual within Synchro 9” for additional details.
 - e. Correction has been made to the calculation of Movement Capacity for Rank 3 movements including through traffic on the minor street (in the case of a four-legged intersection) and left-turning traffic from the minor street (in the case of a T-intersection). This change affects intersections with very high volumes on one or more Rank 2 movements (major-street left-turning vehicles), and zero probability that the conflicting Rank 2 movement(s) operate in a queue-free state.

Release 9.1.904(.125/126): August 25, 2015

This version is primarily a maintenance release that includes a small number of changes and bug fixes.

1. **Traffic Impact Analysis (TIA)** – The following modifications have been made to the TIA module.
 - a. Date format DD/MM/YYYY is now supported in TIA's Development Properties. This is a property of the language setting of Windows.
 - b. Calculation of fastest route has been improved. It now accounts for the Lane Group Delay instead of the Approach Delay.
 - c. Details have been added to the TIA Integrity Information message
 - d. Developments may now be deleted.
 - e. Correction has been made to display of Development Volumes, so that once a development is deleted the associated volumes are removed from the Volume Settings window and all Synchro calculations.
 - f. Correction has been made to the saving of TIA data, in order to prevent unintentional loss of data.
 - g. Recalculate Distribution button has been updated, so that it recalculates only the distribution percentages and the routes are not affected.
 - h. Pass-by can now be included for all driveways, including driveways not included as part of any route(s).
 - i. Users no longer need to open the Trip Assignment screen to preview data before trips can be saved and used in other Synchro calculations.
 - j. Minor text correction to hints defining Development Volume, Combined Volume, and Future Volume.
2. **HCM 2010 TWSC** – Correction made to procedure in determining the number of lanes on the major street approaches. This change only affects approaches with an exclusive U-turn lane.
3. **HCM 2010 Roundabouts** – Warning message added for roundabouts with 3 or more circulating lanes. This geometry is not supported by HCM 2010 methodology.
4. **Map View** – Improved usability, as described below.
 - a. Correction to Link Length display when file is in metric.
 - b. HCM 2010 results may now be displayed in the Map View for TWSC intersections, using the Ln/Mvt section of the HCM 2010 toolbar.
 - c. Zoom in/out function has been improved.
5. **Time Tracker** – New option created to permanently disable the Time Tracker. Access this option at Options → Disable Time Tracker.
6. **Toolbars** – A new function has been added to the Options menu to reset the toolbars to their default positions. Note that all toolbars will reset to their default location upon installing this build.

7. **Reports** – HCM 2010 reports will now skip intersections of different types. For example, the HCM 2010 Signalized report now prints for signalized intersections, but skips all unsignalized intersections.
8. **SimTraffic** – Correction has been made to the following area:
 - a. Errors have been reduced when opening SimTraffic for files with TIA data.
 - b. Development Volumes transfer correctly from TIA in Synchro to SimTraffic.
9. **Warrants** – Updates have been made to the following reports.
 - a. Warrant 4 section of Combined Report has been updated to include all relevant figures.
 - b. Figure on Warrant 3 report has been corrected to ensure consistency with the on-screen display.
10. **TripGen** –
 - a. Pass-by rates have been updated per ITE's Trip Generation Handbook, 3rd Edition
 - b. Alternative Summary Report can now be accessed through the right-click menu.
 - c. Deleting a Land Use now also deletes all associated note(s).
 - d. Date format DD/MM/YYYY is now supported. This is a property of the language setting of Windows.
 - e. File association improved, to allow double-clicking on file instead of opening the software first.

Release 9.1.903(.76/77): April 10, 2015

This update introduces the Traffic Impact Analysis (TIA) module in Synchro. Some of the features are highlighted below; see Synchro 9 User Guide for additional details.

1. **Traffic Impact Analysis (TIA)** – This new Synchro functionality allows a user to:
 - a. Create Developments and input the respective definitions and descriptions.
 - b. Import TripGen volume information or manually input site generated volumes, including pass-by.
 - c. Define origin(s) and driveway(s) for each development
 - d. Define routes based on selected origin(s) and driveway(s) automatically by shortest or quickest criteria. Users may also define any route manually.
 - e. Calculate Trip Distribution (including Pass-by Distribution) based on existing traffic patterns. Users may also define Trip Distribution percentages for each route manually.
 - f. Report all Trip Assignment volumes for each route and driveway in the development.
 - g. Evaluate a Future Scenario for a selected growth rate over the selected number of years.
 - h. Automatically transfer all of the TIA volume results to the assigned intersections for evaluation and reporting in Synchro.

- i. Synchro will track changes (i.e. nodes, movements, etc.) that impact TIA and alert the user.
- j. New reports are included for TIA volume metrics.
- 2. **TIA Generated Volume Displays** – The TIA volume results as mentioned in item 1h are displayed in Synchro's Volume Settings window and associated reports as defined below:
 - a. *Development Volume* – Development trips, as assigned using TIA
 - b. *Combined Volume* – Traffic Volume (user input) + Development Volume
 - c. *Future Volume* – Combined Volume with future growth rate, as defined in the Trip Assignment window of TIA
 - d. *Adjust Flow Rate* – Future Volume with adjustments for PHF and Growth Factor applied
- 3. **Emissions** – In some cases, files created in Synchro 8 produced an error in reported Emissions in Synchro 9. This issue has been resolved.
- 4. **New File Format** – A new file format has been created for Synchro 9.1 (*.syn) to incorporate the new TIA functionality. Synchro 9.1 can open Synchro 9.0 and 8 files, but Synchro 9.0 cannot read the new format. For backwards compatibility, save the Synchro file as Synchro 9.0 or Synchro 8 respectively.
- 5. **SimTraffic** – Simulated volumes are based on the Future Volume as defined above in item 2c.

Version 9.0

Release 9.0.902(.153): December 1, 2014

This maintenance patch resolves an error on some security environments with limited permissions. Microsoft SQL Express needed an explicit permission granted to the parent directory of a Shared Synchro directory. No changes had to be made to the Synchro program itself.

Release 9.0.902(.151): November 13, 2014

This maintenance patch fixes an error when double-clicking directly on a .syn file to open Synchro. This issue has been resolved and clicking on a .syn file now opens Synchro without incident. No changes had to be made to the Synchro program itself.

Release 9.0.902(.150): November 6, 2014

This maintenance patch fixes an issue where the SQL LocalDB Instance, in some cases, would not be created during install. Subsequent errors would appear in Synchro. No changes were made in the Synchro program itself.

Release 9.0.902: October 20, 2014

This version is primarily a maintenance release that includes a small number of changes and bug fixes. The highlighted enhancement focuses on easing permission restrictions for installation requirements on Windows 7 and newer Operating System platforms.

1. **Database** – The Synchro products now include the personal edition of SQL Server Express (LocalDB) for the database backend. This is a full feature version of SQL Server Express that installs local to the user. This version of SQL Server Express precludes the more restrictive administrative permission issues that some customers encountered with the general SQL Server Express edition during the install process. This enhancement is not available for Windows XP platforms. Availability is for Windows 7 and 8. There will now be two different installation packages: one for XP and one for Windows 7 and 8.
2. **HCM 2010 Signalized Module** – The following corrections have been made to calculations at signalized intersections using HCM 2010 methodology.
 - a. Under some circumstances T-Intersections were not analyzed correctly. This issue has been corrected.
 - b. HCM 2010 requires an All-Red time less than 3 seconds. This is now verified by Synchro before performing an HCM 2010 analyses.
3. **HCM 2010 AWSC Module** – Correction made to the calculation of “Degree of Utilization” calculation for over capacity lanes at all-way-stop-control intersections.
4. **TripGen** – The following enhancements have been made to improve usability of some reports.
 - a. A new customizable Summary Report is now included, allowing users to select the time period(s) and alternative, or phase(s) of interest.
 - b. Warning message added to the Driveway Volume Distribution form to warn users when the volume percentages do not total 100%.
 - c. Refinements for driveways, alternate and phase configuration, and land use forms.

Release 9.0.901(.75): August 18, 2014

1. **MOE Summary Table** – The **Sum by Cycle/Node** export to .csv format has been updated to remove irrelevant data.
2. **Sample Files** – The sample file “HCM Example TWSC 19-2_Ped.syn” has been added to the installation package. This file highlights the new HCM 2010 TWSC Pedestrian module. For details, refer to the **Synchro Studio 9 Examples** document.
3. **Synchro Menus** – Transfer→Data Access menu has been updated to clarify the UTDF options.
4. **Synchro Toolbars** – Toolbars are no longer hidden upon opening data entry windows.
5. **Background Images** – Updates made to comply with new Bing™ license agreement.
 - a. Show All and Hide All buttons added to Select Backgrounds window.
 - b. Bing™ aerial images automatically download if cache is cleared, or when opening the Synchro file on another computer. An internet connection is required.

- c. Refresh buttons added to delete cached Bing™ images, and re-download the latest images background images available from Bing™. Selecting Refresh All clears all cached images, for all Synchro files. The latest background images will be automatically downloaded from Bing™ upon opening each Synchro file, but an internet connection is required.
- 6. **HCM 2010 TWSC Module** – Improvements made to the data display and formatting of both the display window and reports.
 - a. Correction made to the display of the major street approach delay.
 - b. Reports formatting improved to consistently print on a single page.
- 7. **HCM 2010 TWSC Pedestrian Module** – Enhancements made to improve functionality.
 - a. Formatting modified to improve consistency with other Synchro windows.
 - b. Enhancement made to improve the speed of calculations on larger networks.
 - c. File must be saved for Synchro to complete these calculations. If needed, users are now prompted to save the file when opening the TWSC Pedestrian Mode tab.
 - d. Additional procedures added to improve data retention when adding/removing a median. When transitioning from a two-stage crossing to a one-stage crossing:
 - i. Yield Rates are averaged.
 - ii. Crosswalk Length is recalculated.
 - e. Pedestrian Volume and Pedestrian Platooning are now singular values for two-stage crossings.
- 8. **HCM 2010 Signalized Intersection Module** – Cycle Length at some Actuated-Coordinated intersections was calculated incorrectly. This issue has been resolved.
- 9. **TripGen** – Enhancements and corrections have been made to some reports.
 - a. Correction made to the volume totals section of the Phase Summary Report.
 - b. Internal Capture Report may be generated using either the Report menu or right-clicking in the project tree.
- 10. **Uninstall** – Changes made to the Synchro Studio uninstall.exe, to prevent deleting files shared by Synchro Studio 8.

Release 9.0.900(.46): May 29, 2014

This section outlines some of the major changes in the initial release of **Synchro Studio 9**. A full list of changes since **Synchro Studio 8** to the initial release of **Synchro Studio 9** is found in the **Getting Started and What's New in Version 9** document.

- 1. **Customizable Tool Bars** – Each of the toolbars may be relocated, both within Synchro's Map Window and even to another monitor. Each toolbar may be customized based on user preference.
- 2. **View Ports** – Users have the ability to create up to four (4) View Ports within the Synchro Map View. Each View Port is independent of one another, thus allowing users to zoom in or out without affecting the roadway network within the main Synchro Map View window.

3. **Templates** – This new feature allows users to quickly populate an approach or intersection lane geometry, timing, and volume input fields. Users may choose among the default templates or create custom templates.
4. **Enhanced Optimization Functionality** – Additional functionality is now available in the optimization routine:
 - a. Users now have the ability to add weighting factors during the optimization routine. The weighting factors can be applied to individual phases or directly to the reference phases.
 - b. Detailed measures of effectiveness (MOE) summary table is viewable within Synchro, and/or exported to a .csv file.
5. **Default Network Settings** – A number of the default values in Synchro have been updated to reflect changes to the 2009 MUTCD. Additional emissions parameters are available in the Network Defaults Settings window. For a complete list, please refer to the **Getting Started and What's New in Version 9** document.
6. **Changes for HCM 2010** – Updates are included for both signalized and unsignalized intersections.
 - a. Computational Engine 7.12 from TRB is implemented for signalized intersections.
 - b. TWSC Pedestrian Mode is now available.
7. **TripGen** – Enhancements include:
 - a. A new *Add Land Use* button on the main screen.
 - b. Export calculated trips to csv function.
 - c. Additional report options.