

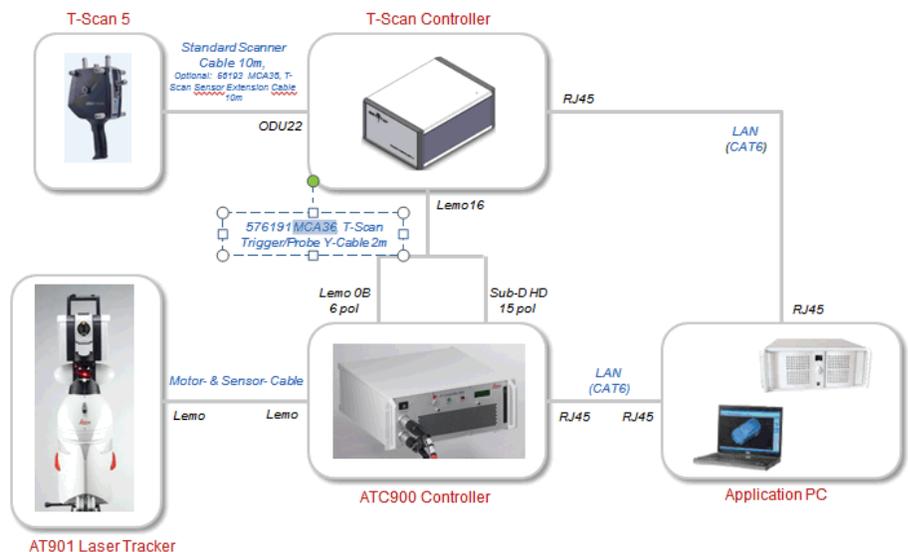
## Leica T-Scan Interface



### Hardware Setup

This Quick-start guide can be used for the initial setup of the Leica T-Scan5 system for operation within SA in conjunction with either an AT960 or AT901.

- Set up the unit following the manufacturer’s directions. The AT960 uses the MCA-47 cable between the T-Scan and Tracker controller’s signal port (the trigger port is not used). The AT901 uses the MCA-36 cable which has a dual end for the tracker signal line and trigger connections. A single network cable should be connected from the computer to the t-scan controller and a second Ethernet cable connects the tracker and t-scan system along with a signal cable (Figure 3-119).



**Figure 3-119.** AT901 Cable Configuration

- Ensure that you have the T-Scan License key to operate the sys-

tem.

- Ensure that you have the USB drive containing the \*.mtx and \*.emsys files (calibration files) which should also contain the Leica setup manuals and a version of the required software (T-Scan Collect or T-Scan Interface and TwinCat Engineering).

## Tracker Configuration

The T-Scan target definition must be defined on the tracker controller. The procedure to do so depends on the tracker type:

- AT960 Configuration:
  1. Open Tracker Pilot, and connect to the AT960 using the “Advanced” permissions (if you need the current Tracker Pilot you can browse directly to <http://192.168.0.1> (or the trackers IP) and download Tracker Pilot from the controller).
  2. Go to targets and ensure the T-Scan is defined. If not use the Import Targets button and browse to the \*.emsys file for the t-scan provided on the USB disk.
  3. Once defined Exit Tracker Pilot.
- AT901 Configuration:
  1. Open the Emscon TransferTool, enter the tracker IP and press Test.
  2. In the Transfer to emScon section press Parameter File and browse to the \*.emsys file for the t-scan provided on the USB disk.
  3. Save and Exit

## Software Setup and Initial configuration

Download and install the current version of T-Scan Collect which can be found on our website here:

<https://www.kinematics.com/ftp/SA/Install/Driver%20Downloads/Laser%20Trackers/Leica/TScan5/>

The current version is: *T-Scan Collection 10.3.7.39*

### Directory Setup:

1. Determine if you have a license key for either the T-Scan Interface or the full T-Scan Collect Software (Either one or the other should be installed as require but not both), and install the correct one on your machine.
2. Transfer the \*.mtx files from the USB drive to the T-Scan directory. T-Scan looks for the files in a particular spot (C:\Program-Data\Steinbichler\T-SCAN\Calibration) you will need to build the Calibration directory and place the files in this folder.

**TScanCol.ini Edit Process:**

1. Within the C:\ProgramData\Steinbichler\T-SCAN\T-SCAN Interface 10.30\ folder (or T-Scan Collect 10.3 folder) you will find a file called "TScanCol.ini". Open and edit this file as follows (it's a long file so scroll through it to the correct section):
2. Verify the Specific IP address of your tracker (192.168.0.1 by default)
3. Enter the TrackerInterfaceType (EMSCON for AT901 or LMF for AT960)
4. Enter the ScannerAlignmentBaseName (such as LLS1100271). This number is on the front of the T-Scan.
5. Enter the AMSNETID for the T-Scan Controller. Which should be printed on the front of the controller (Such as 5.29.142.116.1.1)
6. Once complete save and close the TScanCol.ini file (see [Figure 3-120](#)).

```

TScanCol.ini - Notepad
File Edit Format View Help

[TrackerSettings]
TrackerIPAddress =192.168.0.1
TrackerIPPort =700
TrackerFrameFrequency =200.000000
CollectionTime =100.000000
TrackerStdTimeout =20000
; Specifies the type of tracker interface
;
;           EMSCON      = emScon interface
;           LMF         = LMF interface
TrackerInterfaceType =LMF

[ScannerSettings]
ScannerAlignmentBaseName = LLS1100271
AMSNetID = 5.29.142.116.1.1

[Mask]
ToolId =4
ShowSystemMask =FALSE
IncTools =TRUE

```

**Figure 3-120.** TScanCol.ini file**Initial Network Configuration:**

1. Configure your local area network connection as follows:
2. Go to Control Panel> Network and Internet> Network and Sharing Center
3. Open the Local Area Network Connection properties (ensure the cable is connected to the T-Scan Controller if you don't see it)
4. Go to the properties for the Internet Protocol Version 4 (TCP/IPv4)

5. Set the IP address to a static IP and use the following IP: 10.168.2.2XX (enter 201-250 only) and subnet 255.255.255.0.

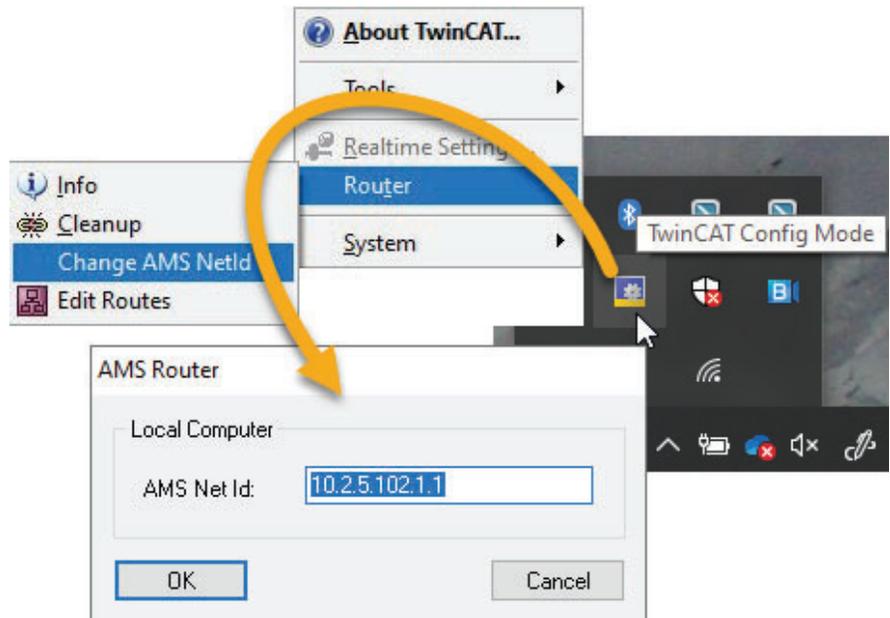
**TwinCAT Software:**

1. Install the TwinCAT Engineering Software (which will manage the dual network communication between the tracker and the T-SCAN system). This software should be available on your USB drive, and is also on our webpage here:

<https://www.kinematics.com/ftp/SA/Install/Driver%20Downloads/Laser%20Trackers/Leica/TScan5/>

The current version is: *TC31-ADS-Setup.3.1.4020.32.exe*

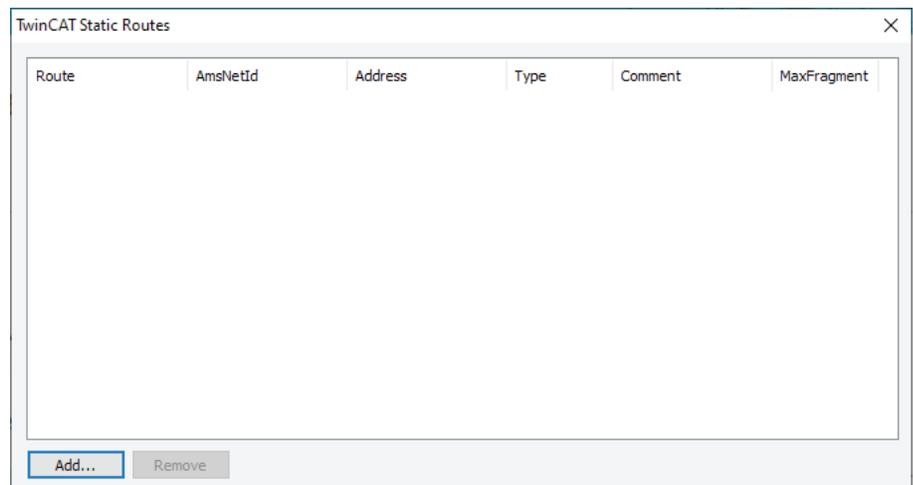
2. From the Windows task bar launch the TwinCAT System Manager and select *Change AMS NetID* and configure it to talk to the T-Scan Controller. This will require a system restart (Figure 3-121).



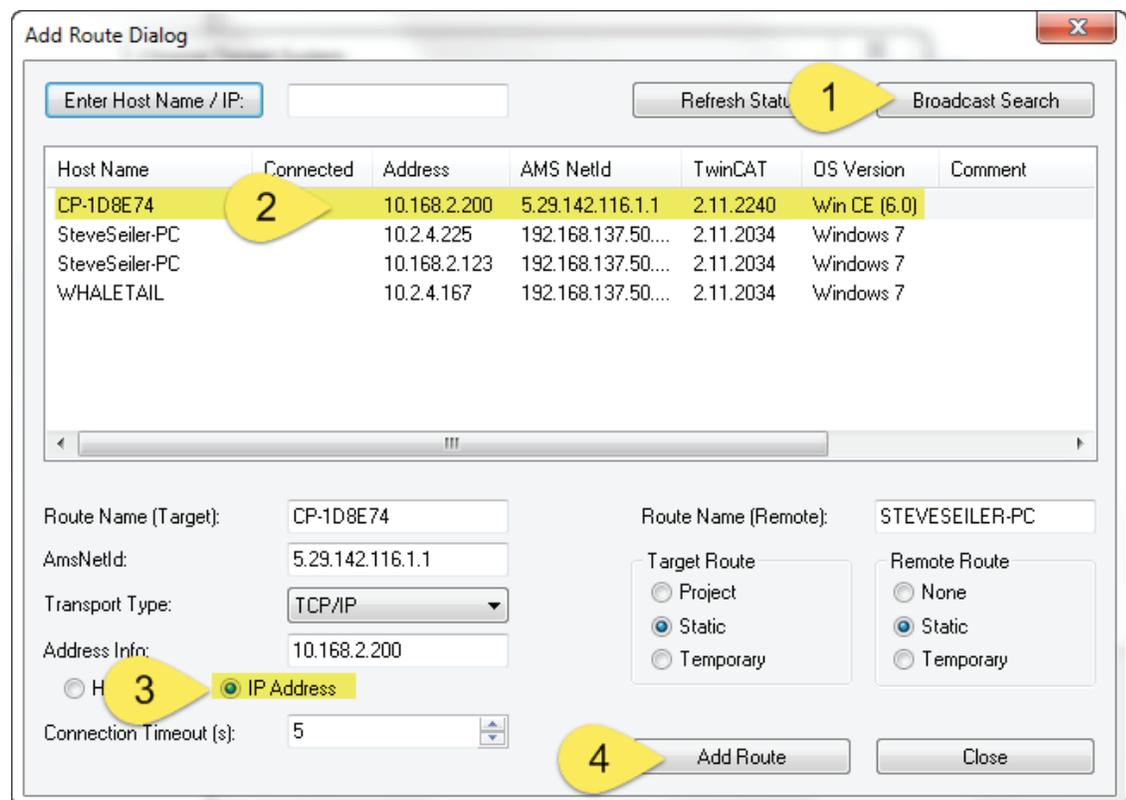
**Figure 3-121.** Setting the AMS NetID to talk to your controller.

3. Return to the **TwinCAT Config Mode** in the windows start menu and select **Router>Edit Routes** then choose **Add...**(see Figure 3-122):

**Figure 3-122.** TwinCAT System Manager and Target Selection.



4. Perform a Broadcast Search and look for the AMS NetID of the controller which should show up on the network list. When it does, select it and select **Add Route** (see [Figure 3-123](#)):



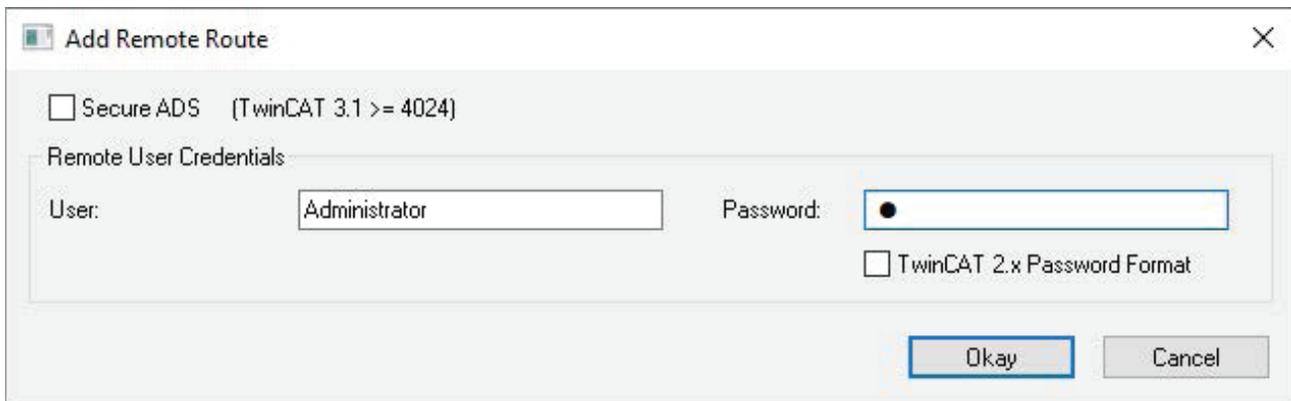
**Figure 3-123.** Route Selection

5. Enter the Login Information. The login selection depends on the controller you have ([Figure 3-124](#)).



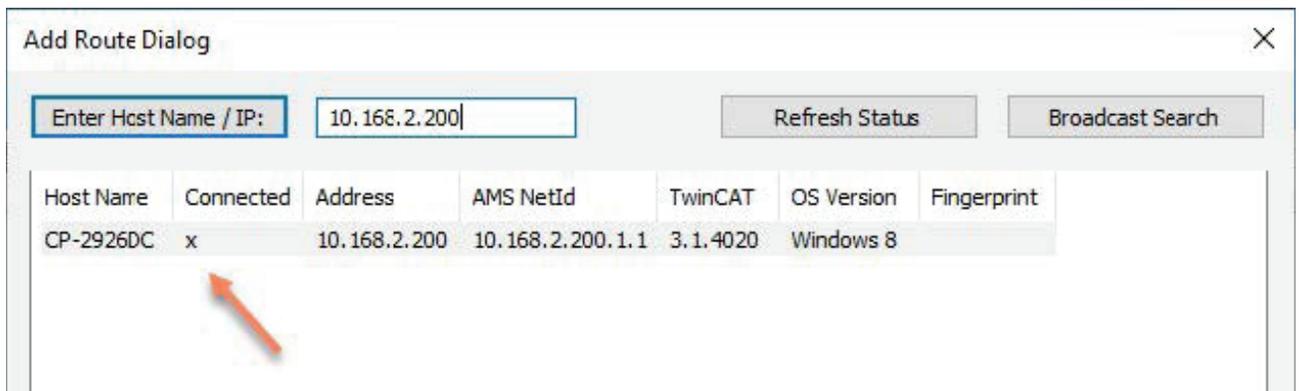
**Figure 3-124.** T-Scan controller types.

For Rev 2.0 controllers by default you will enter “Administrator” for the User and “1” for the password, and make sure that the TwinCAD 2.x Password Format is unchecked (Figure 3-125)



**Figure 3-125.** Rev 2.0 password entry.

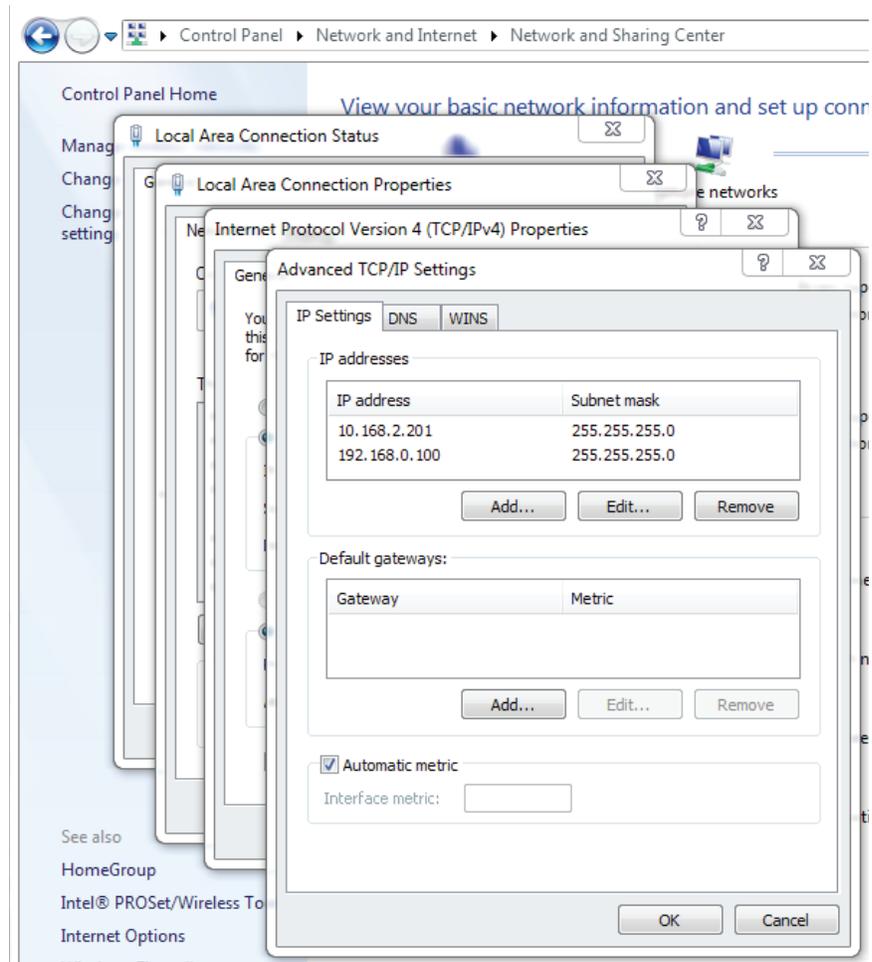
For Rev 1.x controls leave both the User and the Password blank but check the TwinCAT 2.x Password Format check box. Then Press **Okay**. The route should then be displayed and marked with an X in the route’s selection dialog(Figure 3-126).



**Figure 3-126.** Connected status display.

### Final Network Setup

1. Return to properties for the Internet Protocol Version 4 (TCP/IPv4)
2. Press Advanced and add a second IP (for the tracker). Enter 192.168.0.XXX (enter 2-250 for the IP), again using 255.255.255.0 for the subnet mask (see Figure 3-127).



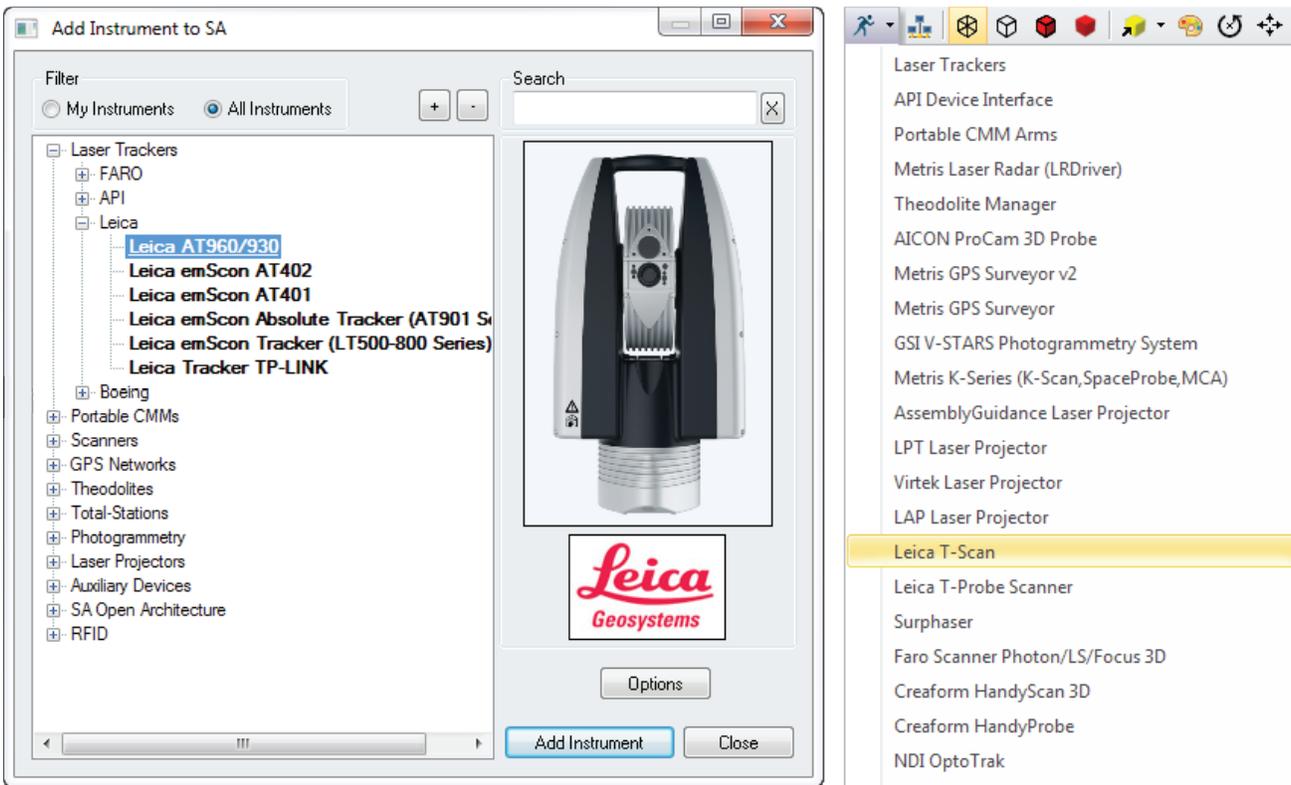
**Figure 3-127.** Network Configuration settings

3. Click OK and close out of all dialogs and exit out of the network Sharing Center when done.

You can double check that you have a successful connection to both the T-Scan Controller and the Tracker and that the system is ready to go by opening T-Scan Collect directly. Once you see the Status indicator in the bottom right report a green connected status for both devices you can close T-Scan Collect and connect within SA.

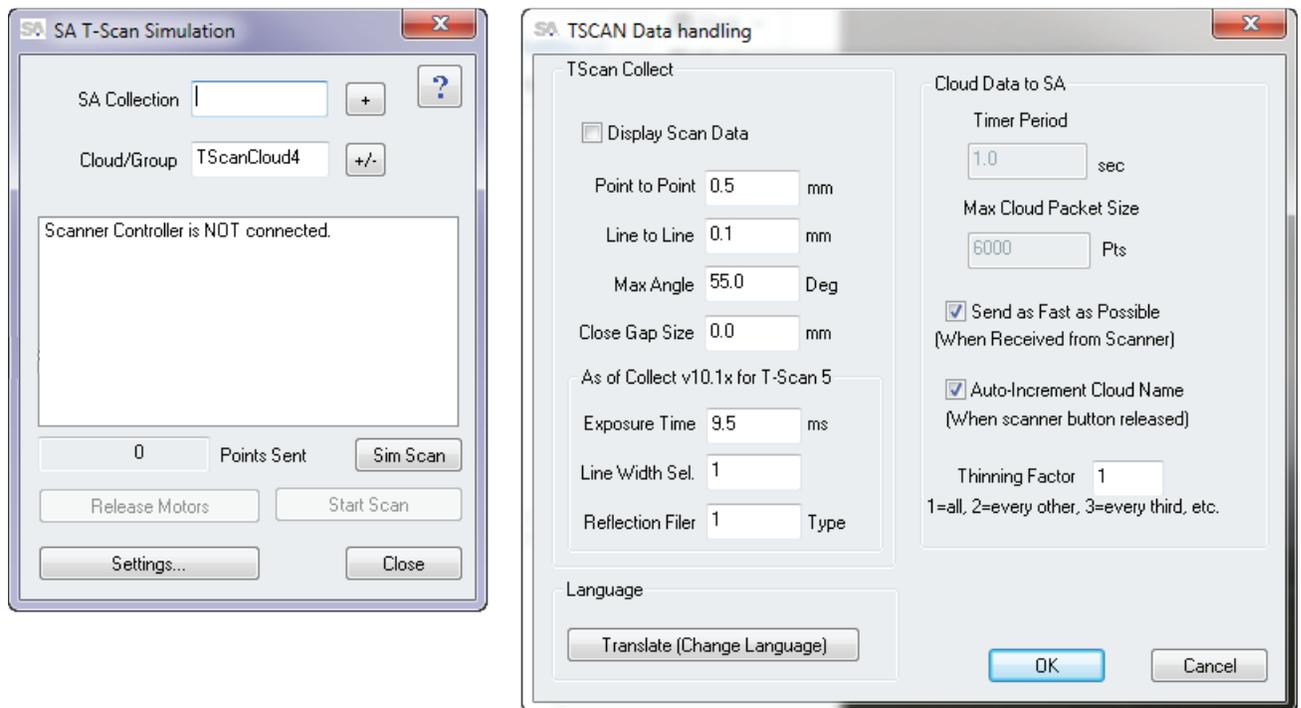
**Running the T-Scan Interface in SA:**

1. Add the Instrument (Instrument>Add...) and choose the appropriate Leica Tracker (AT901 or AT960)
2. Start the Interface through the menu Instrument>Run Interface Module and choose Leica TScan. (Do not connect using the Laser Tracker Interface) (see [Figure 3-128](#)):



**T-Scan Interface in SA:**

When you start the Leica T-Scan interface it will automatically connect to either T-Scan Collect or the T-Scan Interface which will run in the background. The T-Scan interface in SA is designed to be as simple as possible while providing full control (see [Figure 3-129](#)):



- Collection and Cloud Name control is provided and a new cloud name will be incremented automatically with each separate scan.
- A progress report will be displayed in the connection window
- T-Scan control is provided through the Settings button. Control for both the TS50 and the new Tscan5 is available in sections in the left hand column, the following Tscan5 controls are provided:
  - **Exposure Time can be set manually from 0.25 to 20.0 milliseconds**
  - **Line Width Set can be set from 0-12 (0=100%, 12=40%).** This reduces the width of the line as you increase the integer value (set as an integer for scripting purposes).
  - **Reflection Filter intensity setting (1 = Standard, 2 = Low, 3 = Medium, 4 = High).** Again this value is set as a simple integer for easy scripting control.

T-Scan MP Controls SA:

Leica T-Scan	
Increment Group/Cloud Name	Increment the Current Group/Cloud Name by 1. This name is used for clouds when scanning.
Is Laser Locked	Succeeds if the laser is locked. Fails if not.
Set Scan Point To Point Distance []	Set Point to Point Distance to that designated by [] mm ([] not part of string)
Set Scan Line To Line Distance []	Set Line to Line Distance to that designated by [] mm ([] not part of string)

Leica T-Scan	
Set Scan Maximum Angle of Incidence []	Set Maximum Angle of Incidence to that designated by [] degrees ([] not part of string)
Set Scan Exposure Time []	Sets the scanner's exposure time , where [] is in milliseconds ([] not part of string). Use 0.25-20.0ms for T-Scan Collect version 10 and higher, or 0.01-9.98 ms for PROBEscan.
Set Scan Width Iteration []	Sets the width of the scan line where [] is a value from 1-12 ([] not part of string). 0=100%, 12=40% (decrements by 5%).
Set Scan Reflection Filter []	Sets the reflection filter type, where [] is a value between 1 and 4 ([] not part of string). 1 = Standard, 2 = Low, 3 = Medium, 4 = High.
Close Scan Gaps Up To []	Maximum allowable closed gap in mm ([] not part of string). Use 0.0 to disable this option.
Scanner Power On	Turns the scanner on (unavailable as of TScan Collect version 10.0).
Scanner Power Off	Turns the scanner off (unavailable as of TScan Collect version 10.0).
Start Scan	Begin a scanner measurement
Stop Scan	End a scanner measurement

## Leica Automation Interface

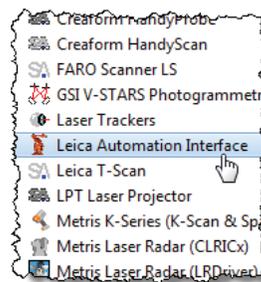
### Hardware Setup

Before starting the AIC driver, it's necessary to ensure that all hardware connections are complete:

- The AT-901 tracker controllers should be connected to the AIC hardware.
- The auxiliary device (T-Mac, T-Probe, external trigger, etc.) should be connected to the AIC hardware.
- The AIC hardware should be directly connected to the computer on which the interface will be run.

### Starting the AIC Driver Manually

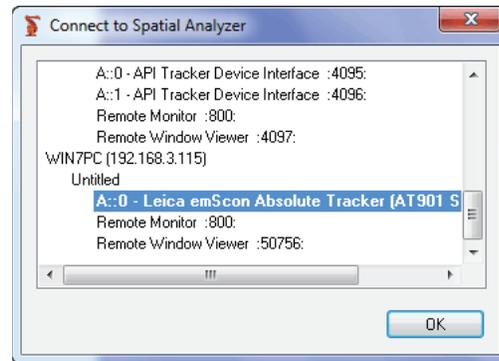
1. First, add up to four Leica AT-901 trackers to the SA job.
2. From the appropriate SA folder in the Windows Start Menu, navigate to Interfaces and select Leica Automation Interface (Figure 3-130).



**Figure 3-130.** Starting the Leica Automation Interface.

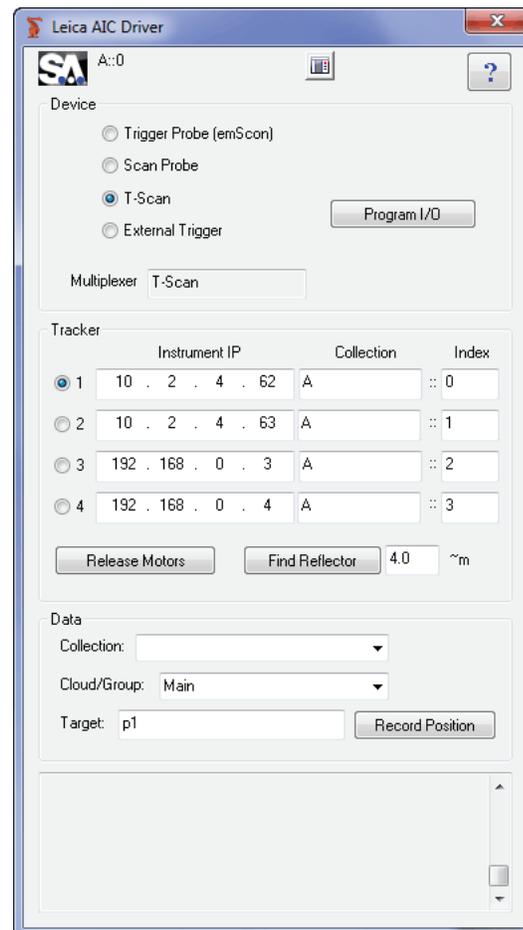
3. In the **Connect** dialog, select the tracker you'd like to connect to (Figure 3-131).

**Figure 3-131.** Connecting to a tracker.



4. The Leica AIC Driver interface will appear, automatically connect to the AIC, and immediately be ready to use. Note that the AIC Driver will detect the current AI Controller's connection to hardware at the Multiplexer--it is the T-Scan in this case (Figure 3-132).

**Figure 3-132.** The AIC Driver window.



**Note:** If we'd had a T-Mac connected, the MUX (multiplexer) would show T-Mac and the Device would be Trigger Probe.

### Using the Interface

Each tracker in use requires an assigned IP address and collection/index, which indicates which instrument in the SA file is associated with the corresponding hardware. Use the radio button to switch between different trackers.

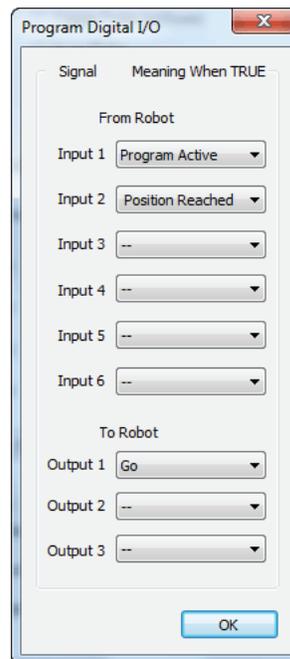
All settings appropriate to the current device will be automatically set. Measurement parameters can be set via Measurement Plans.

- The **Record Position** button is used to teach positions for automatically locking on the T-Scan via an MP command. The Collection::Group::Target name is used for the storage of the auto-lock position in SA.
- The **Release Motors** button will release the motors on the active tracker so that it can be pointed by hand.
- The **Find Reflector** button will initiate a search for a reflector in order to lock onto the selected device. The distance field next to this button is used to provide the controller with an idea on how far to search for the reflector based on its distance from the tracker.

### Running the AIC Driver In Automation Mode

The Program I/O button is used to program the digital I/O signals for Automation Mode. In this mode, the AIC Interface expects to receive signals from the robot, and will send signals to the robot, for handshaking. The Program I/O button allows communication between the AIC interface and the device with which it is working--typically a robot. You can define the meaning for up to 6 input channels coming in from the robot, and up to 3 channels going out to the robot (Figure 3-133).

**Figure 3-133.** Programming the I/O.



A series of **Instrument Operational Check** Measurement Plan command strings are available for interacting with the AIC in automation mode. Refer to the "MP Command Reference" document for details.