Faro Laser Trackers

Faro Vantage / Faro Ion / Faro Xi

This guide applies to the setup of the Faro X, Xi, Ion and Vantage (including Vantage^{S}/^{E}, Vantage^{S6}/^{E6} models).

Hardware Setup

Set up the unit following the manufacturer's directions.

Connect the temperature probe and ensure that it is well clear of any external heat sources (such as the heat fan on the back of the power supply). Ensure that the instrument is powered on and that an SMR is in the home position.

Software Setup

Faro trackers are networked TCP/IP connected devices and should be connected either to a wireless network or directly to a computer with an Ethernet crossover cable.

Set your computer's Local Network connection to be compatible with that of the Faro tracker. Faro trackers are shipped with a standard wired IP address of 128.128.128.100 (subnet 255.255.255.0). Wireless connections default to 169.254.4.115.

Download the latest java drive from: **`http://www.kinematics.`**

`com/ftp/SA/Install/Driver Downloads/Laser Trackers/Faro/`. Extract the files to the C:\ drive. This should create a directory structure with the Faro Java files contained in C:\FaroJRE.

Your JRE files must match your version of SA...

- Versions 2017.02.09 and older, use the Faro JRE v4.3
- Versions 2017.02.09 to 2018.07.11, use the Faro JRE v5.0.0.1
- Versions 2018.12.07 to 2019.11.21, use the Faro JRE v5.1.3.1
- Version 2020.04.09, use the Faro JRE v5.1.7.3
- Version 2020.07.20 and 2020.12.01 use the Faro JRE v5.1.8.3
- Version 2021.01 and newer use the Faro JRE v5.1.9.4 (required to support the 6D probe2)

If you plan to use the video (overview) camera, you must also get the 'Faro Tracker Camera files.zip' file (version matching that of the JRE Files). Unzip the file and follow the instructions contained in `ReadMe Faro Camera.txt`. Note that cameras are wireless. If your camera has the default IP address, you can set your PC's wireless connection's address to 129.129.0.1.

Starting the Interface

1. Select **Instrument > Add** and choose the appropriate Faro tracker from the ***Add Instrument to SA*** dialog (Figure 3-64).

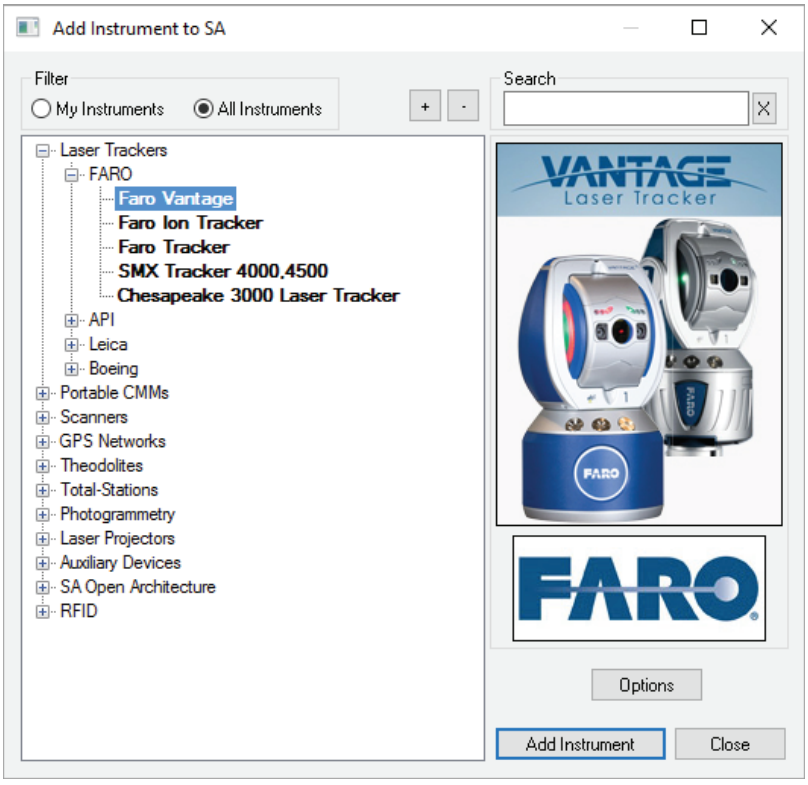

Figure 3-64. Adding a Faro tracker

2. Run Interface Module without connecting (**Instrument > Run Interface Mode**) and choose *Laser Trackers*.
3. Within the Connect to Spatial Analyzer dialog, Select the instrument station (computer name, job name, Collection::Instrument Name: Serial Number) you wish to connect your instrument to from the network list and press OK.
4. This will bring up the ***Faro Connection*** dialog (Figure 3-65).

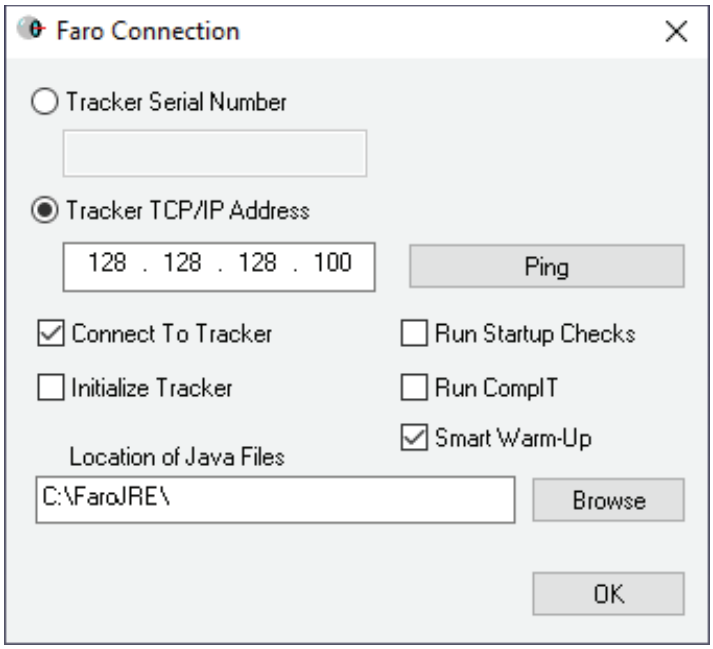

Figure 3-65. The Faro Connection dialog

5. Enter the tracker's IP address (if different than the default) and use the Ping button to test the connection if needed.

Once satisfied, click OK. The next time you connect this instrument to the instrument, you can just select *Run Interface and Connect*. This will utilize the last saved settings and automatically connect the instrument.

Notes on the connection process:

- The first 7 digits of the tracker serial number can also be used to find the tracker. When you use this method it will search for both a wired and wireless connection.
- To connect Wireless, be sure to connect your computer to the trackers wireless signal and use either the serial number or the wireless IP address which will something like 169.254.1.1 (not the wired default).
- If you have any trouble be sure to check your windows firewall. Exceptions need to be made for both the *Spatial Analyzer* and *SA Laser Tracker* applications.

The interface is now connected and ready for use. Please refer to the Measurements chapter of the manual for more details on the tracker

interface and instrument settings options.

Faro Specific Settings

Distance Mode

Beam rest can be manually overridden as needed. Choose between:

- **ADM Only.** This mode restricts beam tracking operations to ADM only.
- **IFM Only.** This mode restricts beam tracking operation to IFM only which requires a homing procedure each time the beam is broken.
- **IFM Set by ADM.** Faro's default mode which is a hybrid mode that provides accurate tracking using IFM and easy beam re-capture using ADM modes.

External Trigger Settings

- **External Trigger Settings.** The external trigger will apply to ANY measurement profile which has either a spatial or temporal scan as it's Acquisition.

When "External" is set (for the *Measurement Start Trigger* in the **Faro Tracker Settings**), points will be taken when the trigger is pulsed. The only requirements is that a profile must be started for the external trigger to be recognized which as an Acquisition mode of either spatial or temporal scan. The advantage of this design is that no adjustments to the measurement profile need to be made, and any profile will work (Figure 3-66).

- The trigger cable must be connected to the "Up" port on the tracker controller.
- 0 Volts on the trigger port implies take data and send the data in continuous mode (where as 5Volts indicates stop). So by default the external trigger is set to on and sending data and must be powered to stop sending data. This means that if there is no external trigger, the measurement will simply begin at the maximum temporal rate of the trackers.

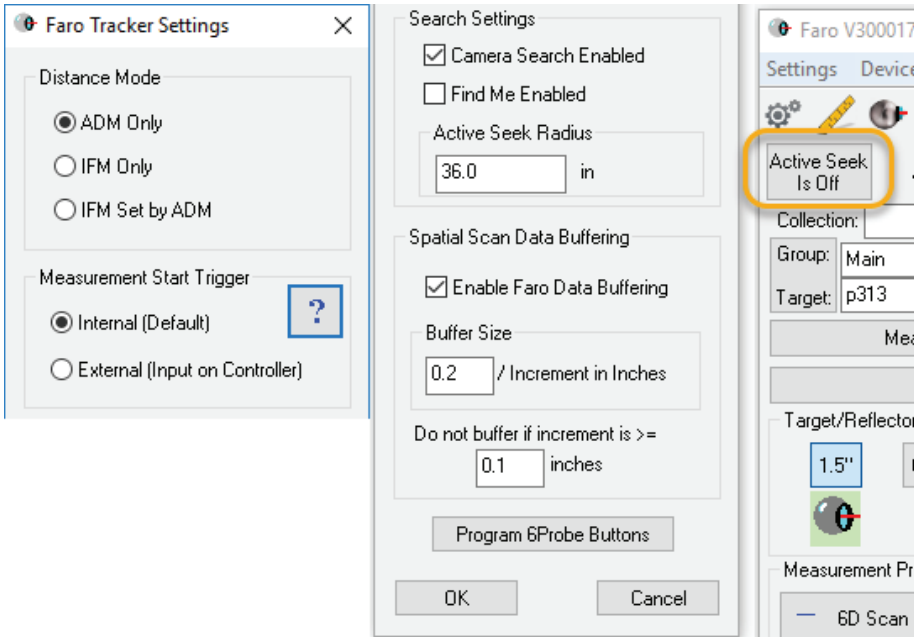

Figure 3-66. Faro tracker settings including external trigger settings

Search Settings

Faro's video camera is used is used for reflector acquisition and provides a couple of optional modes:

- **Camera Search Enabled.** This option enables camera search. Disabling this option is used to limit target search to a beam spiral search only.
- **Find Me Enabled.** This is similar to the "Gesture Recognition" setting and allows the tracker to snap to the moving target.
- **Active Seek Radius.** Active Seek can be set from main window (formerly "Smart Find") dialog if supported. The **Active Seek Radius** can be set to limit the search zone relative to the current beam position considered by the camera.

Spatial Scan Data Buffering

Data buffering was added to ensure that SA keep up with data delivered form the instrument. With a very tight scan increment this can be quite fast (~100Hz).

- **Enable Faro Data Buffering.** Provides a switch to enable or disable data buffer. If unchecked, behavior is unchanged from previous versions
- **Buffer Size.** Default is 0.2. At 0.2, for a spatial increment of 0.01" (2.54 mm), the buffer would be 0.2/0.01 = 20 pts. Another way to look at this is the Buffer Size means the number of inches worth of data that will get buffered. So at a value of 1.0 and a spatial increment of 0.01", the buffer size would be 1.0/0.01 = 100 pts, and with a point every 0.01", 100 of them takes up 1.0 inch.

- **Do not buffer if increment is >= .** This allows you to set a maximum increment for which buffering will occur. The default value is 0.1, meaning that when you set a spatial increment of 0.1" (2.54 mm) or higher, no buffering will occur.

Its important to know that this buffering happens on the Faro side, the interface will not receive any data until the buffer is filled. So for example, you cannot set a scan whose increment would result in a calculated buffer size of 100 points, and yet set a profile to stop at 20 points because it will not send data at all until 100 points have been recorded.

Specialty Targets

Windowed SMR Configuration

Windowed SMR's have an additional ADM offset, due to their glass front, which needs to be accounted for. This is done by building a target based upon the correct reflector definition (see "Targets and Retros" on page 19). Care should be taken to always use a target that is representative of the actual reflector being used or an error equal to the ADM constant may be seen in your measurements.

As stated in the Faro accessories manual, proper use of the windowed SMR requires sending it home when the target type is set correctly, otherwise an error will occur. This ensures the correct ADM offset is used. Additionally, when running startup checks or CompIT with the windowed SMR, you should be sure to send the tracker home afterwards, as these routines assume 1.5" standard SMR is being used. An additional homing operation should be performed to update the target definition.

Faro 6D Probe

Faro's 6D probe can be used within SA, using the Vantage^{S6} and Vantage^{E6} trackers. No additional driver installation is required. Compatible trackers will include a **6Probe** definition.

- The Faro 6Probe version 2 with exchangeable tips requires SA version 2021.01 or later.

The 6probe target detection is automatic but an initial connection and activation process must be performed each time the 6D Probe is powered on, and would go as follows:

1. Connect to the Tracker
2. Power on the 6D Probe Unit and catch the beam.
3. Press any button on the probe and wait (approx. 10-20 sec.) for the probe's "happy" beep and blue LED. If you have trouble getting the 6Probe to activate, try moving it farther from the tracker.

4. After the first successfully pairing of the 6Probe and tracker, you'll be asked if you want to pop the Probe Management UI to set the active probe tip. Hit "Yes", and select a tip that is Valid, or Calibrate at least one probe tip, and select it.

The probe is auto-detected once a probe tip is activated. When you lock back on to a 3D probe, the last used 3D probe will be set active for you. The pairing process will not be necessary again until the probe is powered down.

The follow status indicator lights may be displayed:

- **No Lights Flashing.** Press a probe button to begin the initial connection process.
- **Flashing Blue Lights.** A connection to the probe is being made... wait for completion.
- **Flashing Red Lights.** Connection attempt failed. Press a button to begin again.
- **Flashing Green Lights.** Success full connection has been established, waiting for tip selection. The Probe Management UI will open automatically to allow tip selection.
- **Solid Green Lights.** Ready to Measure.

Once configured, the probe is auto-detected and will be set simply by catching the beam. When you lock back on to a standard 3D reflector, the last used reflector (such as a 1.5" ball) will be set as active.

Tip selection and calibration is performed within the Faro utility window that can be displayed directly from the Home Button in the interface which will read Manage Tips when a 6probe is active (Figure 3-67). Also note that the name and diameter of the active probe definitions is displayed on the Measure button.

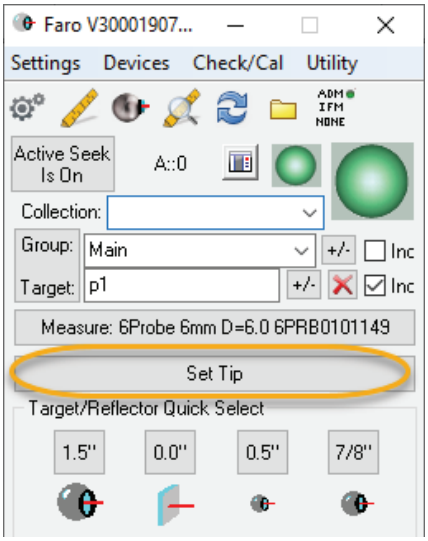

Figure 3-67. Tip Selection control from the "Home" button

This utility is also accessible as a target definition within the Reflectors and Targets database, where the **6Probe** target functions as a button and provides access through a left click to Faro's Probe Management utility (Figure 3-68).

Faro's Probe Management utility provides:

- Ability to select directly for a list of defined probe tips. The 6Probe version 2 will recognize tips automatically when they are connected, but changes to the calibration or initial setup is still performed in this dialog.
- With the addition of the auto-detect tips this is typically not necessary but it is possible to define multiple tips for a holder.
- Probe Compensation options
- Probe Check options

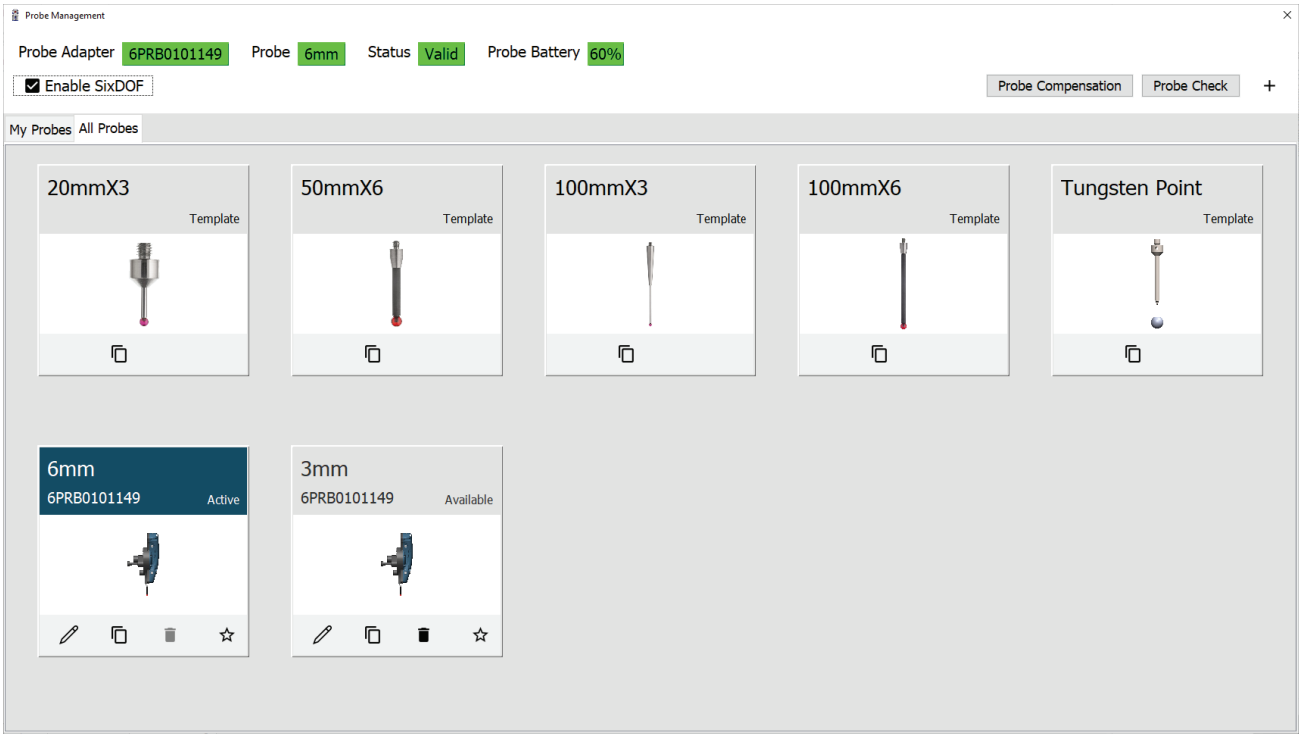

Figure 3-68. Faro's Management UI or tip selection and compensation Tool.

Note that undefined tips will have an initial offset of -1 meter.

To program the 6Probe's buttons, just click on the "gear" icon ( ), and then on the **Faro** button (Figure 3-69).

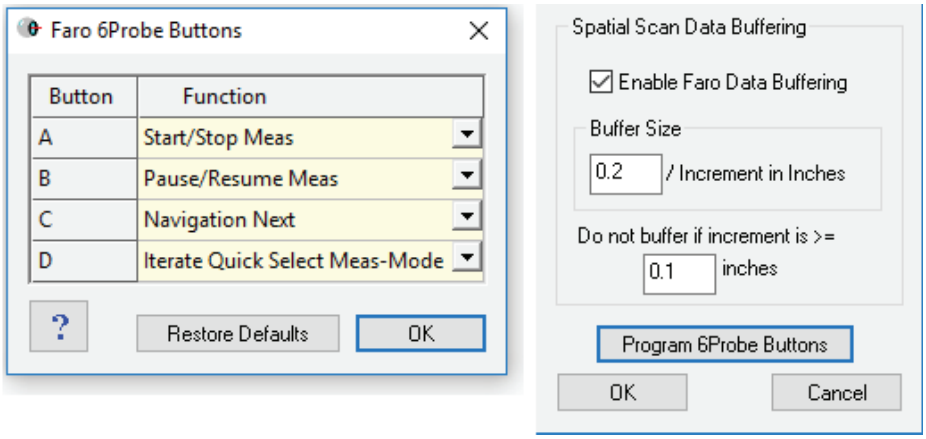

Figure 3-69. 6D Probe buttons can be configured as needed through the general setting.

When set up for a given work flow, such as using the inspection task list, these buttons can be used to work for long periods without going back to the computer. In addition, the 6Probe can be used as a remote even when using and SMR.

A set of standard 6D measurement profiles will also be available with the 6D Probe (Figure 3-70).

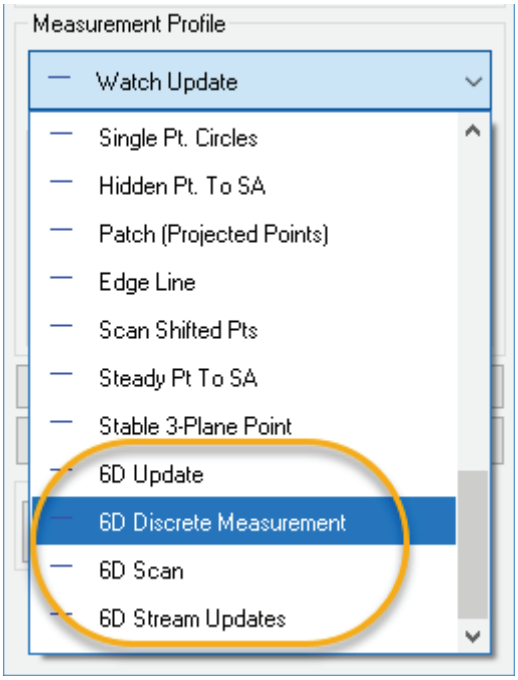

Figure 3-70. Standard Set of 6D Measurement Profiles

These provide a starting point for custom measurement profile development. 6D measurements send frame's to SA to graphically define position and orientation, which can be used in combination with regular point measurements (which also do save the probing information in the measurement details). For more information on defining measurement profiles (see "Measurement Profiles" on page 25).

Running the Tracker Interface Separately

One of the unique features about SA's architecture is that the instru-

ment interface can be run separately from SA. This provides a means to run multiple trackers independently on different machines while connect to a single SA for data storage. Doing so also provides the ability to separate the persistence files for individual trackers, as the persistence file will be saved in the directory as where the tracker interface is launched, as opposed to the ***C:\Analyzer Data\Persistence*** folder.

In order to run the SA Laser Tracker process separately some additional support files are required. These include the following files (Figure 3-71):

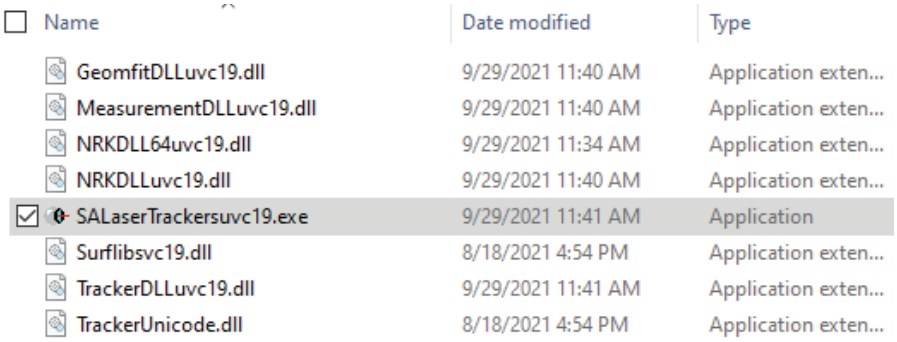

Figure 3-71. Required Files to run the SA Laser Tracker process independently from SA.