# What's New In SA

CHAPTER

One of the advantages of SpatialAnalyzer is that development occurs at a brisk pace. New feature requests, bug fixes, and changes are implemented quickly, giving you the opportunity to start taking advantage of newly implemented features in a very short period of time. The following is a summary of the new additions.

# 2022.2

# **User Interface Improvements**

## **Added Tree Selection**

The F2 selection window has been integrated directly into the SA Tree bar as a new dynamic selection panel. This allows direct access to multi-select options from a filtered list of relevant items, when selection is needed.

i	Home	Instrument	Alignment	Features	Construction
Options		🛃 • 🔮 • 🕂	ion Visibilit ↓ ↓ ↓ ↓ ● ↓ ∮ ↓ ↓ ↓ ↓ ↓	è 💷 🕴	Point Rename
User		View Co	ntrols		Point Edit
	ects to High loint Groups rames ines lanes incles illipses ylinders joheres ylinders joheres vinfaces (ector Groups can Stipe Co sfault Folder eporting Upgre		Object Select      Tree      Tree      A      Dig A       Dig A       Dig A       Dig A       Dig A       Dig A       Dig A       Dig A       Dig A       Dig A       Dig A       Dig A       Dig A       Dig A       Dig A       Dig A       Dig A       Dig A       Dig A	Expand Coroups es es es es es es es es es e	Collapse

#### Tree Selection: https://youtu.be/IZE3e5\_c7Ak

#### Import Improvements

New CAD Import Libraries:

The following updated support is now available:

 Autodesk Inventor 2022, Creo 8.0, FBX 7500, NX 2007, Parasolid 34, Solid Edge 2022, SolidWorks 2022

#### **Inspection Improvements**

#### Added Inspection Options

There are now basic configuration options for inspection which allow you to choose between the Inspection bar and Toolkit Inspection panels and offers an option to automatically open the inspection bar when trapping begins.

7	Inspection Bar	Clear Data	Alignment	<ul> <li>Set Feature Dorma</li> <li>Icock Out Trapping</li> </ul>
		Ins	spection Cont	rols
Inspe	ection Bar and <sup>•</sup>	Trapping Optio	ns	×
-h	nspection Bar	Display		
	O Use Inspecti	ion Bar in Toolkit		
	Use Standal	one Inspection B	lar	
	🗹 Auto Start In	spection Bar on	Trapping Measu	ements
-1	rapping Optio	ns		
		ing Vectors		

#### **Expanded Offset Plane References**

In prior versions Offset Planes were always based upon a reference plane. In this version any objects base frame can be used as the reference. This expands their use by allowing an offset plane to be built from a dynamic frame for example.

#### Added Auto-Measure Batch of Features

*Auto-Measure >> Measure Batch of Features* to support the automated measurement of Compare to Nominal GR-Features selection.

Currently, it allows to measure a list of circles and/or slots by Nikon

APDIS MV400 Laser Radar. See more details in the instrument section.



#### **GD&T** Improvements

#### Added support for ASME 2018 and ISO 2017

Options are now available to have GD&T feature inspection conducted using the more recent standard definitions. These options can be found in the User Options >Analysis>GD&T Options



#### Added Control Over Diameter Tolerances

Added clarification to plus/minus tolerance modes of operation:

- *PlusMinus*. Will apply tolerances relative to the reference feature (as nominal).
- PlusMinusWithNominal. will apply tolerances relative to user defined reference value.

Tolerance	
ToleranceType	PlusMinus 🔻
HighVariance	Limit
LowVariance	PlusMinus
	Exact
	PlusMinusWithNominal

# **Cloud Based Inspection**

#### **Boundary Points**

Added Right-Click option to Generate Boundary Points Clouds from a

Scan Stripe Cloud. The boundary points define the extents of each scan line and can be used for edge or feature identification.

#### Real-Time Meshing Improvements

Real-Time Meshing has been significantly improved. Changes include greatly improved stability with laser trackers based scanners, leading line and cloud visualization as you scan. Greatly improved density and save sizes as well as improved settings and density controls.

Real-Time Scanning Coarse Mesh	×	
Smallest Hole Diameter 5.0 (mm)	I	
	.05 (mm)	
Stripe Max Point Spacing	5.0 (mm)	
Grid Size	1.0 (mm)	
Grid Max Angle 30.0		
Grid Max Ratio 10.0		
		- "
Set Fast Set Standard OK	Cancel	
	Ľ.	

# **Uncertainty Calculations**

#### Modified uncertainty model for laser trackers

Modified uncertainty model for laser tracker (polar instruments) to eliminate singular behavior of uncertainty assessment when the measurement approaches polar points. Although this singular behavior accurately emulates the motor encoders, in practice the uncertainty is better modeled as:

Distance measurement uncertainty -> Error along line-of-sight(LOS)

THETA (Horizontal) uncertainty -> Error orthogonal to LOS in the horizontal plane

PHI (Vertical) uncertainty -> Error orthogonal to LOS in the direction of positive PHI

Consider sighting through a telescopic sight directed towards the measurement. The angular error is now computed with respect to this shot line.

#### CHAPTER 1 • WHAT'S NEW IN SA

CMM Instrument Uncertainty	Tracker / EDM Theodolite Uncertainty	>
XYZ Uncertainties Relative To Instrument Base	Theta (Horizontal) Uncertainty	
X-Axis Uncertainty 0.001 Inches	Dispersion (arcseconds) 1.0	
Y-Axis Uncertainty 0.001 Inches	Threshold (job distance units)	
Z-Axis Uncertainty 0.001 Inches	Phi (Vertical) Uncertainty	
Enter 1 sigma values		
OK Cancel	Dispersion (arcseconds)	
	Threshold (job distance units) 0.0	
	- Distance Measurement	
	Error (job distance units) 0.0003	3
	Parts per million 2.5	

#### Modified uncertainty model for PCMM Arms

The uncertainty parameters for an arm model have been simplified to an XYZ uncertainty with respect to the instrument base.

Added capability for setting XYZ uncertainties for PCMM instruments so that XYZ component uncertainties can be determined during USMN operations.

#### **Reporting Improvements**

Added ability to reverse colors in Discrete Colors mode. Now, red color can be picked for high and blue for low.

		olor Profiles	
		Discrete Colors	
		Color Pr	ofile Properties
	н	igh Limit	Color Bar Layout
		Max Deviation $\sim$	Max Deviation
		0.00168045	Max Deviation
olor Profile Properties - Discrete	Colors		×
Base Colors	Discrete Colors		
High Color: Red 🗸	Number of Colors	12 ~	
Red Blue	Spectrum Option	Standard 🗸 🗸	
	- Color Distribution		
	Continuous (En		
3 Sigma Rule (9) 3 Sigma (99.7% of data)	O Symmetric (Inte		
<ul> <li>2 Sigma (95% of data)</li> </ul>	Middle Value	-0.00179861	
0 2 Sigma (55% of data)	Interval Value	0.00057984	
O 1 Signa (00% or data)			
OK		Cancel	
	- Li	o <del>w</del> Limit	
		Min Deviation $\sim$	
		-0.00527767	Min Deviation

# **Instrument Updates**

#### Leica Trackers

Added New Instrument - Leica AT500



The AT500 offers reflector measurements at up to 160 meters an integrated controller and the ability to measure using the B-Probe<sup>plus</sup>.

Updated to LMF 1.9 (AT9x0, AT600, AT500

- Added support for RDS 6.2 and improved the ability to connect and disconnect from RDS with the AT960 and a scanner.
- ATS600 minimum scan distance goes to 1m from 1.5m, and will now scan any part of a perimeter that is not too close.

**API** Trackers

 Added SDK to support the new 2-axis level for the Radian Plus (OminiTrack2)

#### **Total Stations**

Added default interface selection for total stations under the Add instrument button.

#### CHAPTER 1 • WHAT'S NEW IN SA

ter M	Add Instrument Options	× tarch
	Instrument Stand	
L	None Brunson Model 233 Wooden Tripod Quickset Leica Tracker Stand	
	Instrument Placement Relative to: World Frame	
	Increment Value: 50.0	4 4 4
	Instrument Interface Run Interface Total Station Theo Manager	<b>Leica</b> Geosystems
	OK Cance	l Options

The new total station interface has been greatly improved.

- Added support for Surface Vector Intersection measurements
- Added new instrument toolbar

Instrument Control 1 ( RelationshipFit::1 - Leica Nova MS60 Total Station )											
	Main::p1 Retro: Reflectorless V C: 34.40	Dia:0.0000	•	« <b>@</b> »	<b>.</b>	2	<b>†</b>	ត្ត		9 (\)	

#### Nikon APDIS Laser Radar

 Laser Radar APDIS MV400 has been integrated with Nikon CLR SDK v10.05.06.6174

Added new menu options:

- Instrument >> Hardware Capabilities
- Tests >> Vibration Analysis

Large number of nominal vectors can be measured using menu option *Instrument* >> *Taking Measurements* >> *Auto Measure* >> *Measure Batch of Vectors*. With this we added:

- Now, measured points can be saved in a desired collection
- Added ability to build a new vector group including skipped or failed vectors from the list

#### MV430E and MV450E Laser Radar Enhanced Models

Implemented auto measure of SA Geometry Relationships (Features) by MV430E/MV450E Gauging Engine (GE).

- Currently supported geometry types are circles, rounded slots, and rectangular slots.
- Each feature can have a saved target definition for customized scanning and the option to send clouds, measured geometry or both.

To start measurement process, select on SA ribbon *Instrument* >> *Auto Measure* >> *Measure Batch of Features*.



Gauging Engine: https://youtu.be/Wadmqz-x24w

## Laser Projectors

Added New Instrument - Virtek Iris Projector

An all new interface to the Virtek Iris projector has been added. See instrument Manual for setup details and scripting controls.



#### Updated LAP Projector Interface

Rewritten interface for the SynchroNet API, replacing the older CAD-



Pro API, significantly increasing performance.

# **MP Script Updates**

Updates to Existing MP commands:

- Set Tracker/EDM Theodolite Uncertainties. Replaces previous version and offers updated uncertainty parameters
- Get Tracker/EDM Theodolite Uncertainties. Replaces previous version and offers updated uncertainty parameters.
- Fit Geometry to Points. added the Torus geometry type
- Fit Geometry to Point Groups. added the Torus geometry type
- Get Transform for i-th Frame In Frame Set. Normalize resultant transform to address "stacking creep" when iteratively using result to set working frame

Allow Watch Window commands to set the position and size even if no watch window template is provided. This will affect the following MPs:

- Watch Point to Objects
- Watch Point to Point
- Watch Closest Point
- Watch Instrument
- Show/Hide Relationship Watch

#### Added new MP commands:

- Set PCMM Instrument XYZ Uncertainties. Provides a means to set the uncertainty parameters for a PCMM arm.
- **Get PCMM Instrument XYZ Uncertainties.** Returns the current uncertainty parameters for a PCMM arm.
- Set XYZ Instrument Uncertainties. Provides a means to set the uncertainty parameters for any XYZ uncertainty based instrument.

- Get XYZ Instrument Uncertainties. Returns the current uncertainty parameters for any XYZ uncertainty based instrument.
- Subtract two Point Name Ref Lists. Provides a means to removed points from a list based on a comparison between two lists.
- Append two Relationship Ref Lists. Provides a means to combine two relationship lists.
- Watch Point to Edge. Provides a means to open a watch window that displays deviations after compensating point offsets to a first reference object.