V-STARS 4.3
Release Notes

September 2002

1511 Riverview Driver, Melbourne, FL 32901
Phone: 321 724 6831 Fax: 321 724 9253
www.geodetic.com
info@geodetic.com

V-STARS 4.3 Release Notes

Introduction **3**
Important Changes **4**
New 3D File Format 4
Probe Files 4
V-STARS S-Mode Features **5**
Coded Target Aided Scale Bars 5
V-STARS Key Commands 7
Coded Targets 7
Enable And Disable Codes in the Project 8
Coded Target Nuggets Automatically Active For Feature Targets 8
Improved Coded Target Detection 9
Improved Scanning and Centroiding Algorithm 9
Improved AutoRelabel Function and Interface 9
Support for D1X/H File Formats 10
Import Images to GSI Format 10
Multiple Jobs Supported 10
Vectors in the Image View 12
Undo for Deleting, Renaming and Pasting Points 13
Save Dialogs to Bitmap Image Files 13
Save As Template Project. 14
Automated Repeatability Module (ARM) 14
Saving Images 15
Stretchable Dialogs 15
Camera Calibration Date 16
CSV Files 16
Bundle Text Indicator 16
Bundle Save Info 16
New 3D Viewer and SOLIDS Features **17**
SOLIDS Graphical Toolbar 17
Import View Settings 17
Cylinder 18
Paraboloid 19
Transformation Results 21
Graphical Line Following 21
View Rejected/Accepted Alignment Points 23
Camera Viewpoint 24
Paste Points From Windows Clipboard 24
Copy and Paste Objects 25
View Setup – Display Weak Points 25
View Setup – No Points 26
View Setup – Slice and Stacks 27
Surface Measurements 27
SOLIDS Error Message 27
Point Projection 27
Measurement Residual Labels and Values 28

V-STARS/M Mode Features 29
Unstable Mode 29
Probes 29
Improved Probe Calibration 29
Probe Label Wildcard 31
IP Address 31
M-Mode Setup Dialog 32
M-Mode Remote Trigger 34
V-STARS Bug Fixes 35

Introduction

The following release notes describe the significant new features that are available in V-STARS Version 4.3.

The release notes also describe many of the software fixes implemented since the previous release. (V-STARS 4.2.)

All care has been taken to ensure that the software is functional and operates as it should. This software has passed all internal testing. Although this testing is thorough, it is by no means complete. We cannot run through all the possible combinations and applications that our large and varied user base performs. We therefore urge you to try out the new features as much as you can in the next few weeks to confirm that they work properly. Please notify us as soon as possible of any problems you find so they can be fixed in the next formal release.

If there are any new features you would like, please convey them to us (info@geodetic.com), and we will endeavor to incorporate them into a future release.

Important Changes

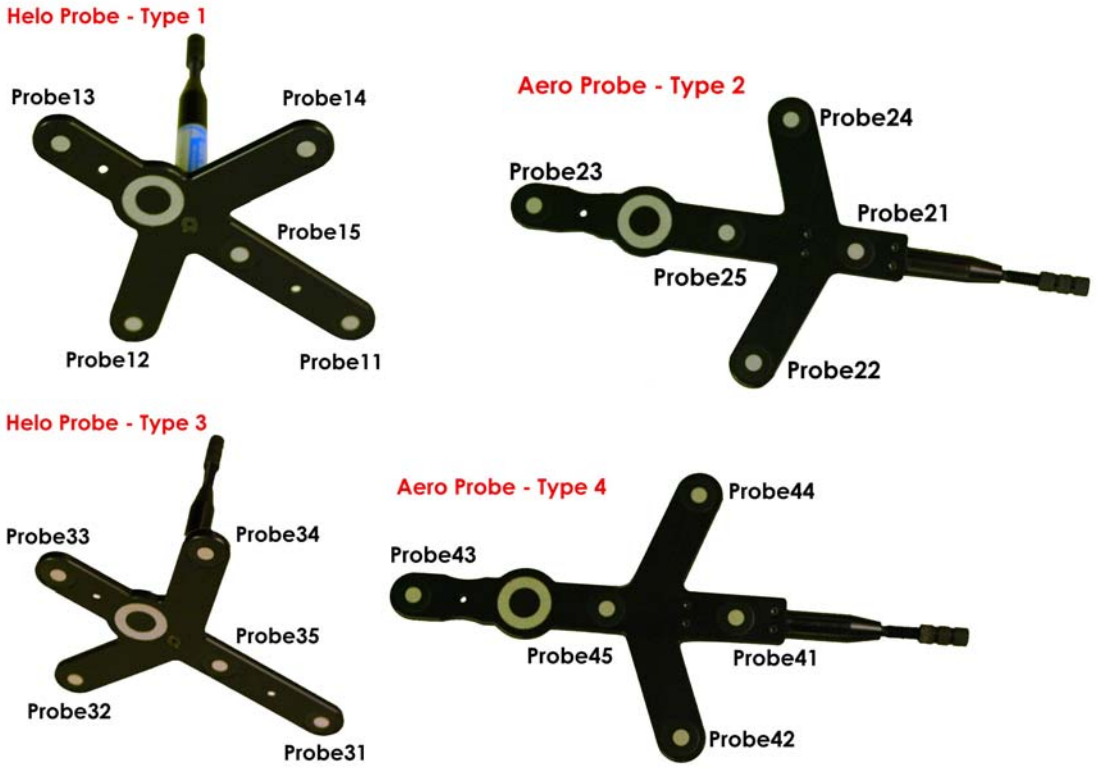
The following items are considered very important changes in V-STARS.

New 3D File Format

V-STARS 4.3 works with a new 3D file format that is incompatible with previous releases. The new format was necessary to accommodate the new cylinder object and other added surface measurement functionality. Any project that is opened with this version will automatically have its 3D files updated to the new version. Your old 3D files will be saved with the extension **`.3dv2001`**. To read these files with the previous version of V-STARS change the file extension from **`.3d2001`** back to **`.3d`**

Probe Files

The format of the probe files has been changed to accommodate improvements in the probe detection algorithm. The new probe files have *.pr1 extensions. Probes in the old *.pro format are automatically converted when V-STARS is run. Note that the algorithm change has also meant a change in the probe point labeling scheme for the Aero Probes. This should not affect users due to the introduction of the new automatic detection used in the probe calibration routine described later. The new numbering scheme is shown below.



V-STARS S-Mode Features

The following features are used in S-Mode measurements.

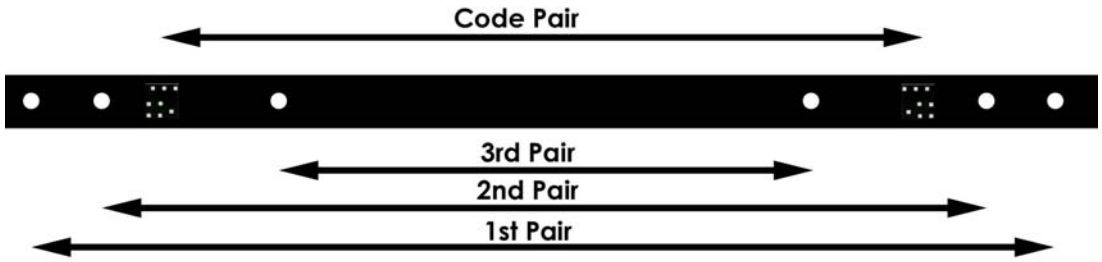
Coded Target Aided Scale Bars

A Coded Target Aided scale bar is a scale bar that uses Coded targets to automatically identify the scale points on the bar. It differs from a coded scale bar in that the codes are NOT the scale points, but rather the points that indicate where the scale points lie. One pair of coded targets can be used to identify a multiple number of scale points.

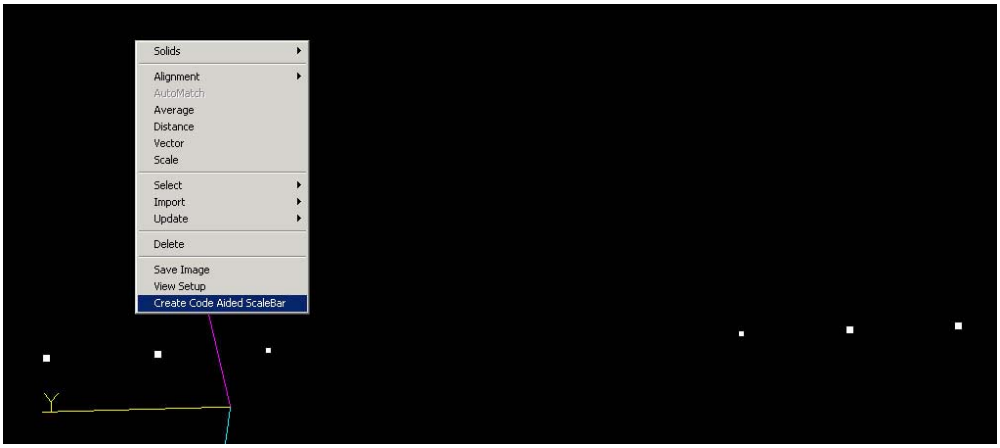
An example of a Coded Target Aided Scale Bar is shown below.

Implementation
A coded target aided scale bar is created in Single camera mode (S-Mode) using the following procedure.

1. Place targets on the scale artifact in a pattern similar to the one shown in the example bar. The scale points and center point of the coded target MUST lie in an approximate line. The number of pairs of points can be varied, but it is advisable to have at least three pairs for redundancy. The pairs of points can be inside or outside of the pair of coded targets.
2. Measure the location of the coded targets and scale points on the scale bar. Scale the points against a known scale artifact.
3. Rename the scale points. The names must be unique and should be descriptive.

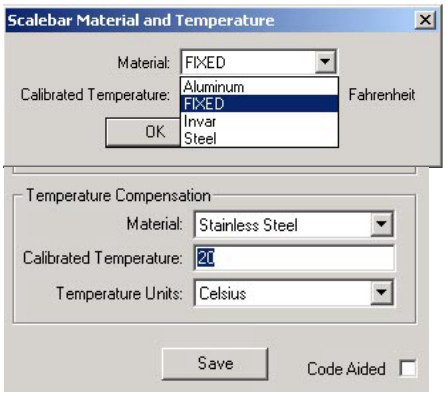


4. From the graphical view, select the first pair of points and the two codes. Right click and select "Create Code Aided ScaleBar".

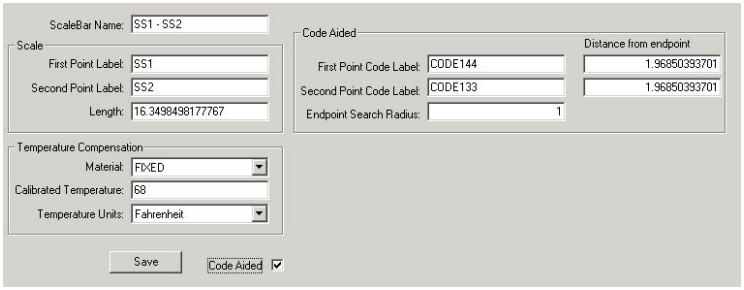


5. Select the scale bar material and the temperature at which the bar was calibrated. Press OK.

   The ability to select the scale material is another addition to this version.



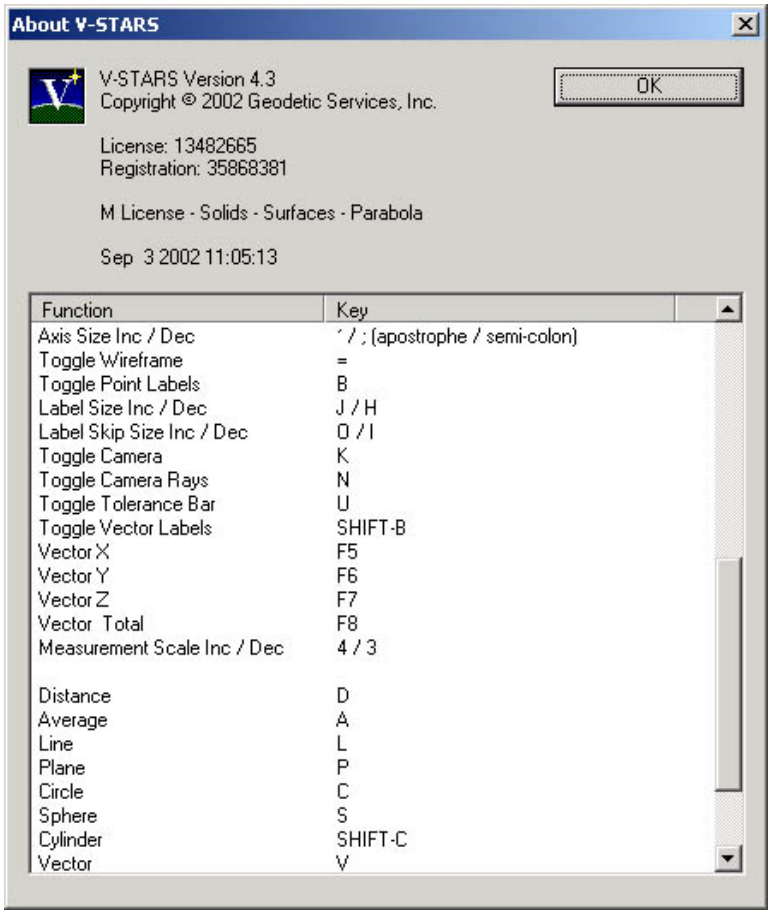
To view the scale bar values open the scale bar from the tree listing in the right hand pane. The values have been automatically set. If you desire you can modify the endpoint search radius. Click the Code Aided box to disable the Coded Aided scale bar.



Please note that these scale bar files are not compatible with earlier versions of V-STARS and will cause the Bundle to fail. If you wish to use an earlier version of V-STARS remove the scale bars from the project prior to running the Bundle.

V-STARS Key Commands

The list of V-STARS key commands can be quickly accessed using the "Help About V-STARS…" menu under the "Help" menu.



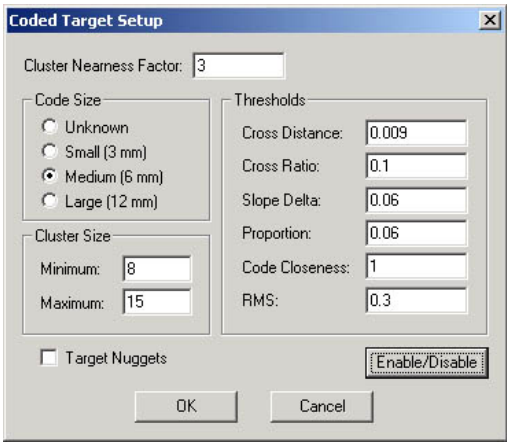
Function	Key
Axis Size Inc / Dec	' / ; (apostrophe / semi-colon)
Toggle Wireframe	=
Toggle Point Labels	B
Label Size Inc / Dec	J / H
Label Skip Size Inc / Dec	O / I
Toggle Camera	K
Toggle Camera Rays	N
Toggle Tolerance Bar	U
Toggle Vector Labels	SHIFT-B
Vector X	F5
Vector Y	F6
Vector Z	F7
Vector Total	F8
Measurement Scale Inc / Dec	4 / 3
Distance	D
Average	A
Line	L
Plane	P
Circle	C
Sphere	S
Cylinder	SHIFT-C
Vector	V

Coded Targets

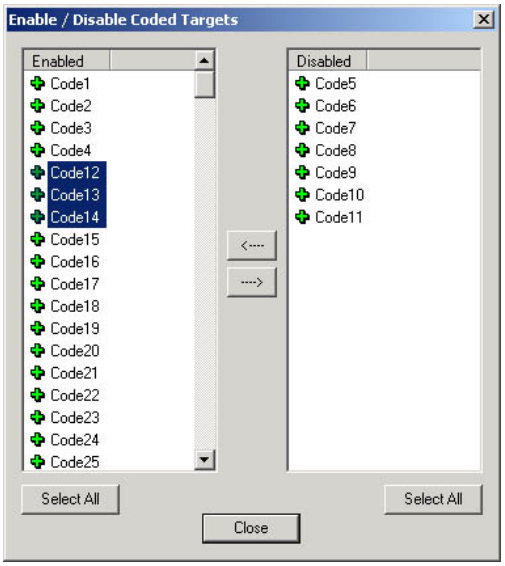
A new version of the **`codes.ini`** file was released to accommodate the new coded target range. Coded targets from **`Code1`** to **`Code240`** are now supported. This file is automatically loaded during the installation.

Enable And Disable Codes in the Project

Individual coded targets can now be disabled in a project. This is useful to disable duplicate codes that have been used inadvertently or to restrict which codes are used in a measurement. A typical example of this is where you are measuring an object and there is another object nearby that also has coded targets attached.



To disable or re-enable coded targets, open the "Advanced Edit" dialog from the V-STARS "Project" menu. Select the "Coded Target" command. Press the "Enable/Disable" button.



A list with all the coded targets will appear. Highlight the codes you wish to disable and press the right pointing arrow command key. To re-enable codes, highlight them in the right pane and press the left pointing arrow command key.

NOTE: Disabled codes will be labeled "SCAN_CODE#" in the pictures to indicate they were detected but are disabled. (Where # is the code number.)

Coded Target Nuggets Automatically Active For Feature Targets

It is no longer necessary to activate coded target nuggets when using Feature Targets. When a 3D file is activated as a Feature Target file, V-STARS will automatically measure the coded target nuggets listed in that file.

This also means that non Feature Target nuggets are not measured unnecessarily.

Improved Coded Target Detection

The algorithm used to detect coded targets has been improved. The new algorithm is capable of decoding coded targets from a greater range of angles and distances. The range has been increased by about 50%.

Improved Scanning and Centroiding Algorithm

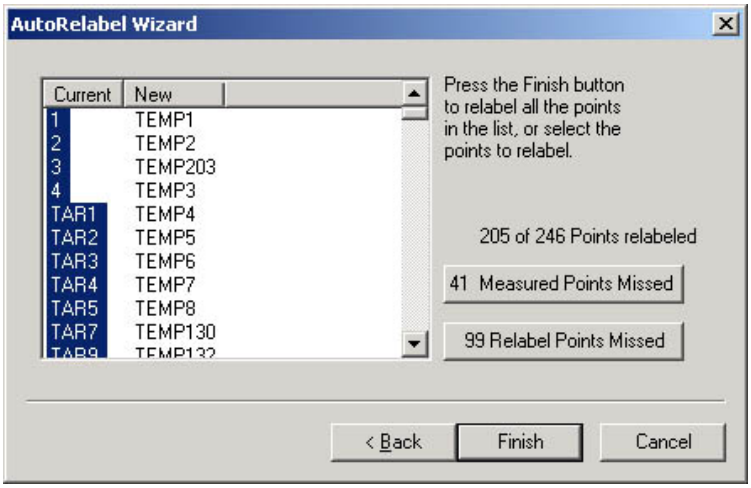
The new scanning/centroiding algorithm provides better target detection especially when the target background is bright.

Improved AutoRelabel Function and Interface

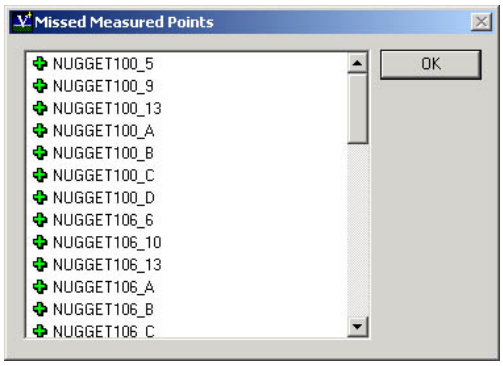
The AutoRelabel function has been improved.

The Transformation RMS of the fit between the point and label files is displayed in the main dialog. The Nearness Threshold is set to three times the Transformation RMS by default, but can also be set manually.

The new interface also has an option to display the number of Measured Points that have been missed. Press the "Measured Points Missed" command to view these.



The "Missed Measured Points" dialog is shown in the adjacent image.

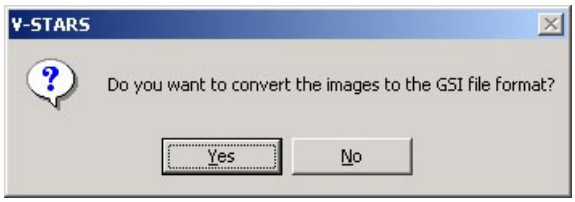


Support for D1X/H File Formats

Native file formats produced by the D1X and D1H cameras are now read directly by V-STARS. This eliminates the need to first translate the NEF files into gray scale TIFF format. V-STARS 4.3 can also still read older D1 files produced by E3 system cameras.

Import Images to GSI Format

Non-GSI format images are imported into the V-STARS project with the option to convert them to GSI compressed format.



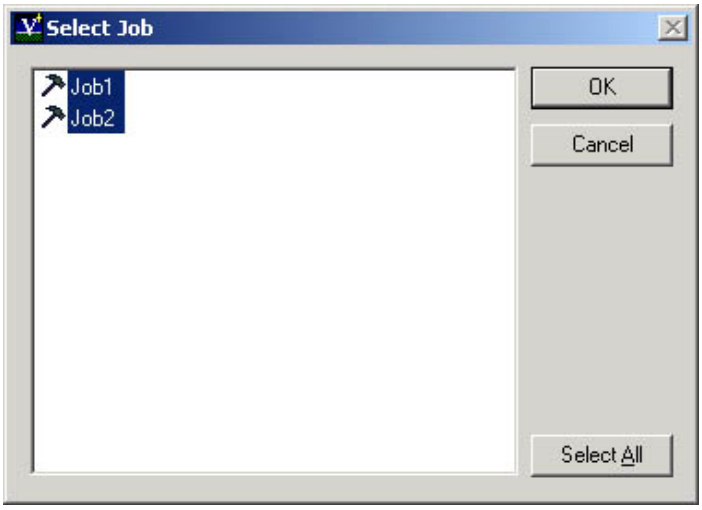
This feature was added to accommodate users of the E3/E3X systems.

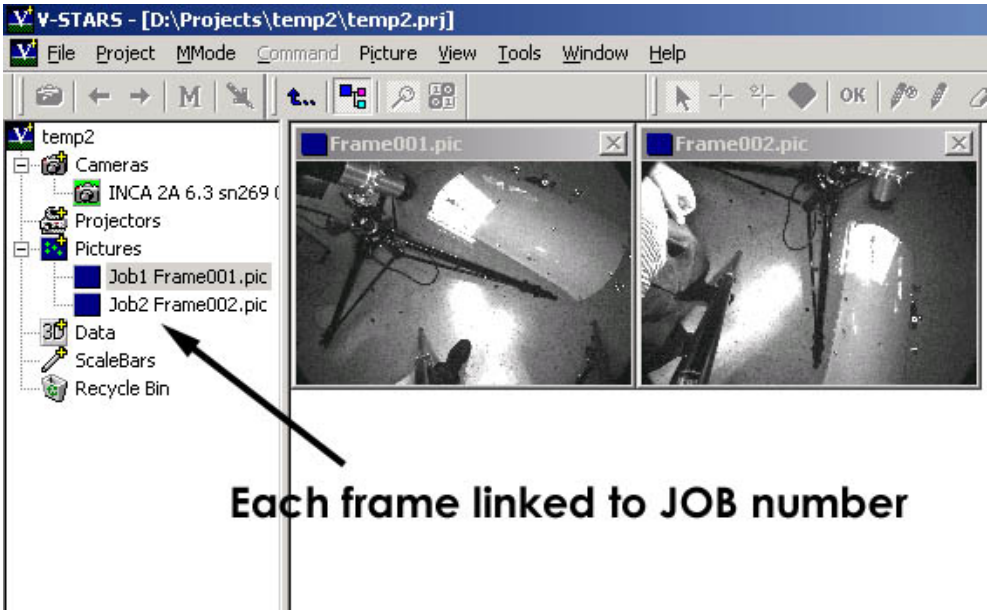
Multiple Jobs Supported

Multiple Job folders can be selected when setting the image path of a project. This is useful when the images collected for a measurement have been placed in multiple JOB folders. An example of this is when multiple sets of images have been captured in a PRO-SPOT measurement or when you need to change disks half way through the photography.

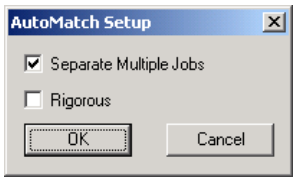
To start a project with multiple job folders, simply select the desired Jobs from the "Select Job" dialog. Each of the picture frames is listed and linked to the Job folder it came from.

The Select Job Dialog is shown below. Select all the Jobs you want to use and press OK.





For Multi-job AutoMatching, the new points found in each job are given a distinct label that indicates the Job from which they originated.



For this function to be active you must go to AutoMeasure – Set Up and check the "Separate Multiple Jobs".

For Multi job AutoMatching, the convention adopted is now **TARGET#_*** where **#** refers to the Job Number and ***** refers to the point number. For example **TARGET1_23** refers to TARGET23 from Job 1.

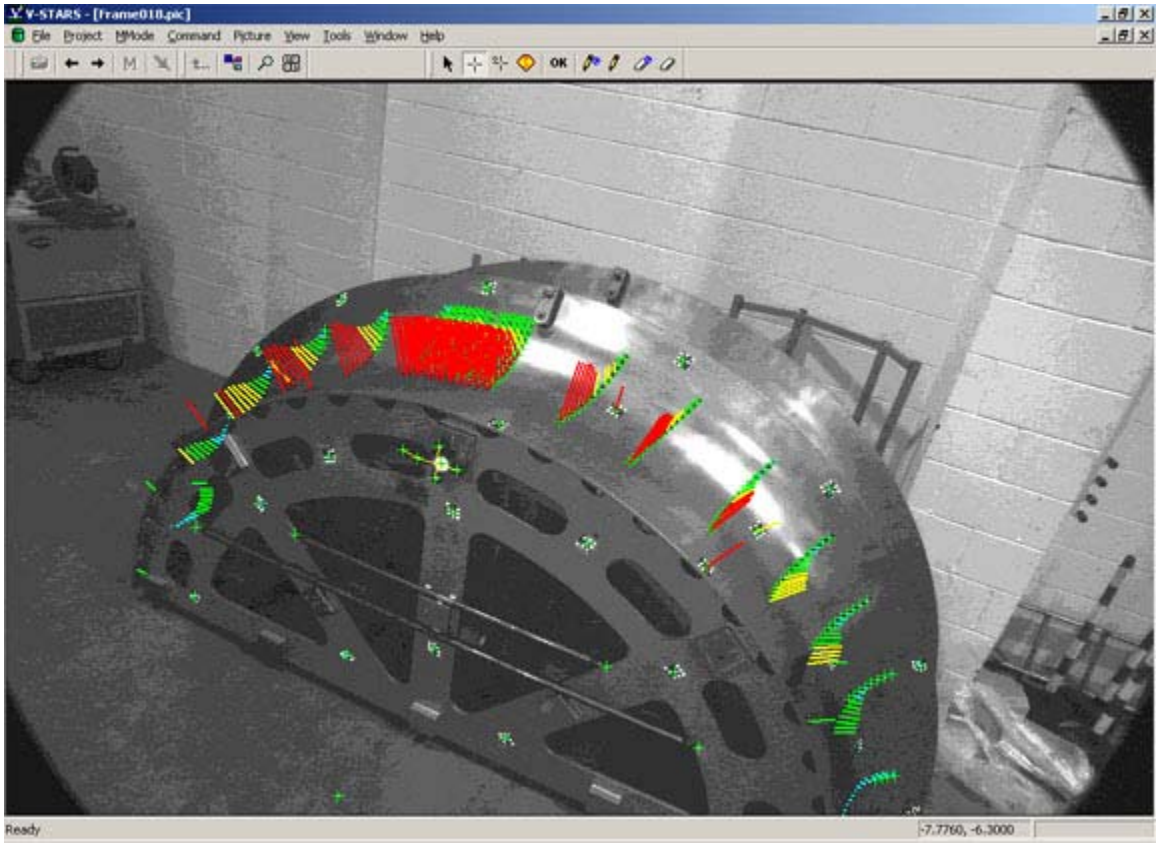
Vectors in the Image View

Measured to Design Residual vectors can be viewed directly in the V-STARS image.

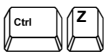
At present only Measured to Design residuals (controlled by design residuals check box and residuals scale) and surface measurements (controlled by surface/design surface check box and measurement scale) are displayed.

To activate the Vectors press Ctrl V. To activate the View Setup press Ctrl F. From the view setup you can alter all the typical view options found in the graphical view. The view can also be altered as normal in the graphical setup.

Note that the Tolerance Bar and color gradient are not supported in the image view.



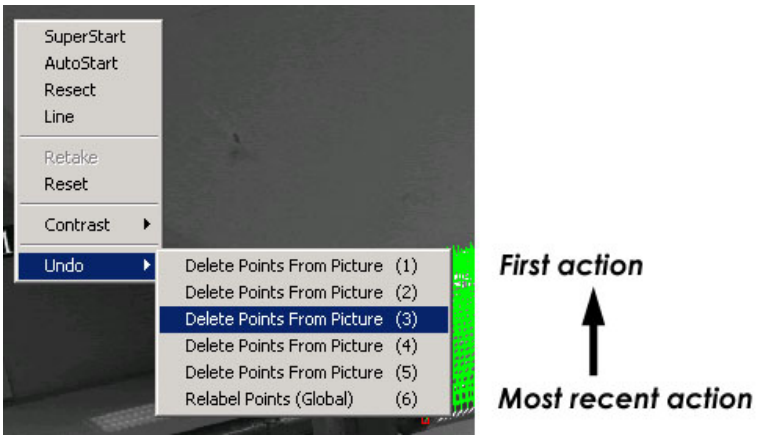
Undo Feature for Points and Objects

Point deletion and renaming in the picture, graphical, and textual listing view can now be undone. The undo option is available for the last 25 operations. It applies to both the local and global delete/rename. To undo an action, right click in the window and select "Undo". The most recent action is at the bottom of the list. To undo all the actions select the first item in the list. You can also step backwards through the list by pressing 

. The undo is also available for the pasting of points and objects into the 3D file.

The undo history is reset once you change pictures or 3D files.

In the example shown below, selecting "Delete Points From Picture (3)" would also undo actions (4), (5) and (6).

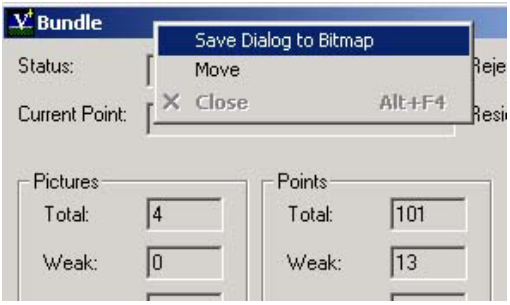


Save Dialogs to Bitmap Image Files

Certain dialogs can now be saved as Bitmap images. This function was added to make it easier to include these dialogs in reports, etc. The following dialogs support the image save function.

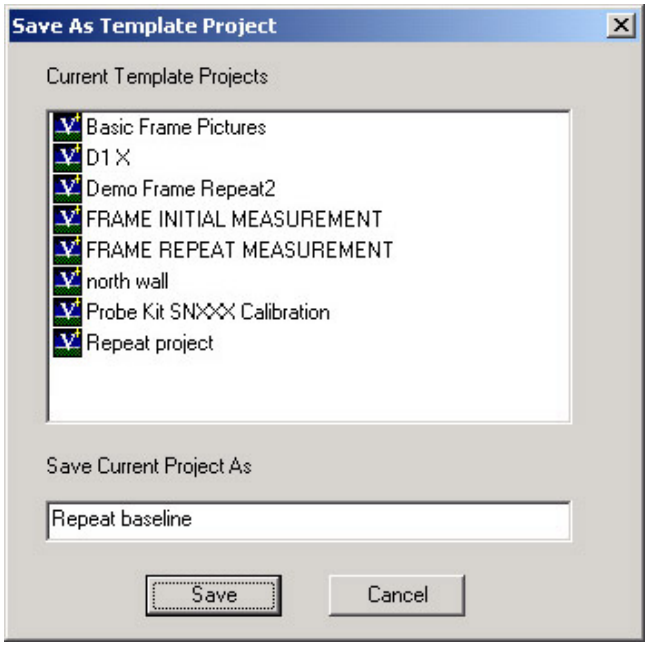
- Accuracy Summary
- Bundle Setup
- Control Point Summary
- Unstable Camera Orientation Results
- Bundle
- Picture Summary
- Point Summary
- Scale Summary
- Camera Summary
- AutoRelabel Measured Points Missed
- AutoRelabel Relabel points missed.
- Bundle Summary

To save the dialog box simply right-click anywhere in the dialog title. Alternatively the option can be reached by left-clicking on the extreme left-hand side of the dialog on the icon.



Save As Template Project.

To save your current project as a Template Project select "Save As Template Project" from the file menu. The adjacent dialog will appear. Select or enter a name and press OK. The Template Project will contain all the files found in your current project with the exception of any .pic and Bundle Folder files. This feature is very useful in cases where you have to repeat the same measurement a number of times and want to keep all the settings and files used the same.



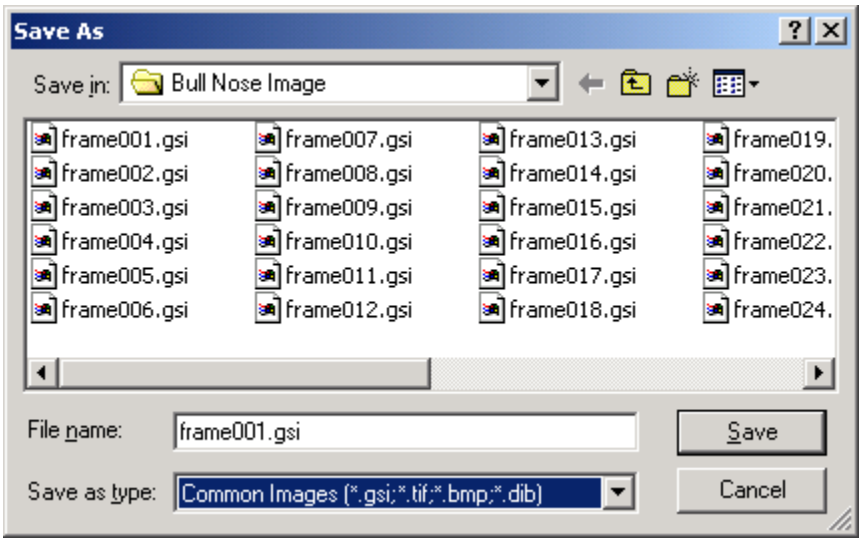
Automated Repeatability Module (ARM)

Please refer to the separate Release note for more information on the new Automated Repeatability Module. (ARM)

Saving Images

The **Save Image As** command under the **File** menu is active only when an image is open. It will save/convert an image as a GSI, TIFF, BMP or DIB format file. After selecting the command, the dialog box below will appear. It defaults to the project directory (thereby showing the .gsi files in the project). You may save the image in another directory using the standard Windows navigation tools.

The file name for the image that is open will be displayed in the "File name" field. You may type a different file name in the field or leave it the same but you MUST set the file type by typing in the appropriate extension (.bmp for Bitmap format, .tif for TIFF format, etc.) for the filename. Then press the SAVE button to save the image in the selected format. The original GSI image will not be overwritten.



Stretchable Dialogs

Certain dialogs can be stretched to improve visibility. The following dialogs support the stretch function.

- Bundle Accuracy Summary
- Unstable Camera Orientation Results
- Point Labels
- Bundle Point Summary
- AutoRelabel Measured Points Missed
- AutoRelabel Relabel points missed.

Camera Calibration Date

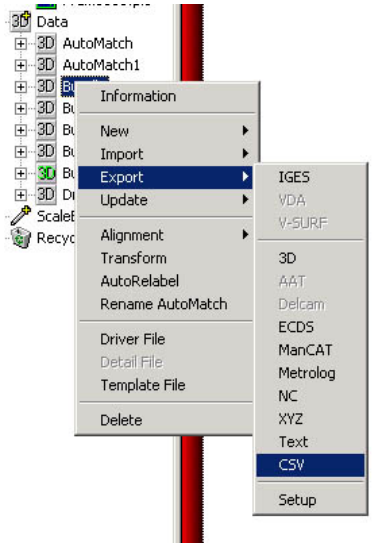
The date of the camera calibration (standard and enhanced) has been added to the camera file. If no date is present in the camera file, the file date field in the Camera Calibration form view will be blank. The camera calibration date for the local camera will be updated once a bundle has been run and the parameters changed.

CSV Files

3D files can now be imported/exported in CSV (comma separated values) format files. This is the format that is most directly compatible with Microsoft Excel.

When importing CSV files V-STARS will automatically list any CSV files in the directory that you are browsing.

When exporting to a CSV file format simply right-click on the 3D file node and select Export – CSV from the menu.



The V-STARS file format for a CSV file is as follows

PointName,X,Y,Z,SigmaX,SigmaY,SigmaZ,Offset,Description

For example

```
TARGET1,2576.675,-1002.023,1511.559,0.011,0.014,0.017,0.000,Plane1
TARGET2,2579.670,-1002.936,1500.845,0.011,0.014,0.017,0.000,Plane1
TARGET3,2581.721,-1004.119,1488.185,0.012,0.015,0.017,0.000,Plane1
```

Bundle Text Indicator

The bundle dialog Current Point Status field now indicates when subsampling is taking place.

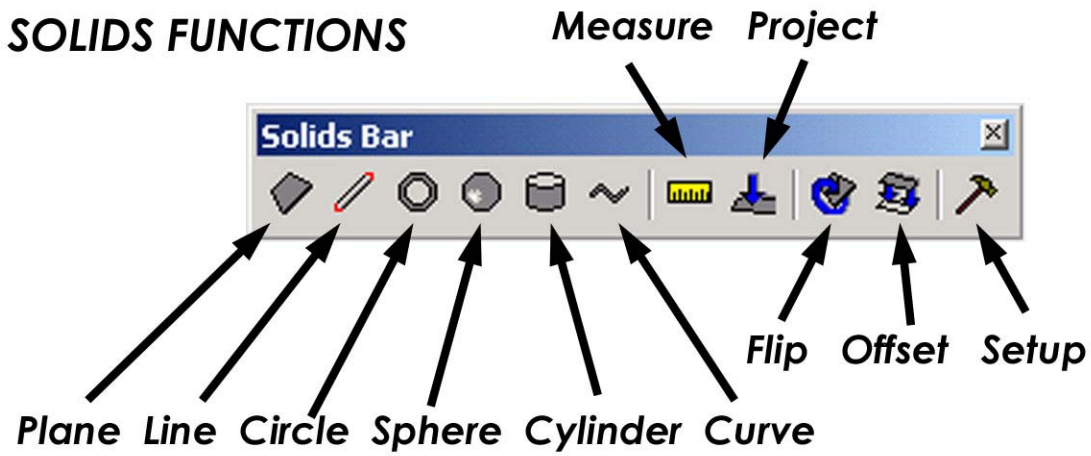
Bundle Save Info

The bundle units (inches, mm. etc.) are now printed to the text file generated by the Bundle dialog "Save Info" button.

New 3D Viewer and SOLIDS Features

SOLIDS Graphical Toolbar

SOLIDS menu items can be accessed via a graphical toolbar. The diagram below shows the icons and their function.

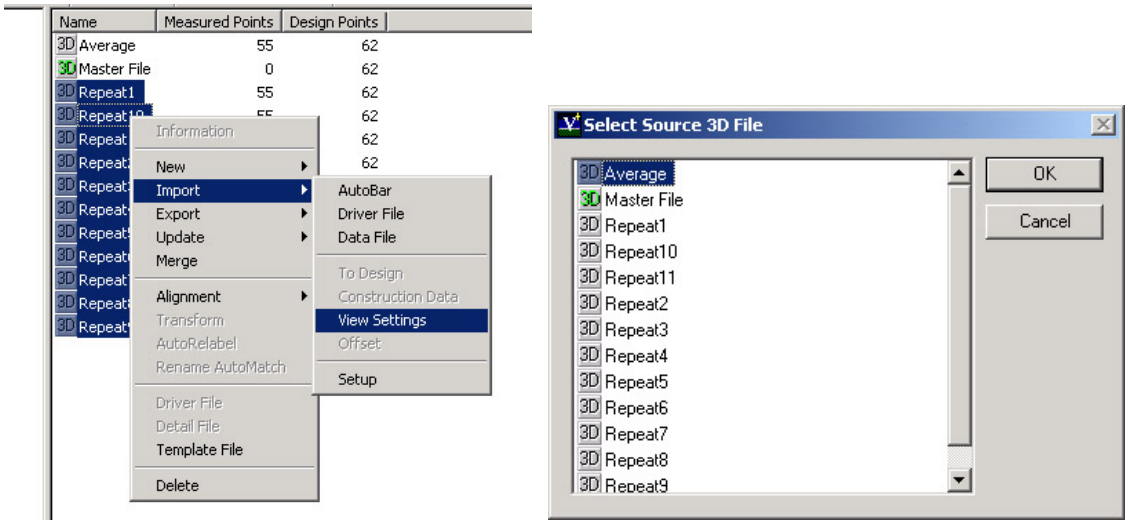


The toolbar is active in both the graphical and point textual view.

Import View Settings

This new function will allow you to import the graphical view settings of one 3D files into any other 3D file in your project. This is very useful for example when you wish to compare files from the same perspective or with the same tolerance colors.

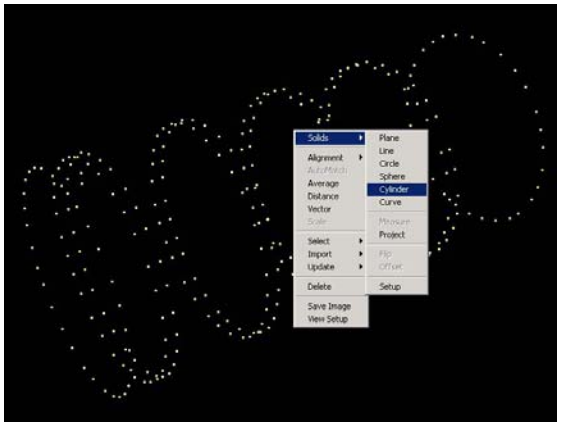
To import the graphical view settings simply select the files you wish to import the settings to and then right click and select "Import" – "View Settings". Select the Source 3D file and then press OK.



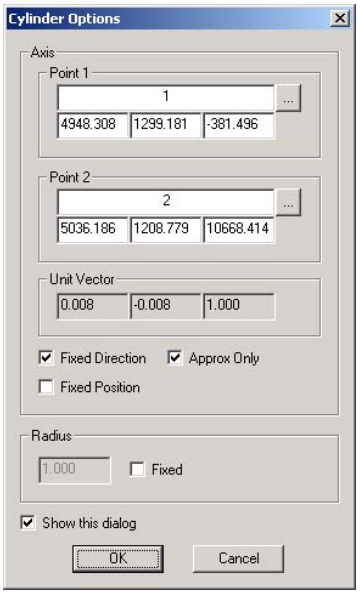
Cylinder

Best-fit cylinder has been added to SOLIDS. The Cylinder function has been implemented in a similar manner to the other SOLIDS functions. The only difference is the way in which the points are selected. To get the best result it is advisable to first select two points that run along the length of the desired cylinder. Once these have been highlighted, the remaining points are selected normally.

Alternatively, all the points can be selected first and then the two direction points can be specified from within the Cylinder Options dialog box that will appear once the Cylinder function has been selected. The Cylinder Options dialog will only appear if the Show Additional Dialogs box has been checked in the SOLIDS Setup dialog.

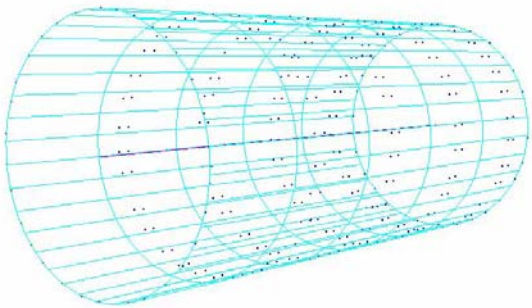


The Axis points can be selected using the pull down menu to the right of the point label. The coordinates can also be entered manually.



The direction of the cylinder can be fixed through the two points or held approximate by checking the appropriate boxes. An example of a fixed direction might be the case where the two centerline points are known and you wish to fix the direction of the cylinder to the axis of these two points. Similarly, the radius of the cylinder can be fixed.

The Cylinder routine will also compute the centerline, which can optionally be added to the 3D file.



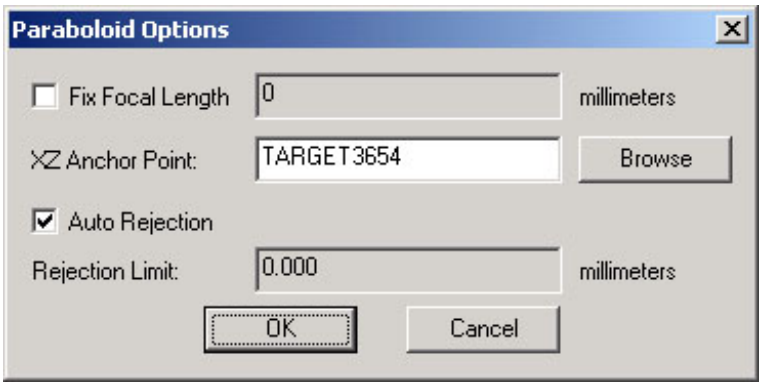
Paraboloid

Paraboloid is an optional SOLIDS function. To run Paraboloid you must have a Paraboloid license (but no SOLIDS license is necessary). The Paraboloid function follows all the same implementation rules as the other geometric functions found in SOLIDS. Please refer to the SOLIDS portion of the V-STARS manual if you are unfamiliar with these conventions.

Paraboloid will allow you to compute the six parameters of a paraboloid using points measured on the parabolic surface. These parameters are the three XYZ coordinates of the vertex, two (of three) components of the unit-vector in the normal axis direction, and the focal length.

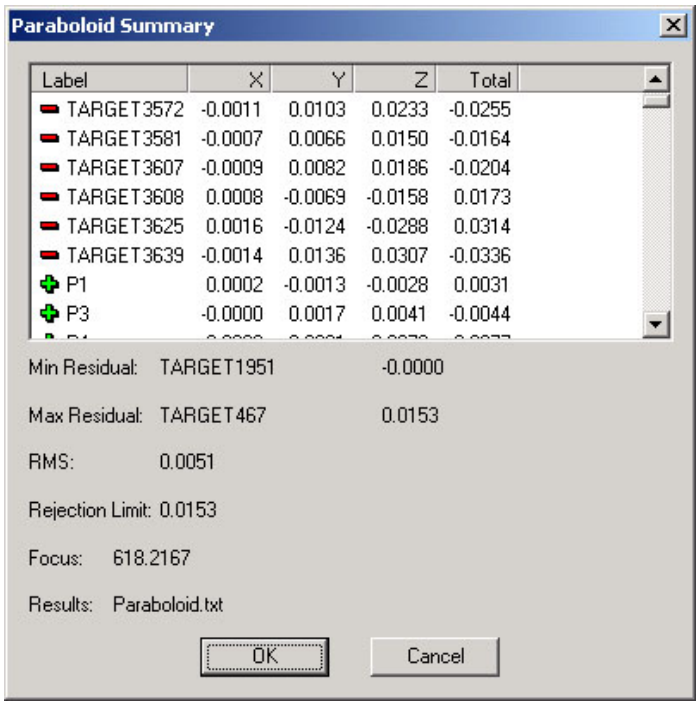
These parameters will be used to compute the deviations to the best-fit parabolic surface of the measured data. The function works on both regular and offset parabolic surfaces.

Once the paraboloid points have been highlighted, select the "Paraboloid" function from the SOLIDS menu. The following dialog will appear.



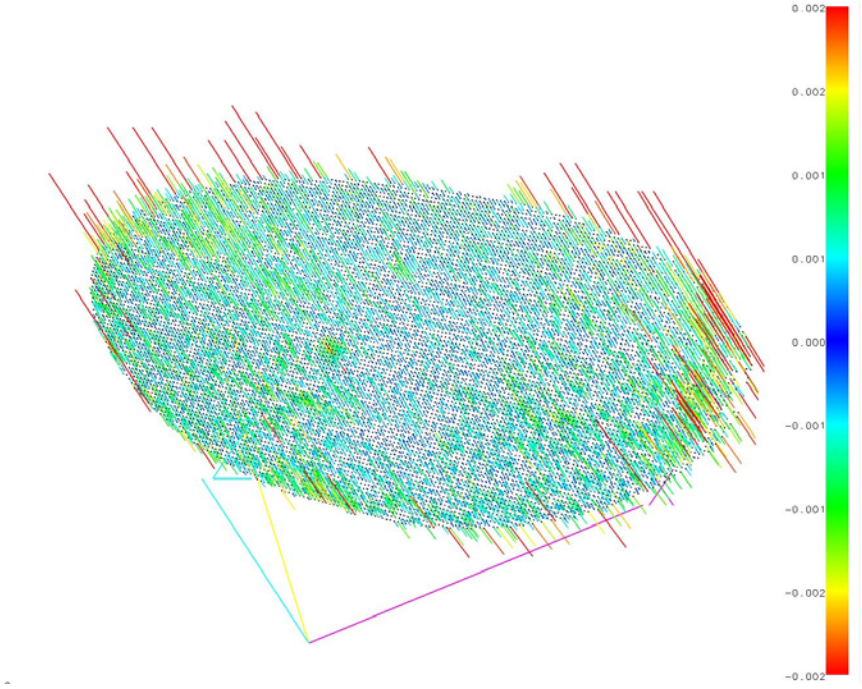
From this dialog you can fix the focal length, select a point to anchor the paraboloid through, or set a rejection limit. The units displayed correspond to the project units. By default the anchor point is set to the first point that was highlighted when the points were selected. This means you can easily select your anchor point graphically rather than textually. Press OK to start the computation of the Paraboloid.

If successful, the following summary dialog will appear.



The results of the Paraboloid fit are summarized in the "Paraboloid.txt" file.

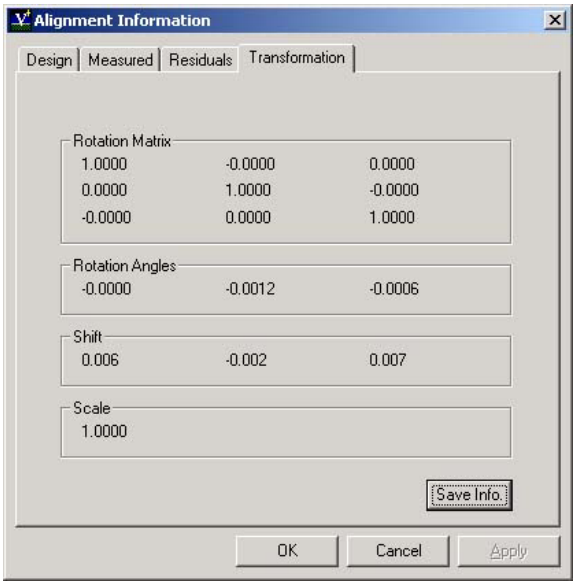
At the completion of the Paraboloid function a new file called "Paraboloid.3D" is created. This file contains the measured data as well as the corresponding theoretical points. The theoretical points are located in the design folder. If the Paraboloid function fails no Paraboloid file is created.



Transformation Results

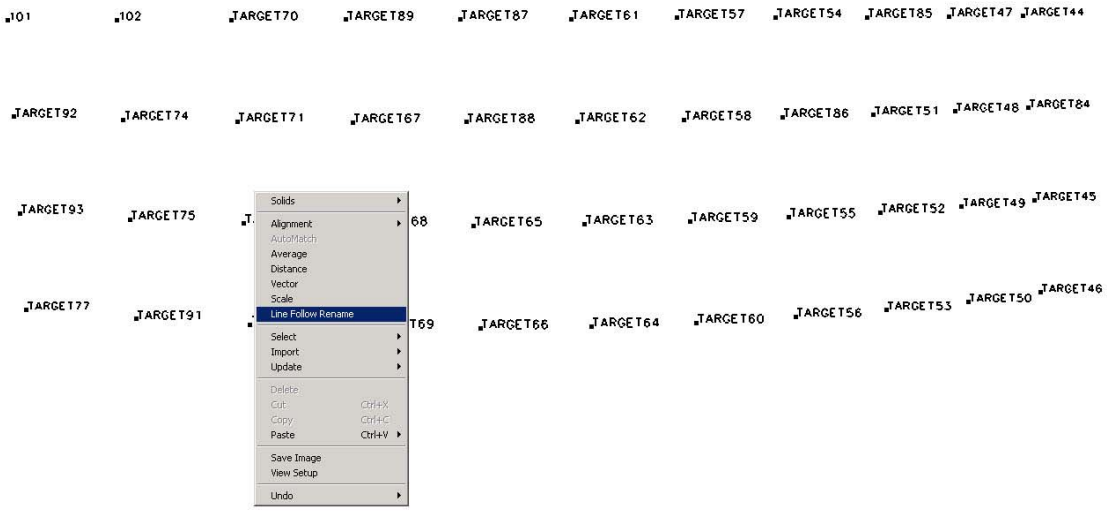
The parameters of a transformation can be saved to a text file.

After a transformation has taken place select the **More** button. Click on the Transformation tab and select the **Save Info** button to write the data to a text file.



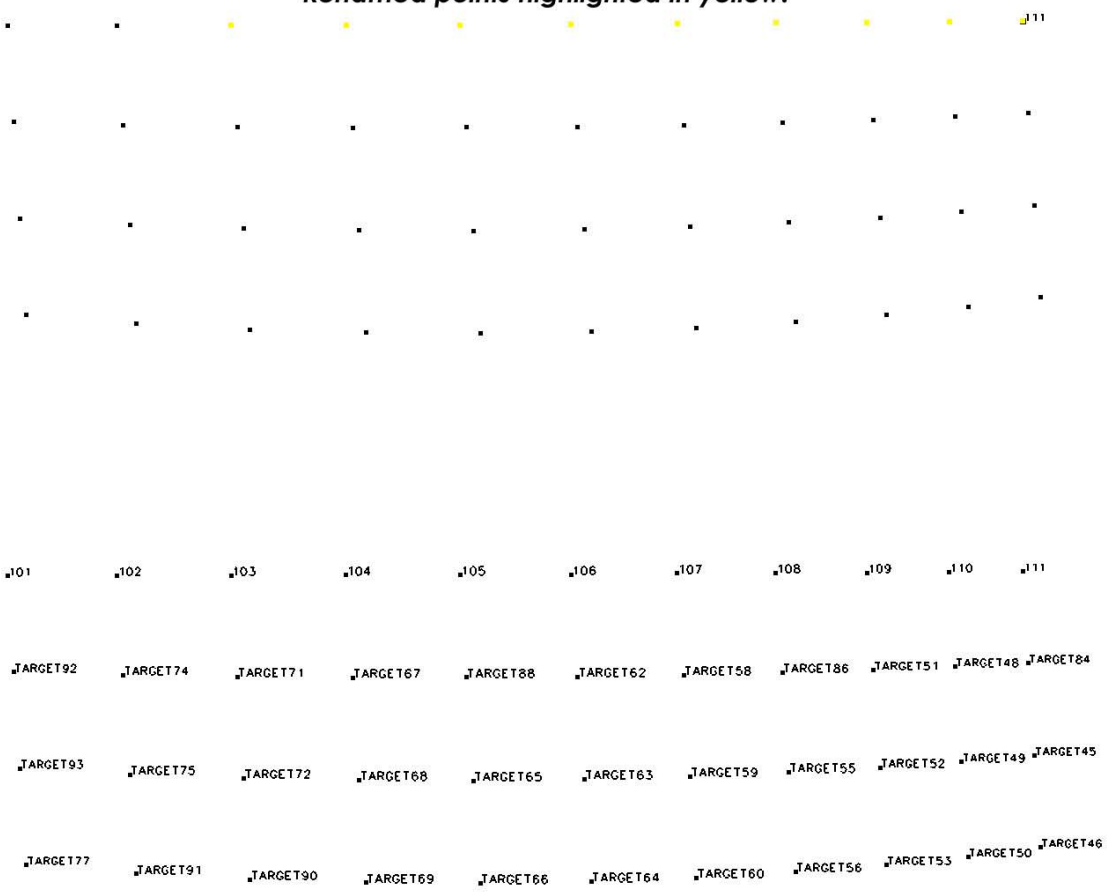
Graphical Line Following

Line following rename is now supported in the 3D graphical view. To rename a line of points simply rename the first two points in the line and select "Line Follow Rename".



The line rename function will run and stop once it reaches the last point it can follow within the tolerance limit. The points that have been renamed will be highlighted in the view until the next action within the window.

Renamed points highlighted in yellow.



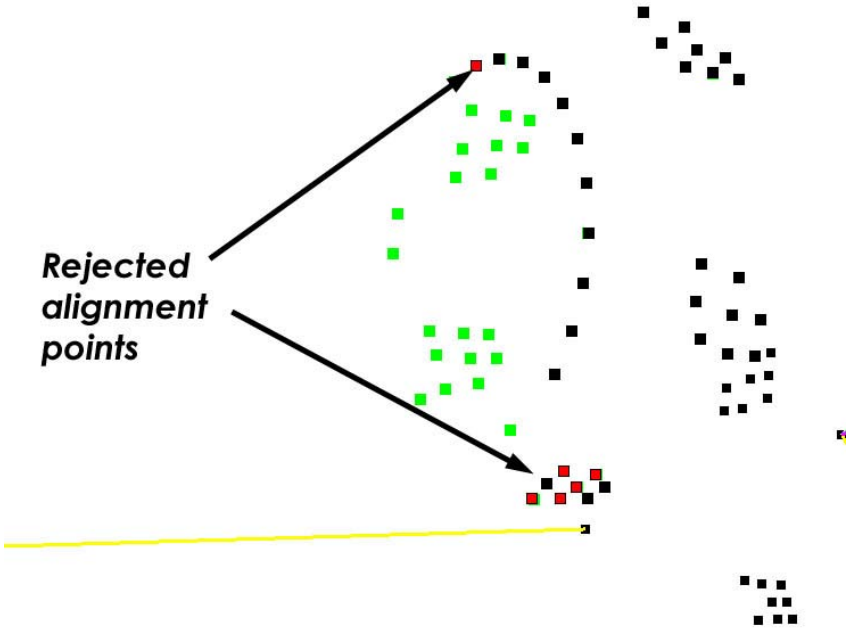
The search window tolerance can be changed in the "Graphical View Setup" – "Tolerances" dialog.

The point rename highlight color can be changed in the "View Setup" – "Display Colors" dialog.

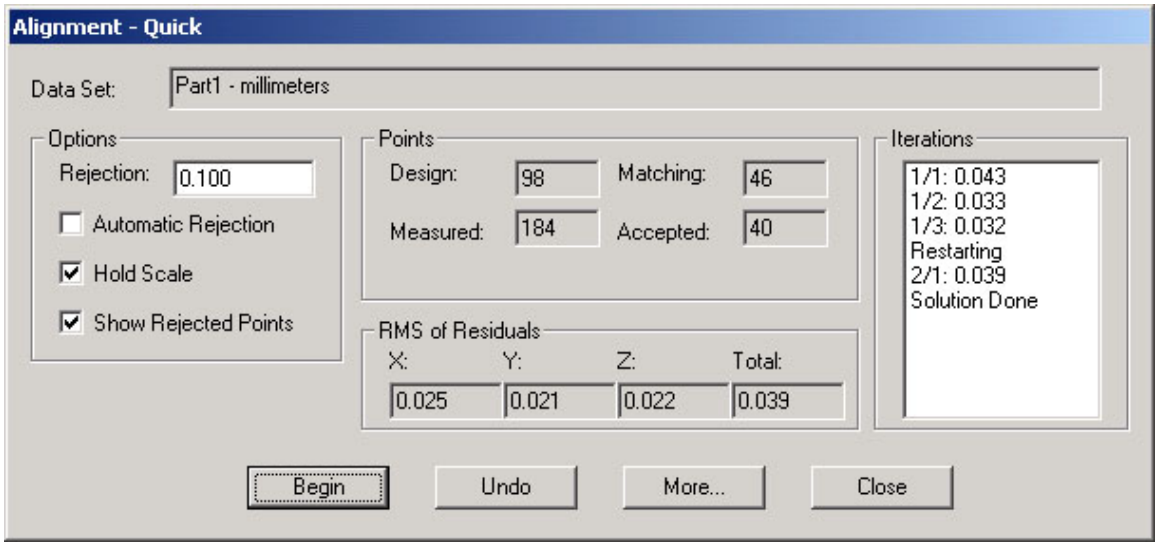
Note: The line follow rename can be reversed by using the new Undo feature.

View Rejected/Accepted Alignment Points

The points that have been rejected in an alignment can be viewed graphically in the 3D file. These points are displayed as "red" points.



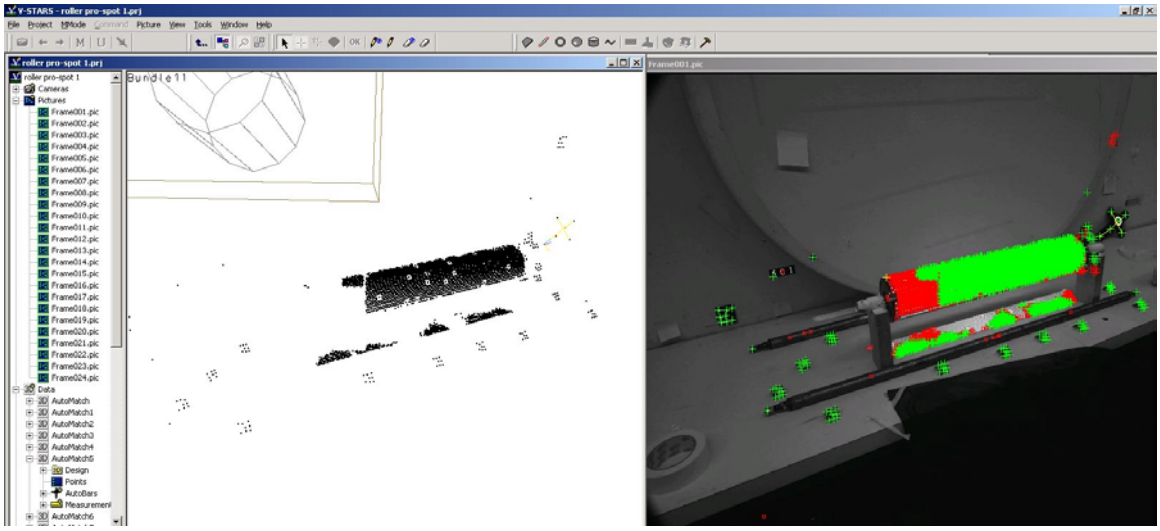
To view these points run the alignment and select the "Show Rejected Points" check box.



To un-highlight these points open the Alignment dialog and uncheck the box. This can also be accomplished from the "View Setup" – "General(cont)" dialog.

Camera Viewpoint

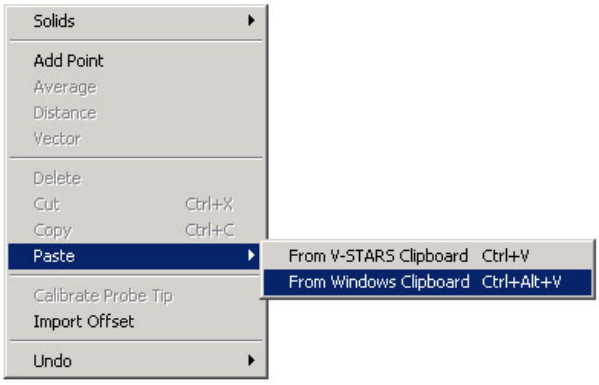
The graphical view of the current driver (green 3D icon) can be setup to display the viewpoint of any image in the network. To do this, select the graphical representation of the camera that took the image and press the Shift + Space. The view must be in "Wire frame" mode in order to see through the camera. This feature is very useful to examine what is seen from an image station.



Paste Points From Windows Clipboard

Points can be directly pasted into a V-STARS 3D file from the Windows Clipboard.

The copied text must be either **TAB** or **space** delimited. The text can be copied from a text file or Excel spreadsheet.



The function supports the pasting of the following fields.

`Pt Name, X, Y, Z, SigmaX, SigmaY, SigmaZ, Offset`

If any of the fields are missing a "zero" value will be entered. If a Sigma value is missing it will be made "FIXED" For example the following text

```
108 520.401 -237.33 -609.063
109 521.806 -234.342 -610.216
110 522.959 -231.309 -611.355
111 523.895 -228.192 -612.51
```

will paste as follows into a 3D file.

Point Label	X	Y	Z	Sigma X	Sigma Y	Sigma Z	Offset	Descript
108	520.401	-237.330	-609.063	FIXED	FIXED	FIXED	0.000	
109	521.806	-234.342	-610.216	FIXED	FIXED	FIXED	0.000	
110	522.959	-231.309	-611.355	FIXED	FIXED	FIXED	0.000	
111	523.895	-228.192	-612.510	FIXED	FIXED	FIXED	0.000	

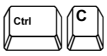
The following listing

```
1
2
3
```

will paste as follows into a 3D file

Point Label	X	Y	Z	Sigma X	Sigma Y	Sigma Z	Offset	D
1	0.000	0.000	0.000	FIXED	FIXED	FIXED	0.000	
2	0.000	0.000	0.000	FIXED	FIXED	FIXED	0.000	
3	0.000	0.000	0.000	FIXED	FIXED	FIXED	0.000	

Copy and Paste Objects

Points, planes, lines and all other SOLIDS objects can now be copied and pasted between 3D files. Select the object/s you wish to copy and press 

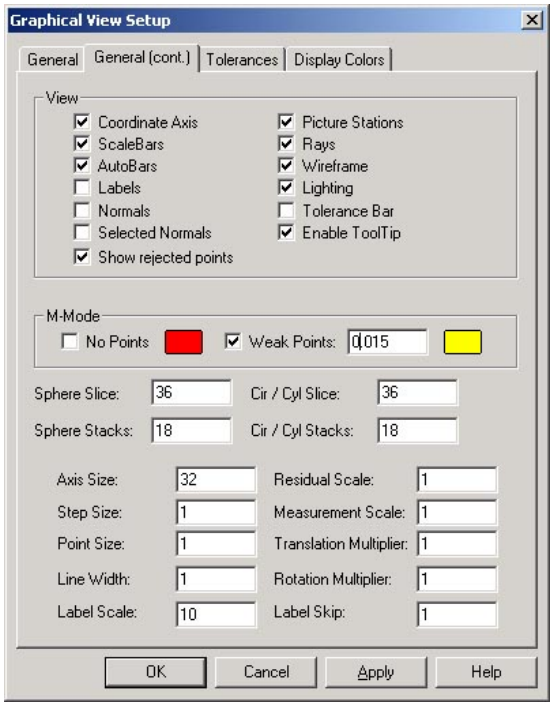
. Open the 3D file you wish to copy the objects to and press

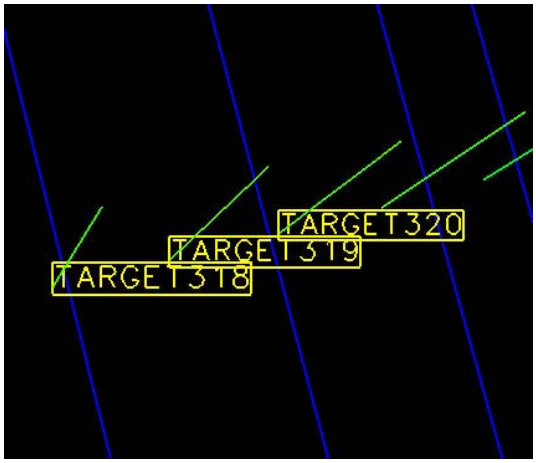
. This functionality is only supported in the graphical and list views.

View Setup – Display Weak Points

Points that have XYZ sigma values greater than a certain threshold can be highlighted. This is useful to quickly identify points that don't meet specific accuracy requirements.

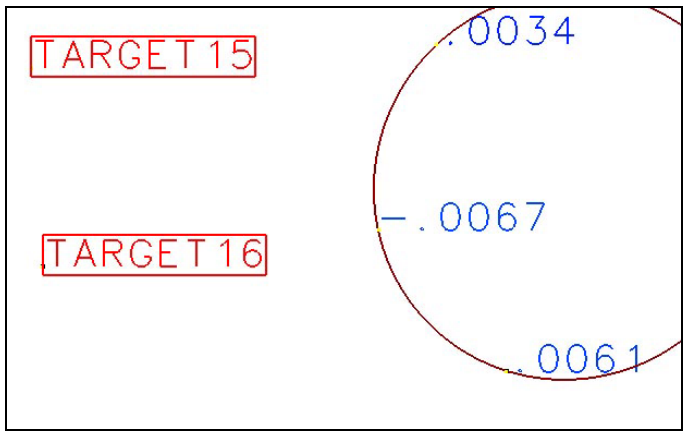
This feature is switched on by checking the **Weak Points** check box in **View Setup – General Continued**. Enter a value in the input box and any point that has a XYZ sigma equal to, or higher than that value will be flagged with its label. An example is shown below. The default color used is yellow, but any color can be selected by clicking on the color square to the right of the input box.





View Setup – No Points

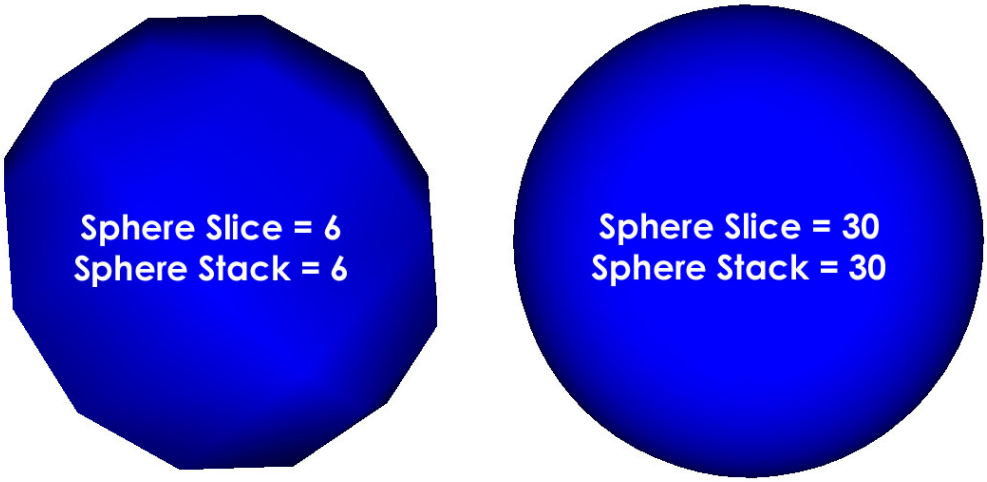
Points that have not been triangulated, but are present in a detail file, can now be flagged with their label. This is useful when you wish to quickly track points that have not been triangulated



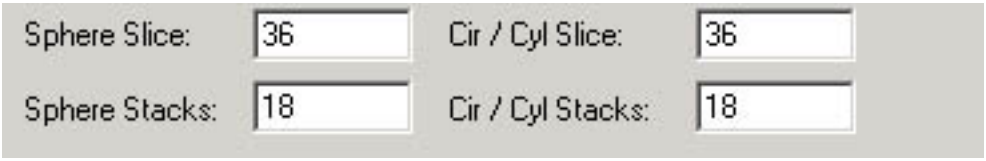
This feature is switched on by checking the **No Points** check box in **View Setup – General Continued**. The default color is red, but any color can be selected by clicking on the color square to the right of the check box.

View Setup – Slice and Stacks

The Sphere, Circle and Cylinder Slice and Stack values control how smooth spheres, cylinders and circle objects are displayed. An example is shown below for a sphere.



These values can be changed in the Graphical View Set Up under the General (cont) tab.



Surface Measurements

Improvements have been made to V-SURF to reduce the amount of computational time needed to determine the correct surface to measure a point to.

SOLIDS Error Message

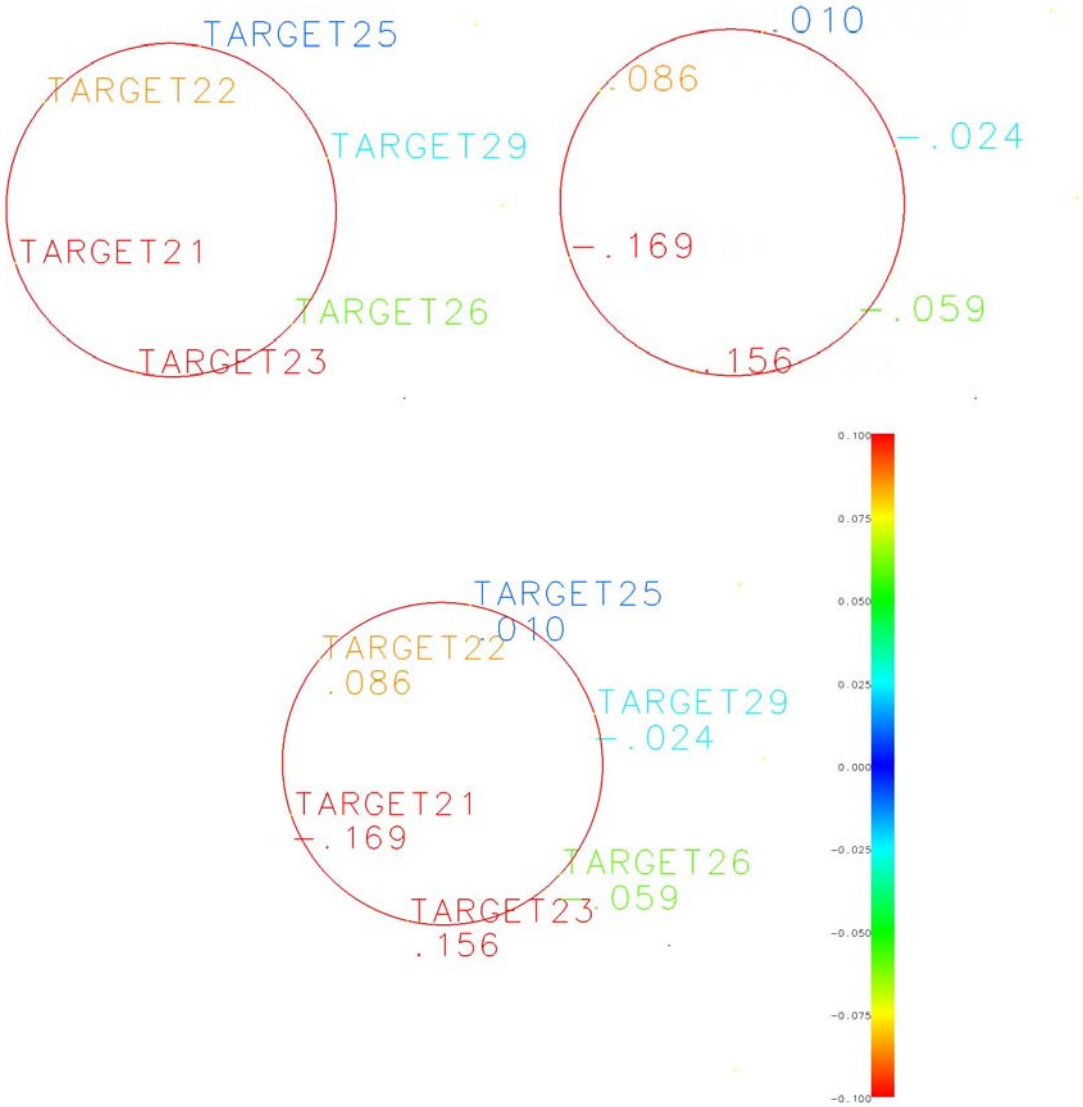
SOLIDS now displays an error dialog if it cannot create a feature.

Point Projection

The point projection function of SOLIDS can now be accessed using the Ctrl M keyboard command. Select the points, the projection object, and then press Ctrl M to complete the projection.

Measurement Residual Labels and Values

Measurement residual labels and values can now be displayed. The labels are activated using the Shift + B key command. Pressing Shift + B will toggle to the measurement residual values. Pressing Shift + B once more will display both the label and value. Pressing Shift + B one final time will toggle back to the original state. The color of the labels and values corresponds to the color of the vector. This color is set according to that of the color scheme selected.



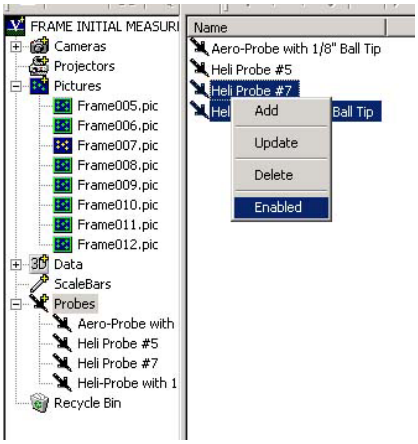
V-STARS/M Mode Features

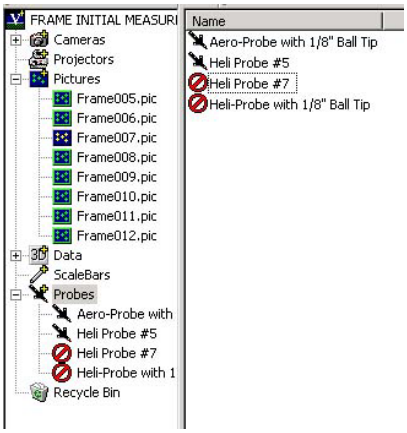
Unstable Mode

An icon that performs the "Unstable Camera Orientation" has been added to the Tool Bar. Once in M-Mode, press the regular M icon to get out of M-Mode.

Probes

Probes can now be enabled and disabled from the tree. To disable one or more probes, simply highlight it/them, right click and select Enabled.

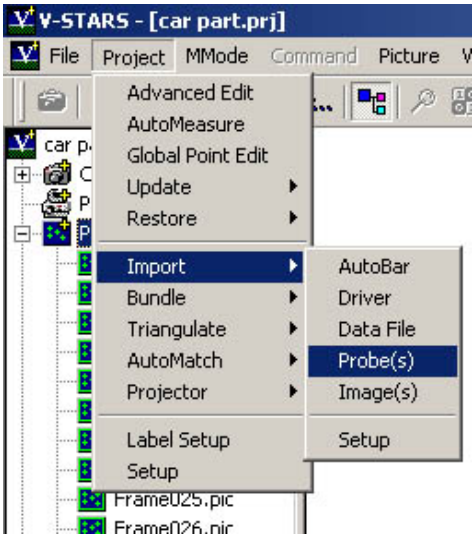


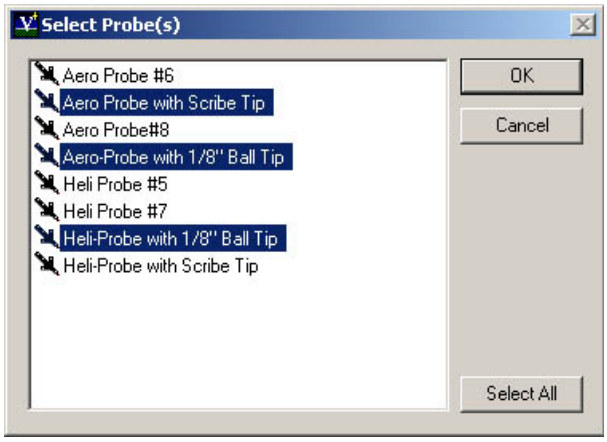


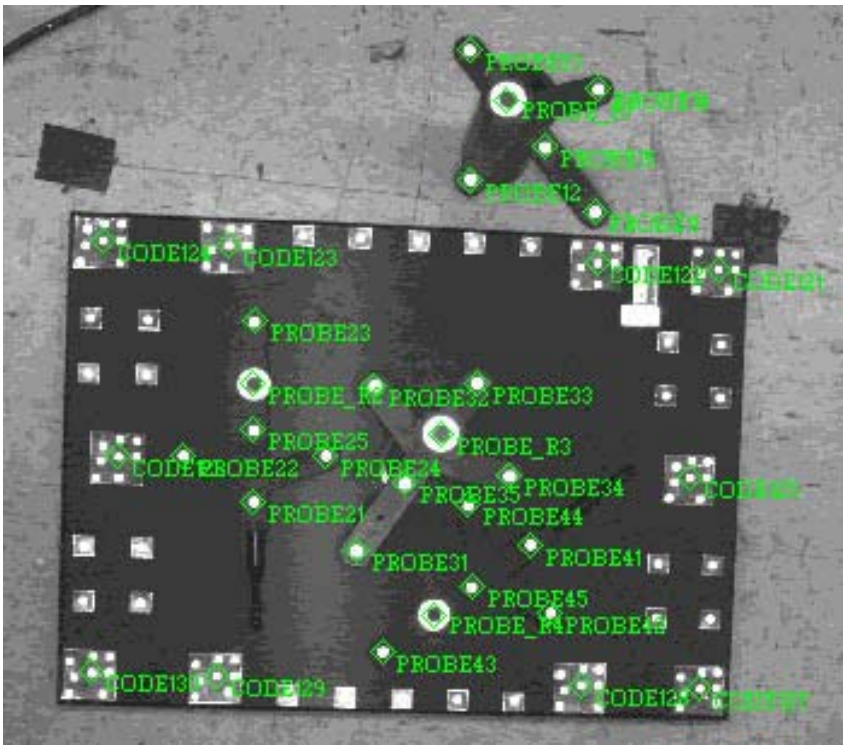
Improved Probe Calibration

The V-STARS/M Probe calibration procedure has been greatly simplified. It is no long necessary to manually rename the probe face targets in the S calibration. The probes are now automatically identified and labeled for you. This removes the error prone re-labeling process.

To implement this new feature it is necessary to import the probes you wish to detect into the project. Once they are in the project V-STARS will take care of the probe identification for you. The rest of the Calibration procedure remains the same.







Probe Label Wildcard

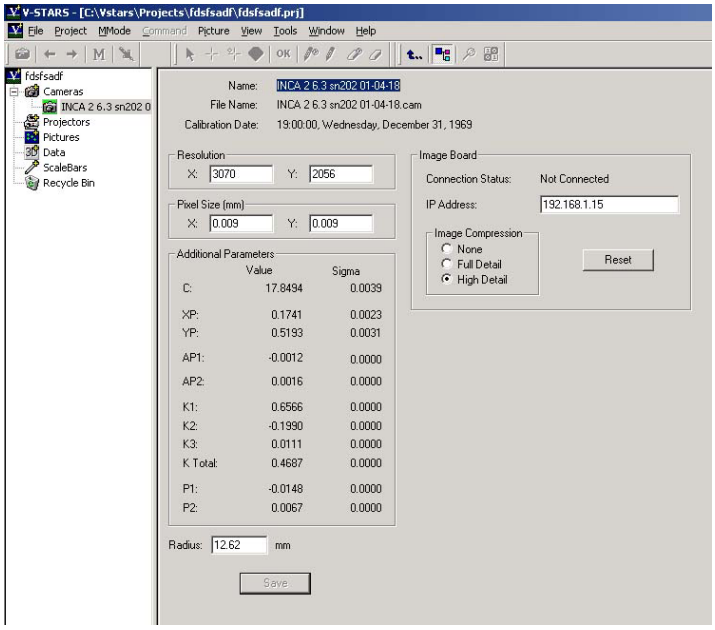
The Probe Point label can now be set to the next free point label available in a sequence. For example LINE1_* will give the next label in the sequence LINE1_1, LINE1_2, etc. that is not used. This is useful for cases where you are jumping between point labels and can't recall the last point used in a string.

IP Address

The way in which the cameras are networked has been simplified. The con and dan files are no longer needed. The IP address is now stored in the camera file. Cameras that already have the right con and dan files will be automatically modified to include the IP address when the new version is run. Alternatively the IP address can be added to the cam file by adding the following text under the General section.

```
ip address=192.168.1.15
```

The IP information will be listed in the camera summary for the camera. The summary also lists the connection status of the camera.



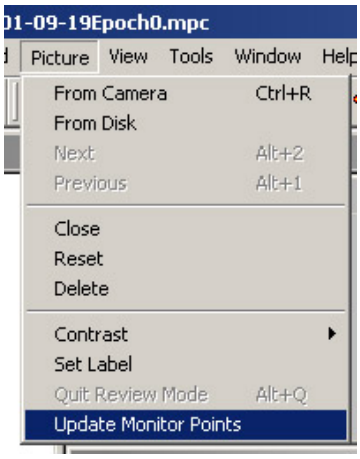
The connection to the camera can be reset from this summary by using the Reset button. The Image Compression can also be changed.

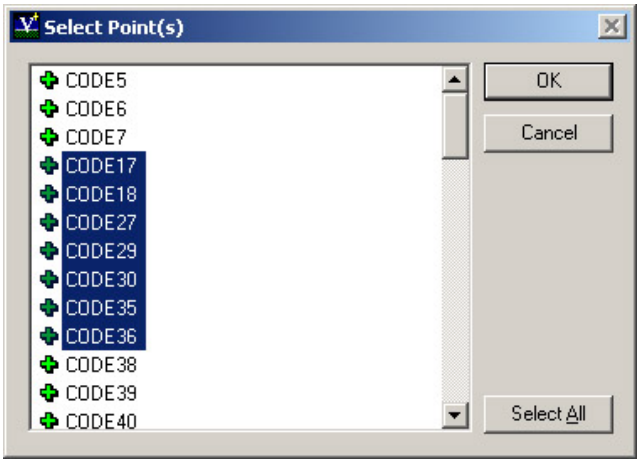
The IP address can also be changed for the camera from within V-STARS as shown above. Please note that any changes made are only valid in the local V-STARS directory. To make the changes global, the system camera calibration file needs to be updated.

M-Mode Stable Mode Monitoring

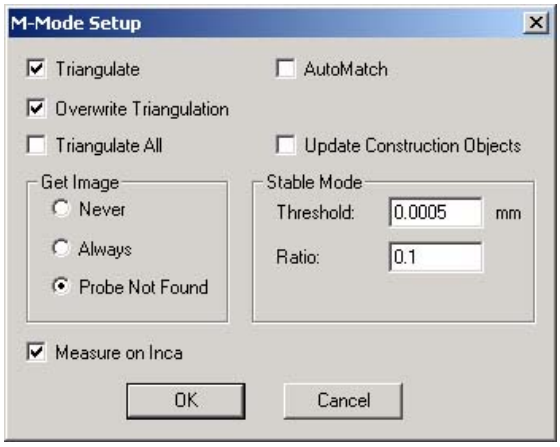
When operating in Stable Mode, the resection targets can be monitored for signs that the cameras are not stable. The stability is determined by comparing the camera image space resection values to the values when the system was put into stable mode. The procedure to use the monitoring points is as follows.

- Use the icon to perform the "Unstable Camera Orientation"
- Select "Stable" from the M-Mode Menu
- Click on the title bar of the first image.
- Go to the Picture Menu and select "Update Monitor Points"
- Use the dialog to select the points you wish to use and then press OK
- Click on the second photo and repeat the process. You are not required to select the same points.





- Open the M-Mode Setup Dialog to change the Threshold and Ratio values.

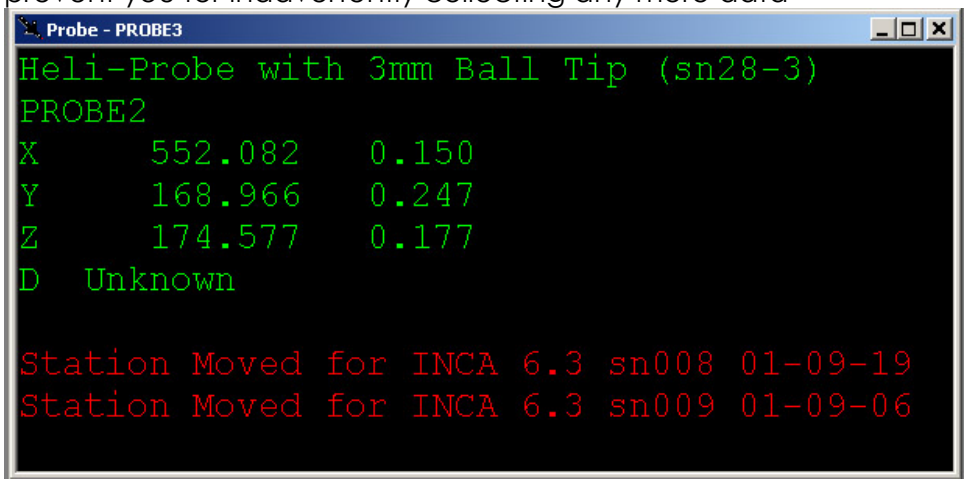


The "threshold" is compared to the image space difference between the last epoch and original resection value for each of the monitor points selected.

If the Threshold is set to "-1" the test is disabled. We strongly recommend that you **do not** disable the test. The default value is 0.0005mm (0.5μm). If your resection closures are high to start with you may want to raise the value to 0.001mm (1μm). You should however address why the resection values are so high. Please refer to your V-STARS/M user manual for more information on how to do this.

The "Stable Mode" Ratio is the percentage of the resection points that are allowed to be greater than the Threshold before the camera station is flagged as unstable. The default value is 10%

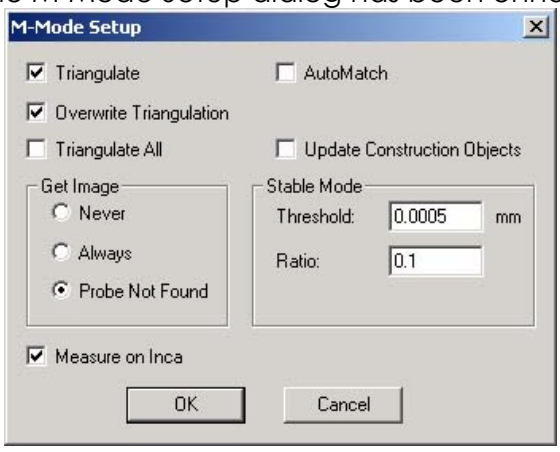
- If the ratio test fails a message will be displayed in the Probe Window indicating that the cameras have moved. The Trigger will be disabled to prevent you for inadvertently collecting any more data



When the above message appears you will need to get out of M-Mode and repeat the procedure described.

M-Mode Setup Dialog

The functionality in the M-Mode Setup dialog has been enhanced.



When AutoMatch is checked, the file produced is called Triangulation. In fact, no matter what you have checked, the resulting file is called Triangulation.

The “Get Image” and “Stable Mode” options have been added to the M-Mode Setup dialog.

The “Get Image” section allows you to specify the conditions in which images will be transferred to the host computer after an M-mode trigger. The default option is to transfer images only after a “Probe Not Found” state has been detected.

M-Mode Remote Trigger

The remote trigger will now remain active after getting out of M-Mode. In previous versions the trigger would have to be re-activated each time the system was put back into M-Mode. To deactivate the trigger simply select it from the M-Mode menu.

V-STARS Bug Fixes

The following bugs have been fixed in V-STARS 4.3

- In M-Mode, when the probe was not found, images were sent even if no enabled probes in project. Now when the probe is not found, images are only sent when probes are present.
- Automatched points (ie "TARGETXXXX"), not used in Unstable Camera Orientation. This has been changed and now all points are used in the Unstable Orientation.
- When switching between F and C in scale bar form view, temperature was not converted.
- The image path was not correctly set for the V-STARS tutorials when V-STARS was installed somewhere other than the C drive. ·
- The offsets for the transformation points used in the AutoRelabel function were not copied over.
- The Offset value for the plane constructor was not converted when the project units were changed.
- Problems with the SuperFind feature have been fixed.
- A divide by zero bug was removed when completing an axis alignment under certain conditions.
- Problem with incorrect values in the Bundle Summary being displayed after the project units were changed has been fixed.