

V-STARS 4.2 Release Notes

V-STARS 4.2 Beta Release Notes	1
Introduction	2
V-STARS S-Mode Features	3
Point SuperFind.....	3
Coded Target Nugget Measurement.....	4
Enable/Disable Scale Bars	5
Picture Contrast Control	6
Zoom Data Window Stays Open	6
New, More Accurate Centroiding Algorithm Used.....	7
Target Filters Added.....	7
AutoMatching Improved.....	8
Support for New PRO-SPOT Projector Added	9
Bundle Changes	10
New Buttons Added	10
Bundle Sub-sampling Improved.....	11
Bundle Automatic Scale Rejection Added.....	14
RSS Accuracy Estimate Added.....	15
Bundle Can Be Continued After Stopping.....	16
New 3D Viewer and Solids Features	17
New Alignment Options.....	17
Solids Certified by PTB.....	18
Direct Export of Planes, Lines, Circles and Spheres.....	19
IGES Functions Are Improved.....	19
More Graphical Hot Keys Added	19
Other New Features	20
Faster Point Listing	20
Tools Menu Now Customizable.....	20
Move Data From Design to Measured	21
Zipping a Project.....	21
Export to Third Party Packages Increased.....	22
Merge 3D files.....	22
V-STARS/M Mode Features	23
M-Mode Setup	23
Construction Bar Improved	24
Support for Coded Target Offset Rods Added	26
V-STARS Bug Fixes	27

Introduction

The following release notes describe the significant new features that are available in V-STARS Version 4.2. A more comprehensive description of the features described herein will be available in the new V-STARS Manual that will be released with the formal release of the software.

The release notes also describe many of the software irregularities (bugs) that have been corrected since the previous release. (V-STARS 4.1 SR4.)

Please keep in mind that this is Beta software and should be treated as such. All care has been taken to ensure that the software is functional and operates as it should. However, until it has been officially released, we advise you to continue using release software for critical jobs.

This software has passed all our 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 does. 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 formal release.

As we are aiming for a formal release of the software in October 2000, we regret we will be unable to incorporate any more new features into this 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.

V-STARS S-Mode Features

The following features are used in S-Mode measurements.

Point SuperFind

Description

This feature allows new points to be measured in all images (in which they exist) by measuring them in a single image. The point is measured in the current picture and then automatically in any other pictures that see the point. The point is then automatically triangulated and added to the current driver file. SuperFind is especially useful for picking up occasional points that were not AutoMatched, or for re-measuring points that were inadvertently deleted. For best results you should usually re-run the bundle after you have measured any new points with SuperFind.

To complete the same process in Version 4.1 it would be necessary to measure the same point in at least two different pictures, triangulate the point, driveback to all the other pictures and then re-bundle with the new point/s.


Conditions


For SuperFind to work, you must have a good solution for the camera calibration, and a good resection solution for each picture. Normally, you will use SuperFind after you have let the AutoMeasure process run to conclusion. In this case, you will have a converged bundle solution so the conditions above will be met. You can also use SuperFind after the AutoMatch portion of AutoMeasure is completed, but your success will depend on how good the camera and picture solutions are at that time.

Implementation

This feature is implemented in much the same way you globally relabel a point.

1. Open the picture that has the point(s) that you wish to measure.

2. Select the SuperFind cursor  from  the measurement toolbar.

3. The cursor will change to the shape of the SuperFind cursor. 
4. Type in the point label that you wish to assign to the new point.
5. Move the point inside the measurement window.
6. Click on the point. The point should now be marked with a cross and labeled.
7. Repeat steps 3-6 for any other points. If there are other points you want to measure that are not in this picture, just close the current picture, and open those picture(s) one at a time and repeat steps 3-6.
8. The 3D coordinates of the points will be automatically added to the current driver file. For the highest accuracy you should re-run the bundle after all points are measured.

Trouble Shooting – Point not found.

The point must be in at least three pictures for SuperFind to work. If the point is not measured, the point will not be marked with a cross or relabeled. Otherwise, the point will be added to the current driver file. If you know the point is in at least three pictures, but is not measured, then the camera and/or picture solutions are probably not good enough to use SuperFind yet. If this is the case it is advisable to run the bundle to get a better solution.

Coded Target Nugget Measurement

Description

In V-STARS 4.2, the square targets in a coded target (called the “nuggets”) can be measured just like the central target. This means that every time a code is seen, eight targets are measured. (Seven nuggets and one central point.)

This is very useful when a picture cannot be automatically measured because it has less than four known coded targets. By turning coded nuggets on, you can often automatically measure a picture that has only three (and sometimes only two) coded targets. This capability also supports a new kind of target developed by GSI that can greatly automate the measurement of certain geometrical features. These new targets are called Feature Targets, and they are described in Appendix A.

NOTE: The images must be scanned/re-scanned in order for the nuggets to be measured.

Implementation

1. To switch on the coded targets nuggets open the **Advanced Edit** dialog **Project -> Advanced Edit**) and click on the **Coded Target** button. The dialog box shown here will appear.
2. Check the **Target Nuggets** box.
3. Run AutoMeasure and press the **Start** button. This is necessary to re-scan the images to find the code nuggets.

Coded Target Setup

Cluster Nearness Factor: Ringed Targets

Code Size

Unknown

Small (3 mm)

Medium (6 mm)

Large (12 mm)

Cluster Size

Minimum:

Maximum:

Thresholds

Cross Distance:

Cross Ratio:

Slope Delta:

Proportion:

Code Closeness:

Affine Rejection:

Target Nuggets

Considerations

Although measuring the coded target nuggets can be a handy way to automatically measure a picture, there are a few things that need to be considered. In cases where only one or two codes are seen in a picture, the picture solution will be very weak and may fail. If it fails, you will have to measure the picture manually if you want to use it. Even if it passes, be aware that the weak picture solution may cause problems later on. Measuring the code nuggets are meant to help you out of tight spots and are not a substitute for good planning and preparation.

Enable/Disable Scale Bars

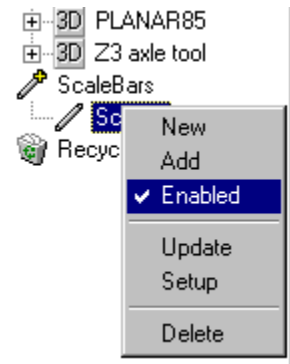
Description

Scale bars can be enabled or disabled from within V-STARS. In previous versions it would be necessary to delete the scale bar or change one of the point labels to disable the bar.

Implementation

Scale bars are enabled or disabled in a similar manner to pictures. You can enable or disable an individual bar by doing the following:

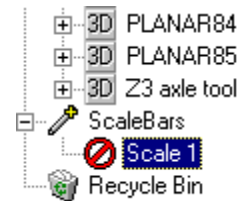
1. Hover over the scale bar you wish to enable/disable and right click.
2. Select Enabled to change the status of the bar.



You can also enable or disable multiple bars by doing the following:

1. Right click on the scale bars icon, and select Enabled.
2. Multi-select the bars whose status you wish to change.
3. Press the OK button.

Disabled scale bars will be displayed with a disabled icon.



Picture Contrast Control

Description

It is now possible to adjust the picture contrast without having to right click and select the contrast. This is shown in the adjacent image.

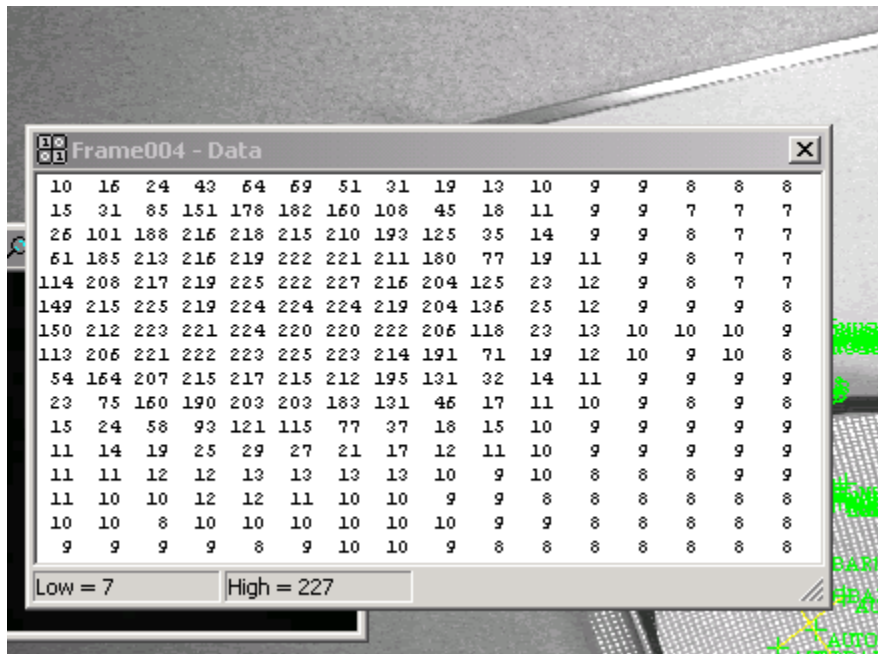
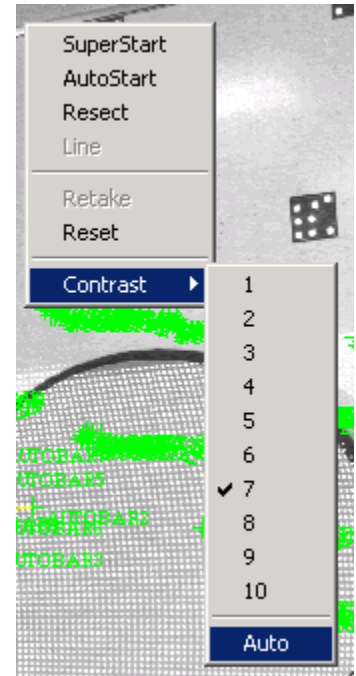
Implementation

1. Open an image
2. Hold down the CTRL key while using the left and right arrows to change the contrast.

Zoom Data Window Stays Open

Description

In previous versions of V-STARS the Zoom Data window shown below would close automatically when the picture was closed. This meant that the window had to be re-opened in the next picture. In V-STARS 4.2 the window will remain open until closed by the user.



New, More Accurate Centroiding Algorithm Used

Description

The accuracy of the target centroiding algorithm has been improved. The new algorithm is also less sensitive to the background of the target. It is recommended that this new algorithm be used. The new algorithm is automatically enabled during the 4.2 installation. If you want to disable it, do the following:

1. Open the global GSI32.INI file. On NT and 2000 machines this should be in the WINNT directory. On WINDOWS95/98 machines this should be in the WINDOWS directory.
2. Change the entry in the [scan] section
new centroiding=true to
new centroiding=false. Case does not matter.
3. Close the file. The old algorithm will be used on all future projects.
4. To enable the new centroiding set the option to TRUE.

NOTE: The old algorithm will be used for versions prior to 4.2 no matter what the setting of the "new centroiding" variable.

Target Filters Added

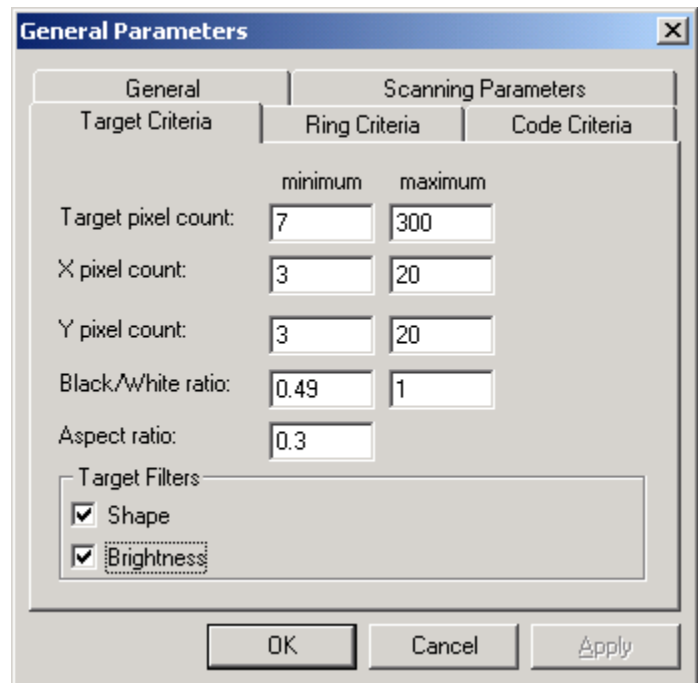
Description

New target filters that are very effective in removing false targets have been added. This, in turn makes AutoMatching faster and more reliable. In some cases, they will remove legitimate targets. If so, this is generally because those targets are of poor quality and will be rejected in the Bundle adjustment anyway. One filter removes targets whose shape is unacceptable (Shape Filter); the other filters out targets that are too dim (Brightness Filter).

Implementation

The target filters are automatically enabled during the 4.2 installation. To disable them, do the following:

1. Open the Advanced Edit dialog box by selecting **Project->Advanced Edit**.
2. Click on the **General** button in the Setup area of the dialog box.
3. Click on the **Target Criteria** tab.



4. In the Target Criteria dialog box, uncheck the **Shape** checkbox to turn off the shape filter.
5. Uncheck the **Brightness** checkbox to turn off the brightness filter.

NOTE: An easy way to check which targets are removed by these filters is to select **Target Search** under the **Command** menu. This will scan a picture for targets without using these new filters. Then if you AutoStart or SuperStart a picture in the usual manner you will see only targets that have passed the filters.

NOTE: If you are using the PRO-SPOT target projector, these filters may remove legitimate projected targets depending on the quality of the surface. If you want to measure all possible projected points turn off these filters.

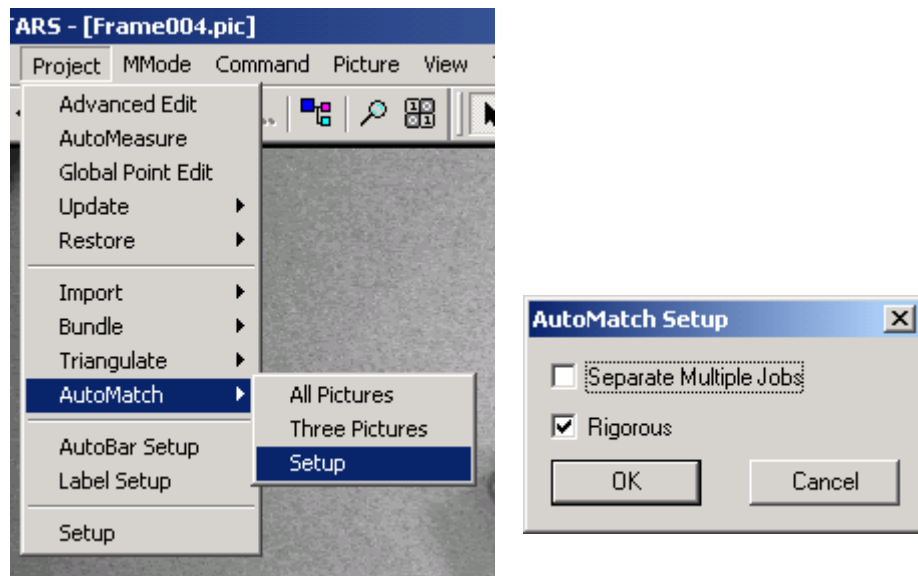
AutoMatching Improved

Description

AutoMatching is faster and more reliable. Users should notice speed improvements and fewer missed points. Also, you can choose a new, more rigorous mode of AutoMatching that is more reliable, but in some cases slower, especially for large data sets (>~20 pictures).

Implementation

To select the new rigorous mode, select **Project-> AutoMatch-> Setup**, and click on the rigorous check box.



Support for New PRO-SPOT Projector Added

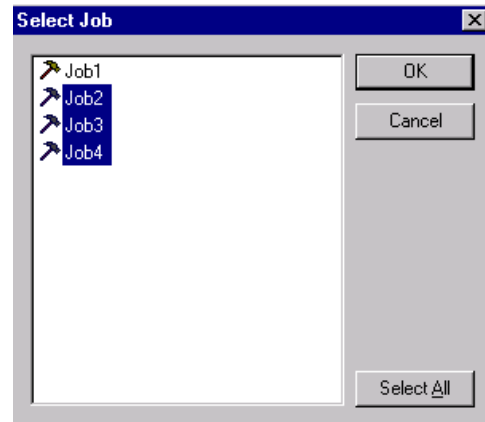
Description

Some new features have been added for GSI's new PRO-SPOT target projector. No special adjustments to the software are needed when a measurement has a single setup of the projector. However, when doing a PRO-SPOT measurement with multiple projector setups, (for example to increase the density of points or to measure a larger area than can be covered in one setup), some software adjustments are needed.

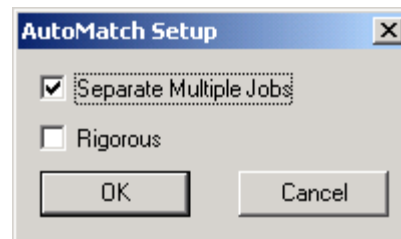
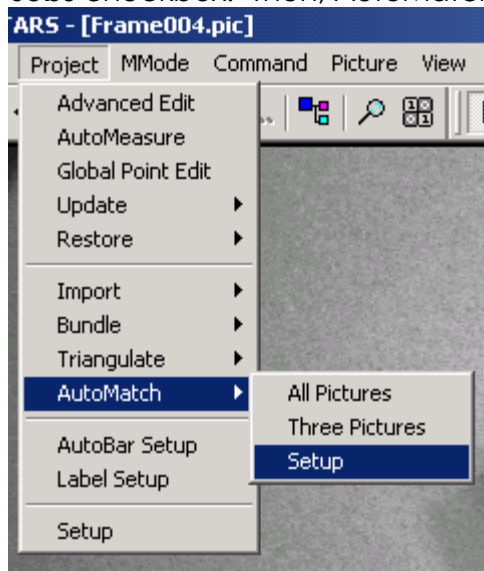
The standard procedure when doing a multiple projector setup measurement is to store the pictures for each setup in a separate Job directory on the INCA camera's disk. Then, V-STARS can be setup to treat each Job's pictures as a separate AutoMatch set and therefore eliminate any confusion about projected points that are very close together.

Implementation

There are two selections that must be made to use PRO-SPOT with multiple setups. First, instead of selecting a single job directory containing the pictures for the project, as is normally the case, you must select all the Job directories used for the different setups. An example of this is shown below where Jobs 2, 3 and 4 are selected for the project (Job1 has another project's pictures). Second, you must tell V-STARS to separate the Jobs into separate groups for AutoMatching.



You do this by selecting **Project->AutoMatch->Setup** and checking the **Separate Multiple Jobs** checkbox. Then, AutoMatching will not match targets across jobs.



Bundle Changes

Description

The main Bundle dialog box has changed to incorporate some new buttons and features. The new Bundle dialog is shown below.

The screenshot shows the 'Bundle' dialog box with the following fields and buttons:

- Status: []
- Rejection Limit: 1.82
- Current Point: []
- Residual RMS: []
- Pictures**
 - Total: 35
 - Weak: 0
 - Bad: 0
 - More...
- Points**
 - Total: 380
 - Weak: 1
 - Bad: 0
 - Two Ray: 0
 - More...
- Scales**
 - Total: 0
 - Weak: 0
 - Bad: 0
 - RMS: N/A
 - More...
- Cameras**
 - More...
- Control Points**
 - N/A
 - More...
- Initial Bundle
- Accuracy**
 - RMS: X [] Y [] Z []
 - Max: X [] Y [] Z []
 - More...
 - Points over limit: []
 - Plan Quality Factor: []
 - RMS of Measurements: []
- Buttons: Setup, Save Info, Start, Reject, Close

New Buttons Added

Description

Setup and **Save Info** buttons have been added to the Bundle dialog box.

Implementation

The **Setup** button will take the user directly to the Bundle Setup dialog. In previous versions the user had to exit the Bundle to make changes to the setup.

The **Save Info** button will save the bundle summary dialog's information into a text file. This is particularly useful if the user wishes to review the Bundle Summary at a later date or include the summary in a report.

A typical Bundle summary is shown below:

Bundle Dialog Information

Status: Bundle Converged after 2 Iterations
Current Point:
Rejection Limit: 0.86um
Residual RMS:
0: 0.22um
1: 0.22um
2: 0.22um

Pictures

Total: 19
Weak: 0
Bad: 0

Points

Total: 175
Weak: 0
Bad: 0
Two Ray: 0

Scales

Total: 0
Weak: 0
Bad: 0
RMS: N/A

Control Points

Control Points: N/A

Accuracy

RMS:
X: 0.019
Y: 0.008
Z: 0.009

Max:
X: 0.039
Y: 0.014
Z: 0.017

Points over limit: 0
Plan Quality Factor: 1.05
RMS of Measurements: 0.22um

Bundle Sub-sampling Improved

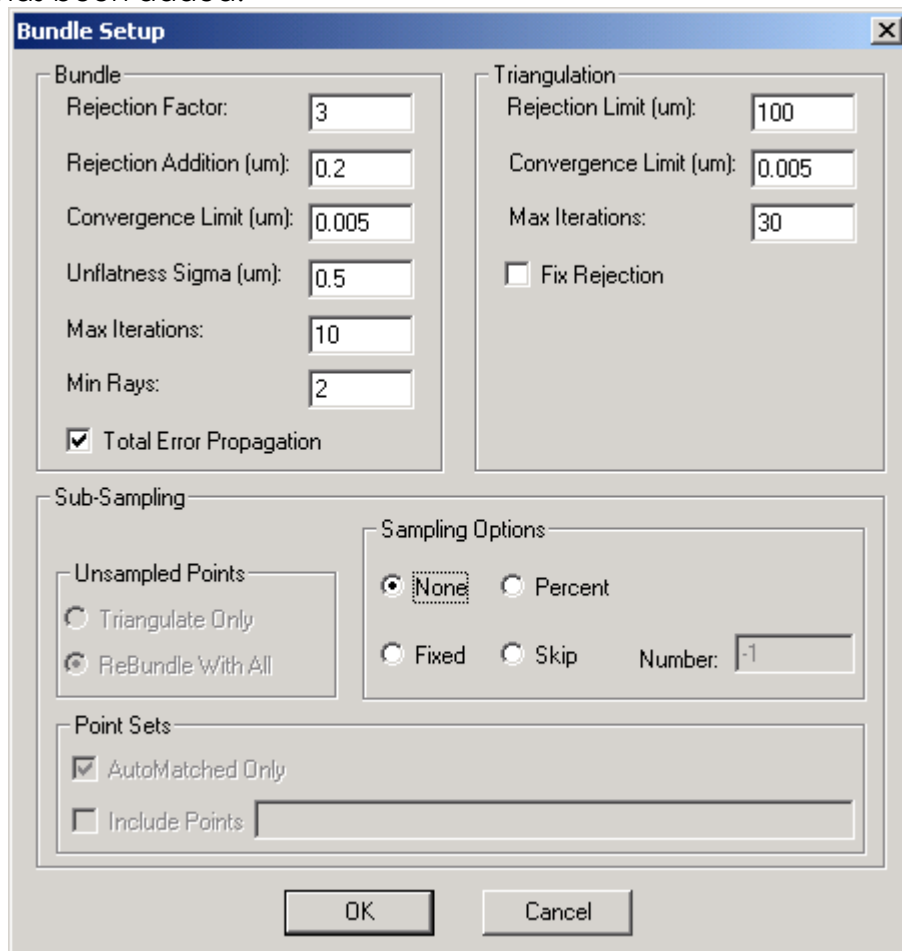
Description

This feature has been enhanced and is very useful for jobs with large numbers of points (such as PRO-SPOT projects). Sub-sampling can greatly reduce the time for processing the data while having insignificant effects on accuracy (if used

properly). To understand what sub-sampling does, a brief explanation of the bundle processing is warranted. In the first step of the processing, the bundle adjustment iteratively solves for the camera calibration and the picture solutions. Then, with this information available, all the points are triangulated to produce their final 3D coordinates. In the past, all the available points were used in the time-consuming bundle adjustment portion. Now, by a judicious selection of a subset of the points, the user can greatly improve the speed of the processing while not significantly affecting accuracy. The time for the bundle adjustment is proportional to the number of points, so if you sub-sample 200 points of a 1000 point measurement, the bundle will run 5 times faster.

Implementation

Sub-sampling is selected via the Bundle Setup dialog box which can be reached from the main menu or now directly from the Bundle Main Dialog. The new dialog box appears as follows. The main difference is that the Sub-Sample section has been added.

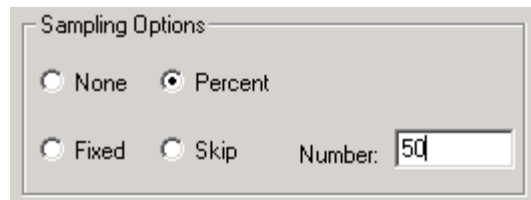


NOTE: Coded targets (and their nuggets, if enabled), and control points are always included in the bundle adjustment. They cannot be sub-sampled.

There are four main Sub-Sampling options as described below.

- 1) **None** – when selected the Sub-Sampling will be disabled. In this mode all the input areas are grayed out. All points will be used in the bundle adjustment.
- 2) **Percent** - The Percent option will use the specified percentage of the total number of sub-samplable points. This percentage is set in the Number input box.
- 3) **Fixed** – The Fixed option will use a fixed number of the total sub-samplable points. The number of points is set in the Number input box.
- 4) **Skip** – The Skip option will select every n^{th} sub-samplable point as it is encountered. Once again n is defined in the Number input box.

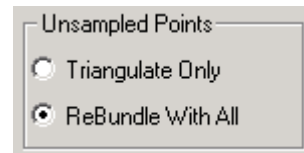
NOTE: By default the number input box is set to -1. Please enter an appropriate number once you have decided on the type of sub-sampling you wish to do.



NOTE: In sub-sampling, the software selects the points from the set of sub-samplable points by selecting every n^{th} point in the measurement (points are ordered alphanumerically by label); n is determined by the sub-sampling option chosen above.

If a sub-sampling option is selected, additional options are available. These are:

Triangulate Only or Re-Bundle - When the bundle solution using the sub-sampled set of points is complete, you have two choices. You can select **Triangulate Only** to use that solution to triangulate all the points. Or, by selecting **ReBundle with All**, you can automatically re-run the bundle adjustment using all the points and use that solution to triangulate all the points. The first choice is faster; the second choice is more accurate (however, the accuracy improvement should be negligible if you have selected a good sub-sample set; see Note below).



AutoMatch Only Checkbox – When checked, only AutoMatched points will be sub-sampled. AutoMatched points begin with the prefix TARGET. All other points will be included in the bundle adjustment. When unchecked, all points (except codes, nuggets, and control, see above) will be sub-sampled.

Include Points Checkbox - The include points option will include in the bundle any of the



points that are listed in the adjacent text box. The text box supports the "*" and "?" wildcards. Multiple strings can be entered; a space or a comma must separate them; case does not matter. A range of points can be specified by separating them with the ">" symbol (i.e. "line1 > line120" would include all points

with labels from line1 to line120 inclusive); spaces are allowed between the > symbol and the two labels.

NOTE: Users should be careful when sub-sampling. Make sure there are still enough points in the bundle adjustment to get a good solution. This means you should have at least 20 well-distributed points (preferably 40) in each picture, and at least 50 well-distributed points (preferably 100) total. When in doubt about the number of points or whether they are well distributed, include more points. Also, make sure that any tie and/or fill points you have used for the measurement are included in the sub-sampled data set.

Bundle Automatic Scale Rejection Added

The bundle now can automatically reject scale bars based on criteria defined in the GSI32.ini file. Criteria are provided for rejecting scale bars with deviations that are large relative to the other scale bars (as defined by the RMS of their deviations), or larger than a fixed value.

By default this feature is disabled (-1). The following lines in the GSI32.ini file control the scale bar rejection.

`scalebar rejection factor=-1` < 0 : Relative scale bar rejection disabled.
 > 0 : Multiply RMS of all scale bars by this factor to get the rejection limit.

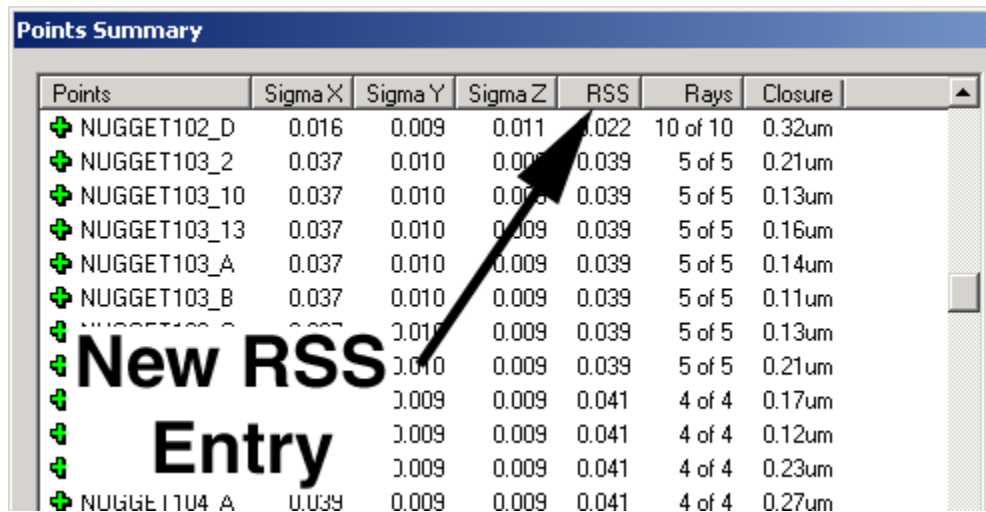
`scalebar rejection value=-1` < 0: Absolute scale bar rejection disabled.
 > 0: Any scale bar deviation with an absolute value greater than this value is rejected.
NOTE: The units for this value are defined by the "accuracy units" variable in the GSI32.INI file.

RSS Accuracy Estimate Added

The RSS accuracy estimate is now added to the bundle points summary. RSS stands for square Root of the Sum of Squares. The formula for the RSS accuracy of a point is:

$$RSS = (X_{accuracy}^2 + Y_{accuracy}^2 + Z_{accuracy}^2)^{1/2}$$

The RSS is a useful statistic that combines together the separate coordinate accuracy estimates into one meaningful quantity. It represents the accuracy estimate of the distance of the measured point from its true value.

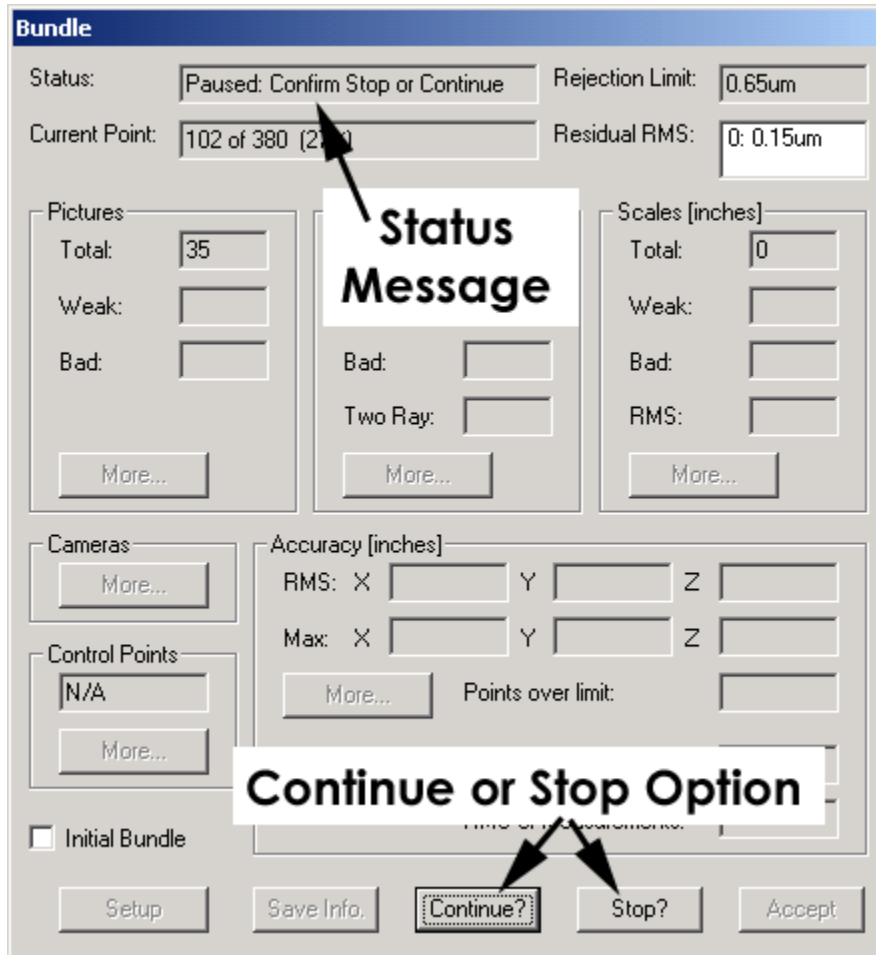


Points	Sigma X	Sigma Y	Sigma Z	RSS	Rays	Closure
+	0.016	0.009	0.011	0.022	10 of 10	0.32um
+	0.037	0.010	0.009	0.039	5 of 5	0.21um
+	0.037	0.010	0.009	0.039	5 of 5	0.13um
+	0.037	0.010	0.009	0.039	5 of 5	0.16um
+	0.037	0.010	0.009	0.039	5 of 5	0.14um
+	0.037	0.010	0.009	0.039	5 of 5	0.11um
+	0.037	0.010	0.009	0.039	5 of 5	0.13um
+	0.037	0.010	0.009	0.039	5 of 5	0.21um
+	0.037	0.009	0.009	0.041	4 of 4	0.17um
+	0.037	0.009	0.009	0.041	4 of 4	0.12um
+	0.037	0.009	0.009	0.041	4 of 4	0.23um
+	0.039	0.009	0.009	0.041	4 of 4	0.27um

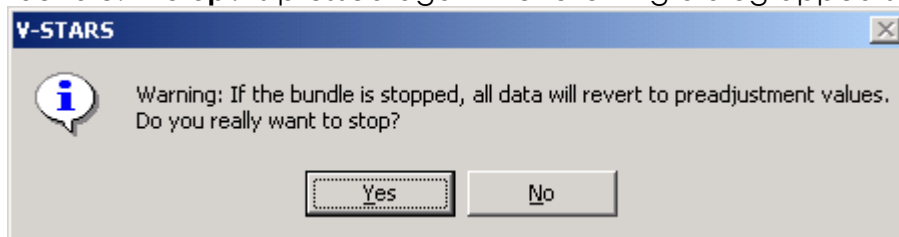
New RSS Entry

Bundle Can Be Continued After Stopping

The bundle adjustment can now be continued after it is stopped. In the past if the user pressed the **Stop** button there was no way to restart the bundle. (Also, to make inadvertently pressing the **Stop** button less likely, it has been relocated.) There are now options to re-start the bundle. When stopped the dialog buttons will change as shown in the dialog below.



Press **Continue?** to continue from where the bundle stopped, or **Stop?** to stop the bundle. If **Stop?** is pressed again the following dialog appears.



Press **Yes** to stop the bundle and revert to its original starting values. Press **No** to continue the Bundle process.

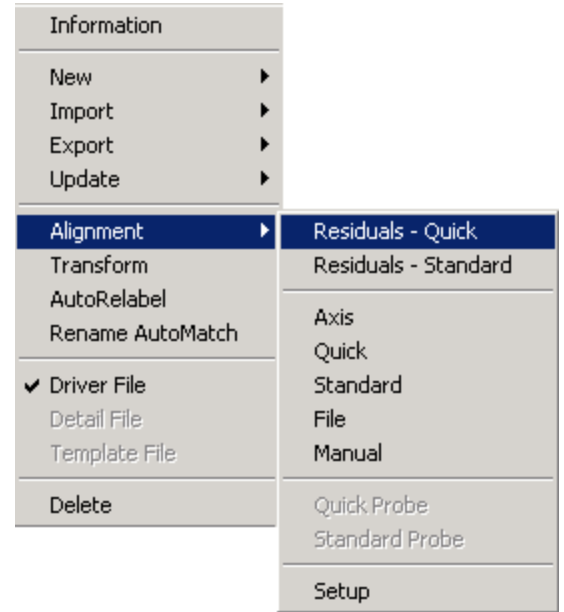
New 3D Viewer and Solids Features

New Alignment Options

Description

V-STARs 4.2 now has enhanced alignment features. The new Alignment options are shown in the adjacent image. They are:

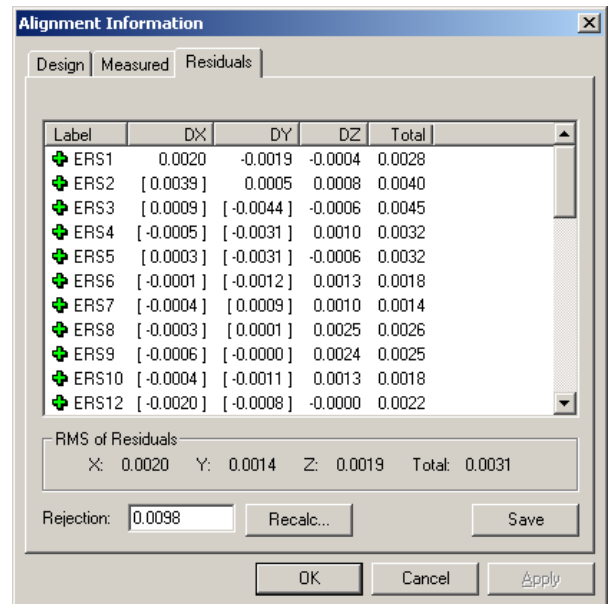
1. You can now view the residuals after an alignment in Quick or Standard form. In Standard form, residuals for points that were not included in the alignment are bracketed, and are not included in the RMS calculations.
2. The **File** alignment allows the user to perform a transformation using a transformation file that is in a compatible third party package's format. Currently, file transformation formats from CATS and HoloS are supported.
3. The **Manual** alignment can be used to manually shift, rotate or scale a 3D file into a new position.



Implementation – Residuals Quick/Standard

Selecting the **Residuals – Quick** option will display the usual residuals dialog. However, selecting the **Residuals – Standard** will display a dialog similar to the one below. The dialog has brackets around any residuals that were not included in the standard transformation (due to their sigmas not being fixed). Also, the statistics at the bottom of the display will not include any bracketed values in their calculation.

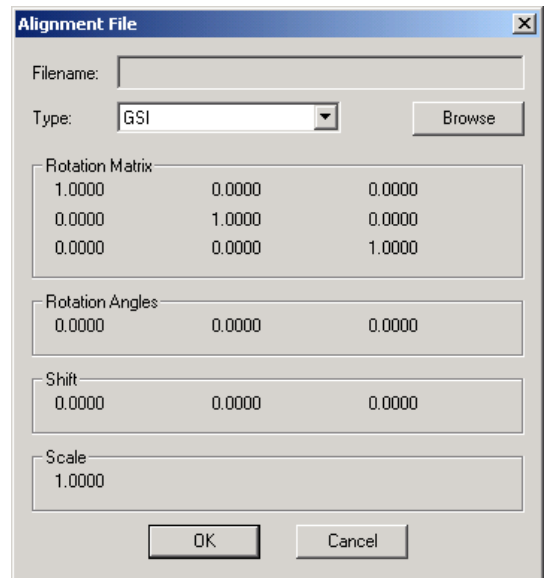
Point Label	X	Y	Z	Sigma X	Sigma Y	Sigma Z
ERS1	298.4934	21.9827	146.2924	FIXED	FIXED	FIXED
ERS2	298.4948	-0.2246	151.4334	APPROX	FIXED	FIXED
ERS3	298.4712	-21.4437	146.4561	APPROX	APPROX	FIXED
ERS4	298.4606	-41.6743	154.9358	UNKNOWN	UNKNOWN	FIXED
ERS5	298.4563	-41.5792	176.3950	UNKNOWN	UNKNOWN	FIXED
ERS6	298.5018	-0.4182	176.8844	UNKNOWN	UNKNOWN	FIXED
ERS7	298.5383	41.5906	154.6425	UNKNOWN	UNKNOWN	FIXED
ERS8	298.5186	41.5327	176.9134	UNKNOWN	UNKNOWN	FIXED
ERS9	298.5411	41.3769	206.1472	UNKNOWN	UNKNOWN	FIXED



Another new feature is that the transformation can be re-computed by typing in a new rejection value and pressing the **Apply** button. The results of the transformation can also be saved using the **Save** button.

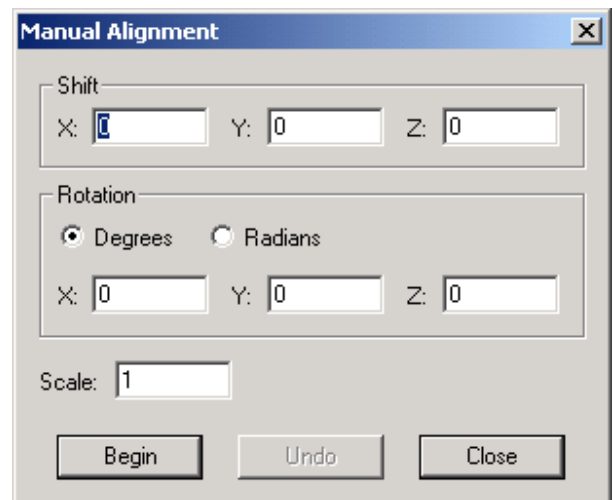
Implementation – File

Selecting the **File** option will display the following dialog. **Browse** to select the file that contains the pre-defined values. Press **OK** to implement the transformation. Currently, transformation files from CATS, HOLOS, and GSI are supported.



Implementation – Manual Alignment

1. Select the 3D file that needs to be manually aligned.
2. Right click and select the **Manual** option. The following dialog will display. You can shift the data in each of the three coordinate axes; you can rotate around each of the three axes, and you can change the scale.
3. To shift the data in X, Y or Z, type the shift values in the boxes and press the **Begin** button. The value in the boxes will be added to every point in the file.
4. To rotate the data around the X, Y, or Z axis, enter the rotation value in the appropriate box, and press the **Begin** button. You may only rotate around one axis at a time. A positive value rotates counter-clockwise around the axis as viewed down the positive axis.
5. To scale the data enter a value in the scale box and press **Begin**. Every point coordinate will be multiplied by the scale value.



NOTE: The **Undo** button will only undo the most recent alignment.

Solids Certified by PTB

Description

Solids has now be officially certified by PTB (Physikalisch-Technische Bundesanstalt). The PTB is the German equivalent of NIST, and tested the geometric algorithms of Solids against standard data sets. For a copy of the certification please contact GSI.

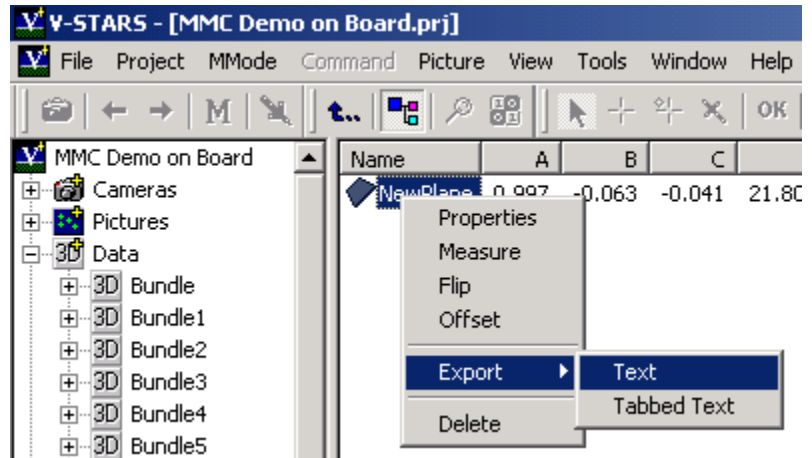
Direct Export of Planes, Lines, Circles and Spheres

Description

Solids can now directly export the results of plane, line, circle and sphere calculations directly to a text file.

Implementation

1. Highlight the object you wish to export. Only one object type can be exported at a time.
2. Right click over the objects and select **Export**. Select **Text** or **Tabbed Text**.
3. Enter a file name and press **Save**.



IGES Functions Are Improved

Description

The IGES reading function has now been improved so that trimmed surfaces are read correctly.

You can also use Wildcards (*) when specifying surfaces. This means that a point or points can be projected or measured to any number of surfaces. For example SURF* is the notation for any surface that starts with the text "SURF".

More Graphical Hot Keys Added

Description

There are now some new hot keys that make V-STARS faster and easier. The following keys have been added:

Command

Enable / Disable Picture Stations
 Resect Selected Picture Stations
 Display stroke Inc / Dec
 Display resolution Inc / Dec
 Enable / Disable selected surfaces
 Enable all surfaces
 Display resolution Inc / Dec
 Display View Setup

Hotkey

Ctrl + E
 Ctrl + R
 Ctrl + 7 / 8
 Ctrl + 9 / 0
 Ctrl + F1
 Shift + Ctrl + F1
 Ctrl + 2 / 1
 ~

Note

Select the Stations first
 Select the Stations first
 V-SURF feature only
 V-SURF feature only
 V-SURF feature only
 V-SURF feature only
 Curve Analysis
 Display the 3D view setup

Other New Features

Faster Point Listing

Description

Point listing is now practically instantaneous. You will no longer have to wait for points to fill in a list.

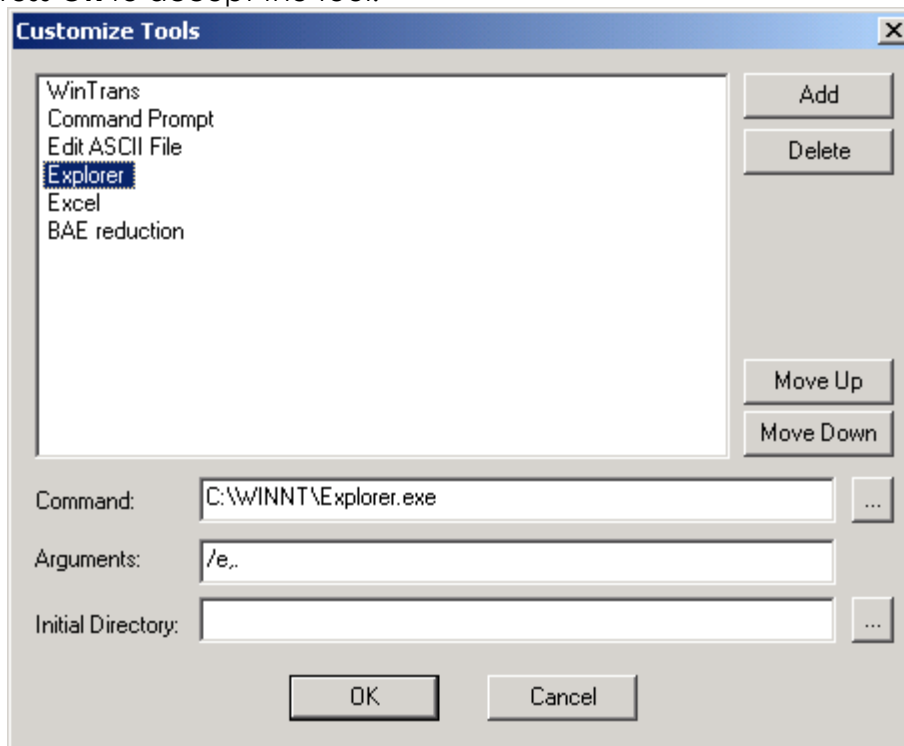
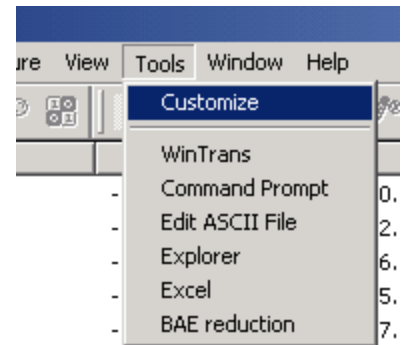
Tools Menu Now Customizable

Description

It is now possible to add programs to the tools menu. This means that users can call programs such as Word, Excel or Explorer directly from V-STARs.

Implementation

1. Select the **Customize** option from the **Tools** Menu.
2. Press the **Add** button to add a new tool.
3. Browse to the appropriate executable using the "..."
button.
4. Enter any relevant arguments.
5. Select the initial directory for any data using the "..."
button. If you want the command to use the
current project directory as the initial directory,
leave this field blank.
6. Press **OK** to accept the tool.



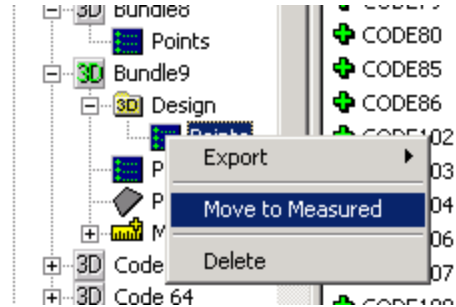
Move Data From Design to Measured

Description

Occasionally it is desirable to move design data into measured data. In previous versions this was tedious as the points had to be copied and then pasted into a new file. V-STARS 4.2 can now directly move the data.

Implementation

1. Open the design folder that contains the data.
2. Right click on the points icon
3. Select **Move to Measured**.



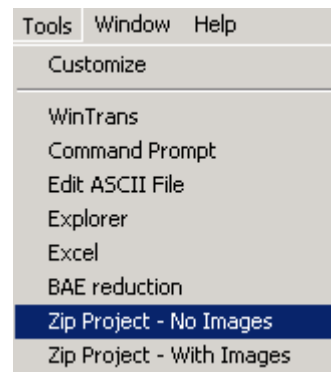
Zipping a Project

Description

You can now easily compress (zip) all project data. This is accomplished using PKZIP. The compressed project is a .zip file that is given the name "*project name.zip*". You have two choices; you can save all data, or all data except the image files (*.gsi files). This feature is useful for saving a completed project in a compressed format that saves space. However, its main use is to allow users to easily zip up the state of a project when a problem or bug is found. Then, you can send the zip file to GSI for analysis. We urge customers to use this feature. Often, as you work around or through a problem, you end up changing the state of the project, and we can no longer reproduce the problem. It will help us tremendously in finding and diagnosing problems if you use this command immediately after finding a problem.

Implementation

To save a project, select either **Zip Project – No Images** or **Zip Project – With Images** from the **Tools** menu. A DOS window will be displayed showing the progress of the ZIP operation. We recommend you not do anything else while the ZIP operation is running. When it is done, the DOS window will disappear, and the data you selected will be saved in a file in the project directory. The file's name will match the name of the project and will have the name "*project name.zip*".



NOTE: The **Zip Project – With Images** command will only zip the .gsi files if they are in the project directory, or a subdirectory of the project directory.

Export to Third Party Packages Increased

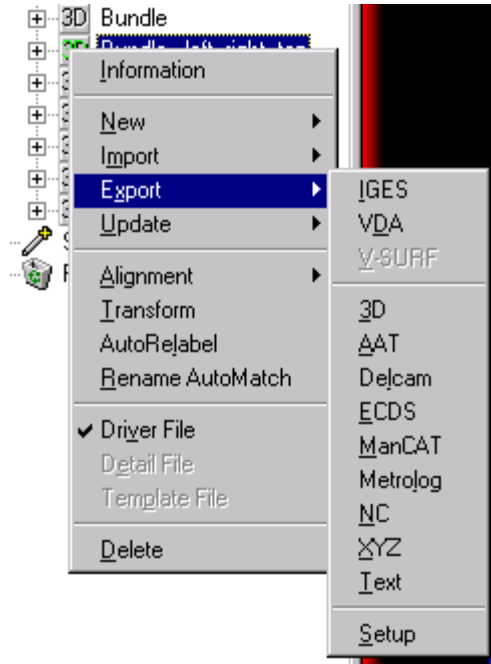
Description

You can now export measurement data to the analysis packages from Metrologic's Metrolog package, and DelCam's Power Inspect package.

Implementation

To export data to either analysis package, do the following:

1. Right-click on the 3D file containing the measurement data, and select **Export** from the menu.
2. Select the package you wish to export to. A dialog box will appear listing a default name for the file that will contain the exported data.
3. When the file name is acceptable, press the **OK** button.



Merge 3D files

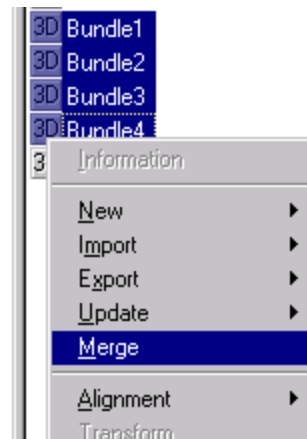
Description

You can now merge several 3D files into a single 3D file. Points with the same label are averaged, and the average values of the points are written to the merged file.

Implementation

To merge a number of files, do the following:

1. Click on the 3D file icon. The names of all the 3D files in the project will appear in the right pane of the window.
2. Select the files you want to merge. The selected files will be highlighted.
3. Right click and select **Merge** from the menu. If **Merge** is grayed out, you have not selected at least two 3D files.
4. A dialog box will appear. Enter the name of the merged data file in the field.
5. Press the **OK** button. The 3D file with the merged data will be saved in the current project.

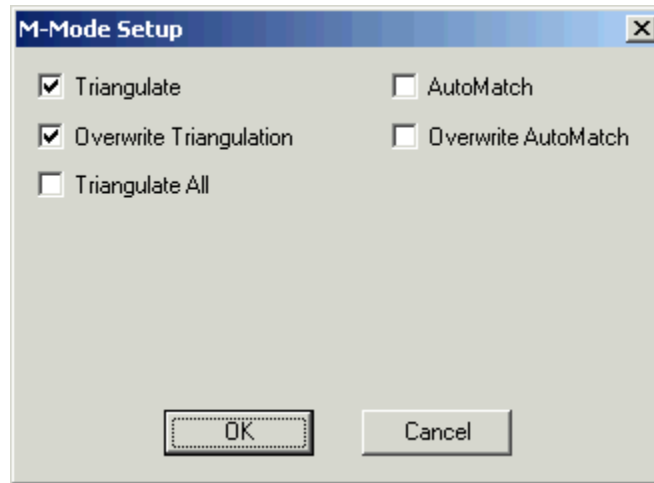


NOTE: Ensure data is in the same coordinate system prior to merging. Merging unaligned data sets will produce unpredictable results.

V-STARs/M Mode Features

The following features are used in M-mode measurements.

M-Mode Setup



It is now possible to edit the M-Mode parameters. The **Setup** dialog is located on the **MMode** menu. The following options are available.

Triangulate

Write new or detail points to a Triangulation file.

Overwrite Triangulation

Overwrite the triangulation file. If this option is unchecked a new triangulation file will be created each time.

Triangulate All

Any points in the detail file and driver file will be triangulated.

AutoMatch

A two station AutoMatch will be run. Keep in mind that this is only based on two images and therefore may not be as reliable as normal AutoMatching.

Overwrite AutoMatch

The AutoMatch file is overwritten after each epoch.

Construction Bar Improved

There have been several improvements when using the construction bar. These include:

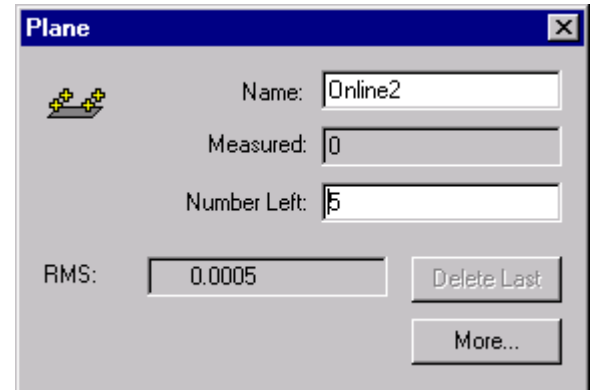
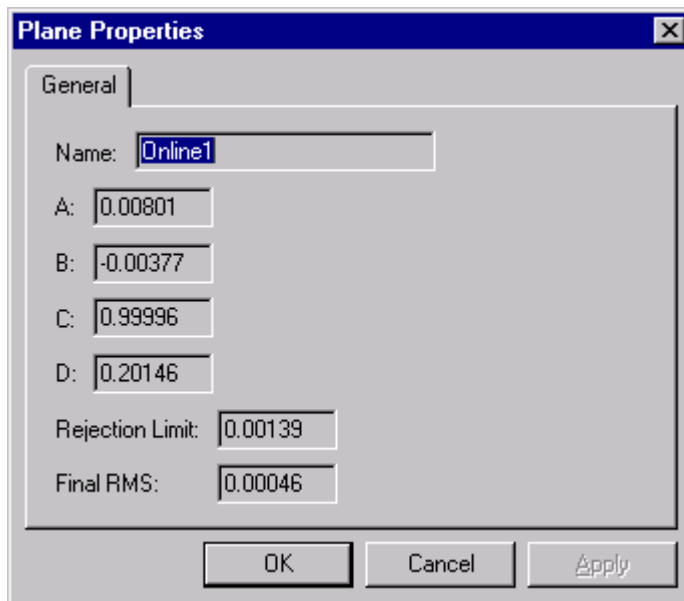
1. You can now change the number of points to probe while probing.
2. You can undo the most recent measurement(s) one at a time,
3. Audible indications are given for various conditions such as feature created, point missed or feature rejected.



Four new features have also been added. They are the create plane, create line, create circle and create sphere constructors.

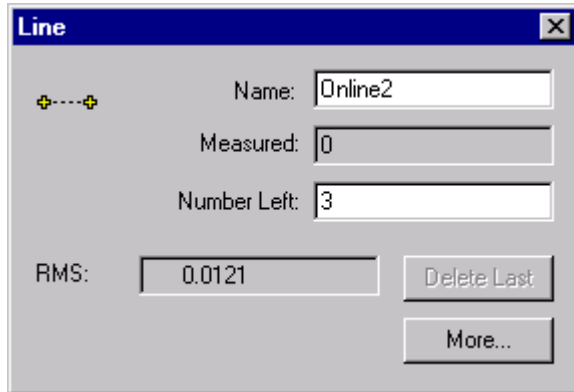
Plane

Use this feature to create a plane. The last point collected is used to define the compensation direction and should be off the plane surface in the direction of the camera. For example in the case below a total of five points were collected. Four of these were on the plane surface. The last point was off the surface. The plane created was offset by the radius of the ball tip in the direction away from the compensation point.



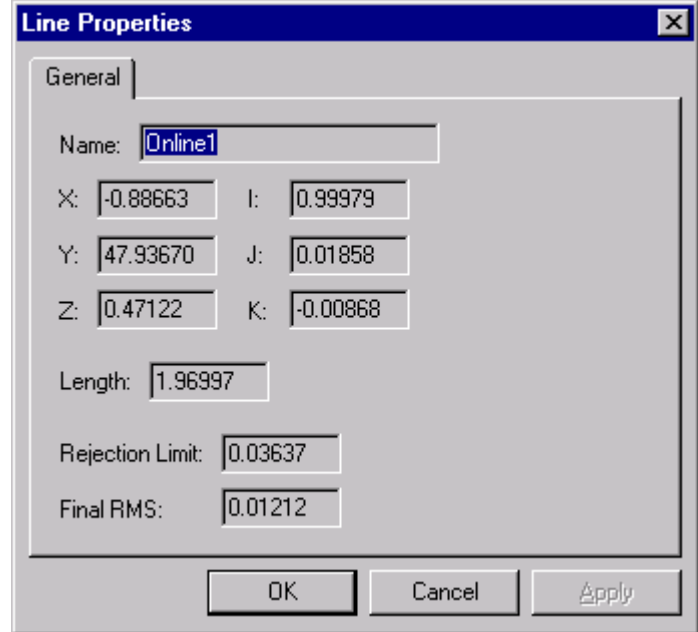
Line

Use this feature to create a best-fit line. Once the data is collected the system will beep twice and the acquired line created.



The 'Line' dialog box contains the following fields and buttons:

- Name:
- Measured:
- Number Left:
- RMS:
- Buttons: and

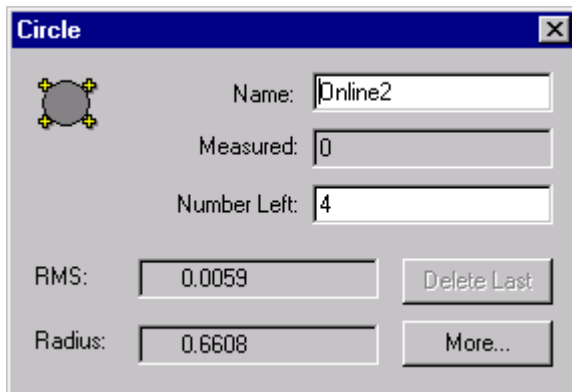


The 'Line Properties' dialog box contains the following fields and buttons:

- General tab
- Name:
- X: I:
- Y: J:
- Z: K:
- Length:
- Rejection Limit:
- Final RMS:
- Buttons: , , and

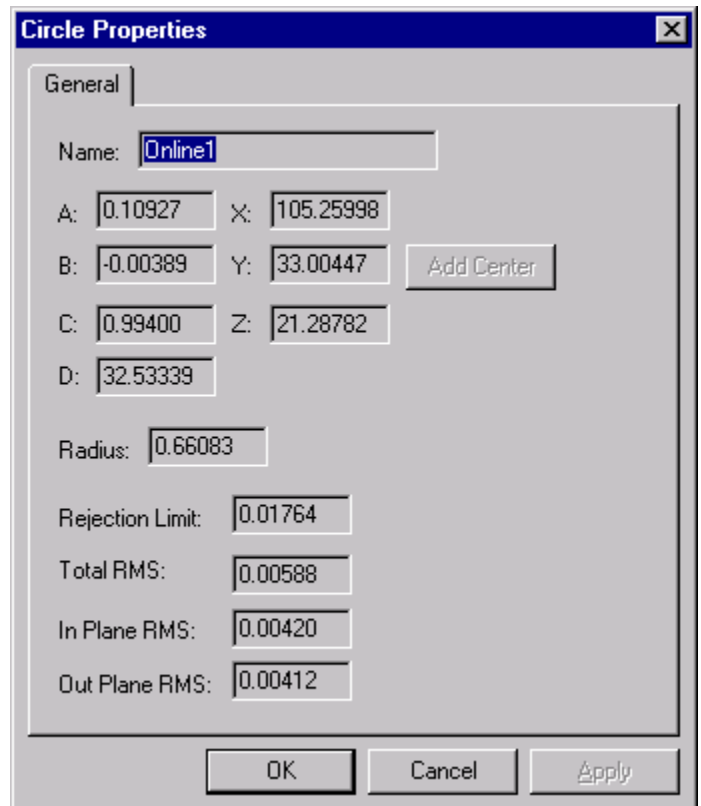
Circle

Use this feature to create a best-fit circle and center (optional).



The 'Circle' dialog box contains the following fields and buttons:

- Name:
- Measured:
- Number Left:
- RMS:
- Radius:
- Buttons: and

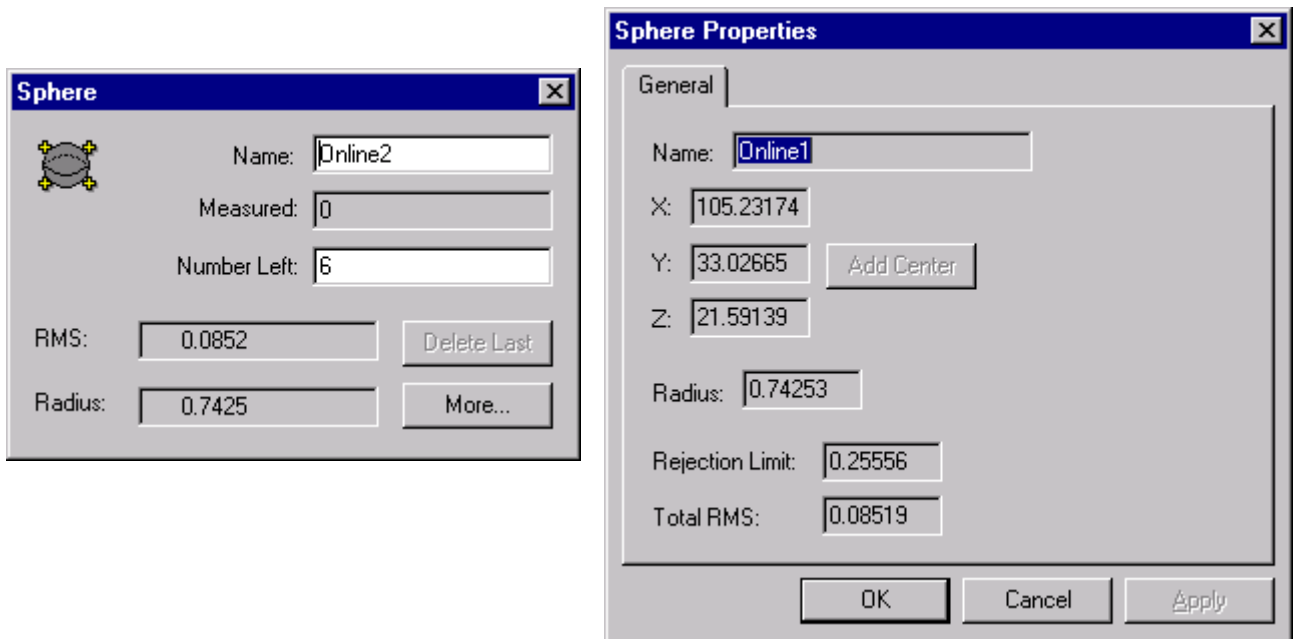


The 'Circle Properties' dialog box contains the following fields and buttons:

- General tab
- Name:
- A: X:
- B: Y:
- C: Z:
- D:
- Radius:
- Rejection Limit:
- Total RMS:
- In Plane RMS:
- Out Plane RMS:
- Buttons: , , and

Sphere

Use this feature to create a best-fit sphere and center point (optional).



Support for Coded Target Offset Rods Added

Description

Our newly developed Coded Target Offset Rods can be used instead of the hand-held probes to measure untargeted points or features. Any practical number can be used at the same time. They are especially useful for the real-time building of parts. In this application, several are typically attached to the part being built, and they are automatically measured by V-STARS no matter where they are located so long as both cameras see the code. They also have the characteristics of Feature Targets (refer to Appendix A) in that they are used to derive the locations of points that are related in some way to the feature being measured.

Implementation

We will be providing an application note in the future on the use of Coded Target Offset Rods.



V-STARS Bug Fixes

The following bugs have been fixed in V-STARS 4.1

- Zero length scale bars no longer allowed (ignored).
- V-STARS no longer drives back to construction points.
- Scale bar labels now visible in graphical view.
- Best-fit circle, sphere now works when center or radius is held fixed.
- Construction objects now update properly.
- Arrow keys now functional in the graphical view while in rename mode.
- When opening a project, if any file project files are read only, the user is warned that any changes made to the file will not be saved. Additionally, deleting read only files from the project is not permitted and the user is warned when attempting to do so.
- V-STARS no longer crashes in print preview if the program is closed.