

V-STARS 4.5.2 Release Notes

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Introduction

The following release notes describe the significant new features that are available in V-STARS Version 4.5.

The release notes also describe many of the software fixes implemented since the previous release (V-STARS Version 4.4).

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 possible 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.

Throughout this guide **NOTE:** denotes particularly useful information. Additionally, **WARNING!** indicates that special attention should be paid to the information provided to avoid an undesirable result.

Known Issues

Opening Projects on CD-ROM or DVD

If you open a V-STARS project that is on a CD-ROM or DVD, none of the changes you make will be saved when you close the project. (V-STARS cannot write data to a CD-ROM or DVD). If you do this, V-STARS will display a warning message. This is an issue with all versions of V-STARS not just this release, so it is important you are aware of it. If you want to save changes to such a project, first copy the project from the CD-ROM or DVD to your disk drive.

3D File Format Changed

Improvements in this release required a change in the 3D file format. This means that earlier versions of V-STARS will not work on projects created with the new release, but this new release will work on projects created by any previous versions of V-STARS. If you try to run earlier V-STARS versions on V-STARS 4.5 projects, you will get a message stating that you cannot do this. Also, when the new release is run on an existing project, it will write any existing and any new 3D files in the new 3D file format which means previous versions of V-STARS will no longer work with that project.

When the new V-STARS opens a project made by a previous version of V-STARS, it makes a backup of the project so you can still run the original project with previous versions of V-STARS. The backup data is located in a folder located under the existing project called *backup_version_2*.

If you want to run a previous version of V-STARS on a project created by the new release (probably to check any differences between the two versions), what you do depends on the situation. If you want to check something regarding a 3D file (displaying it, or doing some analysis for example), first export the 3D file in this new release version as an .XYZ or .TXT file, and then import it into the earlier version of V-STARS. If you want to do anything else, you will have to open a new project with the earlier version and reprocess the pictures from the beginning.

The compatibility issues are summarized in Table 1 below. The 3D file format changes means new versions of WinTrans and the 3D Viewer are needed. If you do not use these programs, skip the next two sections.

Table 1: 3D File format compatibility.

Existing Project	Running Version	
	Pre 4.5	Version 4.5
Pre 4.5	OK	OK (but can no longer run a Pre 4.5 version on the project – use the backup project folder)
Version 4.5	NO (will get error message – Export 4.5 3D file(s) as .xyz, etc. file(s) or reprocess images)	OK

WinTrans 3D file Compatibility

Changing the 3D file format means your existing version of WinTrans will not read 3D files made by this new release of V-STARS (You will get a message stating “Source File Error” if you try to do so). V-STARS will automatically install a new version of WinTrans (Version 4.5) that can read the new 3D file format (and any old 3D file formats). However, be aware that it will write any new 3D files in the new format which then cannot be read by previous versions of WinTrans. Because of this, avoid running the new WinTrans on old projects if you want to run the old V-STARS on those projects.

NOTE: The installation will automatically configure your system so that the new V-STARS will use the new WinTrans and old V-STARS versions will use the old WinTrans. The New WinTrans will say “WinTrans 4.5” in the title bar to distinguish it from previous versions.

3D Viewer Compatibility

Because of the 3D file format change, your existing 3D Viewer program will not read 3D files written by the new V-STARS release (You will get a message that says “Unable to Read the 3D file” if you try to do so). A new 3D Viewer (Version 4.5) that will read all versions of 3D files will be automatically installed and configured so it is used when you double-click on a 3D file. The program is called “GSI3DViewer.exe”. It is installed in the same folder as the V-STARS executable. The default location of this folder is “C:\GSI\Vstars45”. However, if you changed the location of the V-STARS executable during the install, the 3D Viewer program will be stored there. Include this file whenever you send 3D files to anyone for viewing.

NOTE: When you install a copy or shortcut of the new version on the desktop, it will be displayed with a new icon to distinguish it from the old 3D Viewer. You should remove any shortcuts or copies of the old 3D Viewer on your desktop.

Release Required if Using Combo-Shot Mode

There is a bug in previous releases that may cause incorrect operation when using M Combo-Shot mode. You should use this version if you are using M Combo-Shot Mode. INCA3 cameras must have versions 06.06.01G Firmware or later.

Important Changes

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

AutoBar no longer required

If you have ever forgotten to bring your AutoBar on a job, you will greatly appreciate this new feature. If V-STARS doesn't find an AutoBar in any of the images, it will automatically setup an arbitrary coordinate system using the codes.

However, be aware that without an AutoBar, the scale of the coordinate system is unknown. V-STARS will use the size of the codes specified in the project (3mm, 6mm, or 12mm) to get approximate scale for the project but this scale will only be good to 1-2%. If the project does not specify the size codes used in the project (Codes = Unknown), V-STARS will assume that the medium-sized (6mm) codes are used. In this case, the scale could be off by a factor of 2 or more.

NOTE: You must turn on measuring of the code nugget points for the code scaling to be applied.

It is assumed you will scale these projects by some accurate means (scale bars, transformations with scale, etc) in the end to get accurate scale.

Multiple V-STARS sessions possible

You can now run multiple, simultaneous V-STARS sessions on different projects. To do so, just start another V-STARS session and select or create the project. If you try to run V-STARS on the same project, you will get a message that you cannot do this. You can run multiple sessions on S projects, and on S projects and one M project, but not on multiple M projects.

NOTE: Because V-STARS reads the system data (camera, probe data, etc.) at start-up, if one V-STARS session updates this data, other V-STARS sessions will not be updated. You must close the other V-STARS sessions and re-open their projects if you want to access the updated data.

AutoMeasure Improved

The AutoMeasure process is now more reliable. You should now get more pictures and fewer bundle failures.

Combo-Shot Improved

The M Combo-Shot procedure is used with the V-STARS Pro-Spot target projector in M-mode. This procedure is especially useful on shiny, highly-reflective objects and/or objects that have both very dark and very bright areas. Typically such objects cannot be completely measured in a single exposure because some areas are too overexposed while others are too dim.

The process is now faster, more reliable and often needs fewer pictures. In addition, you can select default values for different objects (dark, shiny, very shiny), and conditions (flash hot

spots). Finally, optional stability monitoring has been added to indicate whether the cameras, object or Pro-Spot have moved.

See the *Application Note, M Combo-Shot Procedure 2007-10-09*, for a complete description of the procedure.

Pan-tilt support added

V-STARS now has controls for the new INCA3 pan-tilt unit. To access the pan-tilt control, click the Pan-tilt icon on the toolbar), or select Pan-tilt from the View menu. The Pan /Tilt Control Box will appear and look similar to that seen in Figure 1 below.



The cameras in the project are listed in the left pane. If a camera is not connected to a pan-tilt unit, the camera will be grayed out. Select the camera you want to move by clicking on it in the left pane to highlight it. Press the desired button to move the highlighted camera in the indicated direction. Each press of the button will move the camera by 1 degree. Holding down the <CTRL> key while pressing the button will move the camera by 10 degrees. You can also type the desired position into the Setting field. When you press the <Enter> key, the camera will move to the entered position. If you make a mistake, just press <CTRL>-Z before pressing the <Enter> key.

The limits for the tilt unit are +38.6 degrees, and -81 degrees. The limits for the pan unit are +/- 158.9 degrees. The Setting field indicates where the camera will go. The Current field indicates where it is at. You do not have to wait for the camera to reach the set position before changing the setting. To take a picture and see where the camera is aimed, press any of the trigger buttons.

It is important that you return ALL the pan-tilt units to their zero positions before removing power. Otherwise they will think the position you left them at is the zero position when they are powered back on. This can cause problems. Pressing the Zero button will move both the pan and tilt axes to their zero positions. To minimize the likelihood of hitting something or snagging a

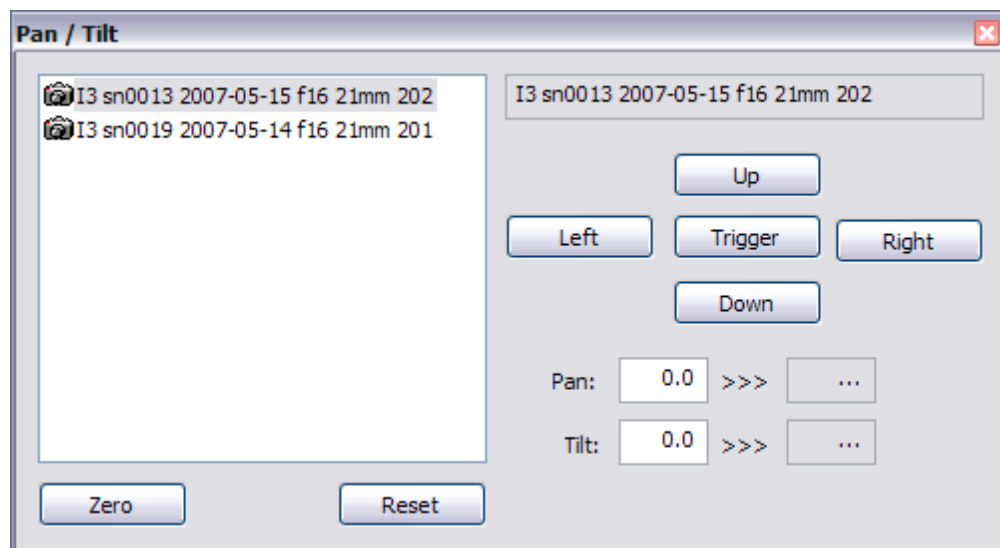


Figure 1: Pan / Tilt dialog.

cable, the tilt is zeroed first, and then the pan is zeroed (If you want to zero just one axis, enter 0 in the appropriate Setting field). When you press the Zero button, you will be asked whether you want to zero all the camera's pan-tilt units or just the highlighted camera's. Press the Confirm button to zero just the highlighted camera, or press the All button to zero them all.

If a pan-tilt unit loses power, or hits an obstruction, it will lose track of its position which can cause problems (A likely cause is that you forgot to zero the pan-tilt unit before turning off its power). Pressing the Reset button will cause both the pan and tilt axes to do a reset procedure to re-establish their indexes. During this process, the axes will go thru their entire range of motion. Also, to minimize the likelihood of hitting something or snagging a cable, the tilt axis is reset first, and then the pan axis is reset. This means the entire process can take some time - about a minute - so you want to avoid forgetting to reset the cameras before removing power. When you press the Reset button, you will be asked whether you want to reset all the pan-tilt units or just the highlighted cameras. Press the Confirm button to reset just the highlighted one, or press the All button to reset them all.

Tile and Auto-Tile Window Features Added

The new "Tile" and "Auto-Tile" features size and arrange the various V-STARS windows automatically and dynamically, respectively to make the windows more visible and useful. Select Tile from the Window menu each time you want to automatically re-arrange the Windows. Selecting Auto-Tile will dynamically re-arrange the windows each time a window is opened or closed (it works the same as if you selected Tile every time a window opens or closes).

AutoTile can be particularly useful in S-mode when you want to look at more than one picture at a time because it will automatically re-size the picture windows as you open and close them to fit them on the display while reserving an area for viewing the thumbnails.

FTP to GSI Added

Sending projects to GSI is now even easier because we have added the ability in V-STARS to send projects to GSI using FTP (File-Transfer-Protocol). You must "archive" the projects using one of the two already available archiving options in V-STARS before using the FTP to GSI command. (Archiving takes all the appropriate files in the project, compresses them and puts them all in one archive file). The entire procedure for sending projects to GSI is as follows:

- 1) Under the Tools menu select either "Archive Project without Images" or "Archive Project with Images" (Figure 2).

NOTE: If you are archiving with images, the images (.gsi files) must be located in or under the project. If they are not there, you can either use Windows Explorer or the "Import -> Images" command on the Project menu to import the images into the project before archiving.

- 2) A DOS screen will appear that will display the archiving process. When done you will have an archive file in your project directory with the project name and the extension ".7z".

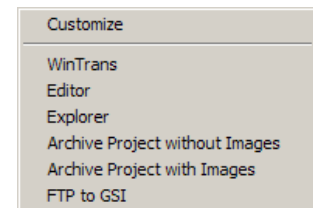


Figure 2: Archive V-STARS projects and FTP to GSI.

- Under the Tools menu, select FTP to GSI (Figure 2). A DOS screen will appear that will display the FTP process.

NOTE: Some companies don't allow employees to ftp files directly to our site. If so, you will get a failure message. Contact your IT department to see how to ftp the data to us.

3D Point Filtering Added

When comparing the measured and design data in a 3D file, it is often helpful to remove (or keep) points that have large differences. Also, it is sometimes useful to remove points that are not in *both* data sets. V-STARS can now filter points in this manner. The filtered points are removed from both the measured and design data sets.

WARNING! The filtered points are deleted and cannot be recovered. If you want to keep the original data, save it before filtering.

To filter points, Select "Alignment" from the 3D file menu, and select either "Residuals – Quick" or "Residuals - Standard". A dialog box similar to the one shown will appear. You can change the rejection limit if you like and press the "Recalc..." button to see the effect. Points above the rejection limit will be placed at the top of the list and will be marked with a red bar icon. Selecting the "Delete Rejected" check box will remove the rejected points from the measured and design data sets. Selecting "Delete Accepted" will delete the points that were below the rejection limit from both data sets. Selecting "Delete Unique Points" will delete any points that are not in both the measured and design data sets.

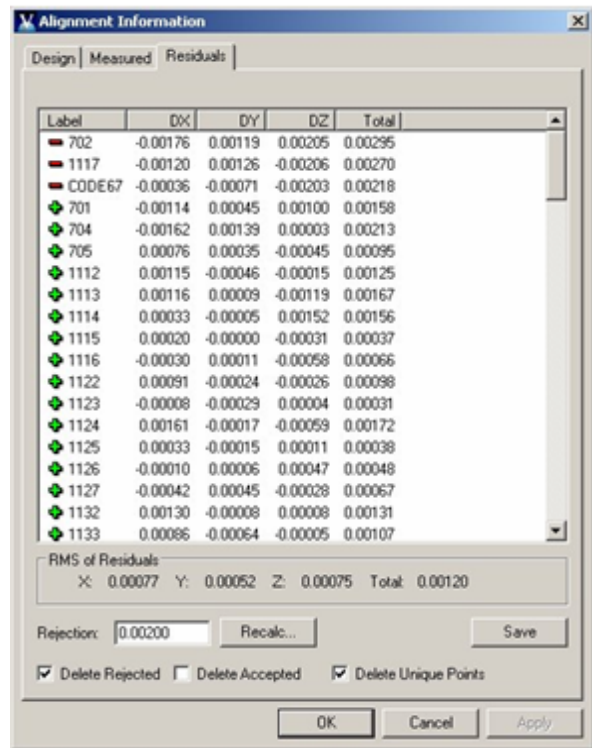


Figure 3: 3D Point Filters.

Proximity Point Labeling

V-STARS further improves measurement automation with the addition of Proximity Point Labeling (PPL). PPL allows you to automatically change point labels from the arbitrary ones assigned to them by the AutoMatch process to meaningful labels based on the point's proximity to certain geometrical objects. A major benefit of PPL is targets no longer have to be precisely placed on objects in order to automatically relabel them. As long as they are placed anywhere on a supported geometrical object, they will be relabeled.

As an example, PPLs allow you to place targets on an object (such as a bulkhead). Then, using the plane PPL you can relabel any targets on the bulkhead to whatever you desire (e.g.,

AFT_BULKHEAD1, 2... N). These relabeled points can then be used by construction objects to automatically make measurements and construct geometry.

NOTE: To use PPL you must have a **SOLIDS** license. To use **NURBS** surfaces for Proximity Point Labeling, you must have a **SURFACES** license. Currently, PPLs can only be used on S measurements. They are not yet supported in M-Mode.

PPL objects are members of a 3D file and appear under the *Proximity Labelers* node within a 3D file on the V-STARS project tree.

In general terms, PPLs consist of

1. A **SOLIDS** or **NURBS** object. Those supported are
 - a. **SOLIDS** – plane, line, circle, sphere, cylinder
 - b. **NURBS** – curve, surface
- 2) A set of criteria that define
 - a. The spatial relationship between the object and a point under consideration for relabeling
 - b. The initial point label for relabeling

To further illustrate the benefits and use of PPLs, consider that in a particular S-survey, the nominal location of a planar surface is known. A number of targets are randomly affixed to this surface for the survey. After the AutoMeasure procedure and final bundle adjustment are complete, these points are labeled arbitrarily as AutoMatched points. Because they are labeled arbitrarily, they can't be used to automatically create a plane object via **Construction Objects**. However, using a PPL, those points that lie within a specified distance of the nominal plane are automatically assigned designated labels which in turn allow them to be utilized in a best-fit plane construction object.

See the *Application Note Proximity Point Labelers 2007-10-15* for a complete description.

AutoRelabel without Manual Relabeling Possible

In previous versions of V-STARS, the AutoRelabel command always did an alignment of the AutoRelabel files. If there were not at least four identically labeled points in both files, it was necessary to manually relabel four points prior to the AutoRelabel so it could do the alignment. Now, if the files are already aligned, the manual relabeling can be skipped when running AutoRelabel by unchecking the “Do Alignment” box (Figure 4). The AutoRelabel will use a default value of 1 for the nearness threshold.

This new feature is very useful, for example, when probing a set of points. Often, you may just want to probe these points as quickly as possible without

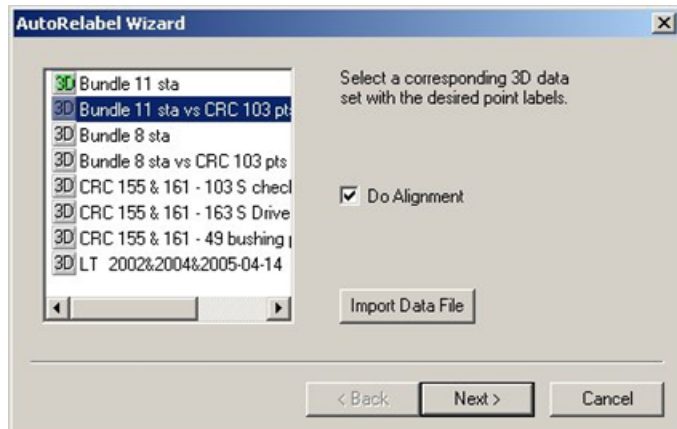


Figure 4: *Do Alignment* option in AutoRelabel Wizard.

worrying about labeling them. Then, if you have a set of design values for the probed points, you can use AutoRelabel to relabel the measured probe points. In the past, even if the design and measured points were in the same coordinate system (which is often the case), you would still have to manually relabel four of the measured points before using AutoRelabel. Now, if they are in the same coordinate system, you can skip the manual relabel and just uncheck the “Do Alignment” check box.

Plane-Line-Point (3-2-1) Alignment Added

You can now do a 3-2-1 alignment using a plane, a line and a point. This feature is very useful when you want to align your coordinate system to physical features of an object. Usually, these features are targeted and you then make a best-fit plane and line using these targeted points.

To do a Plane-Line-Point alignment, do the following:

- 1) In the 3-D view, select a point, a line and a plane. You must select just one of each. In the example shown here, we have selected the plane, the line and a point at the bottom left corner of the object.
- 2) Right click in the 3D View and select Plane-Line-Point from the Alignment menu. If the selection is grayed out, you have not selected one plane, one line, and one point. The Plane Line Point dialog box shown in Figure 5.

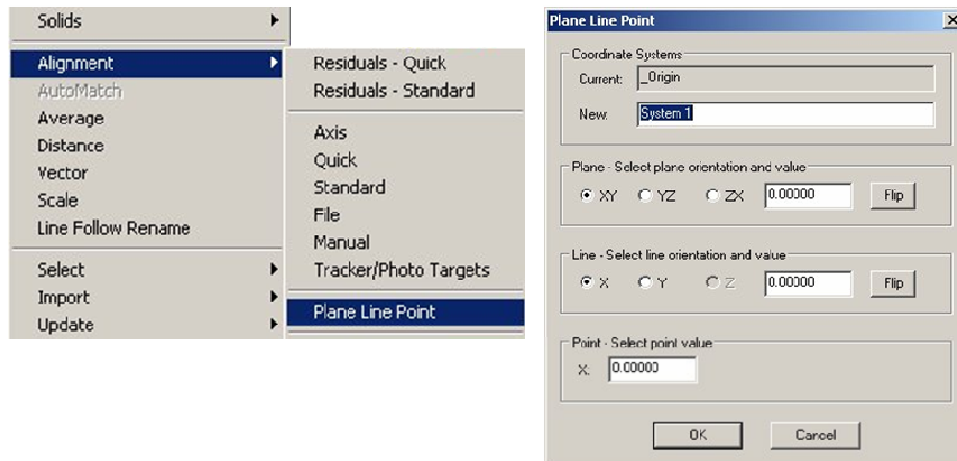


Figure 5: Plane-line-point alignment setup.

- 3) You can give the new coordinate system a name (we will call it “PLP”), otherwise it will be given the default name shown in the “New” field of the dialog. Select the plane and line orientation you desire. Type the values you desire for the location of the plane, the end of the line and the point in the appropriate fields. Since we want the coordinate axes to be nominally parallel with our original axes, and the origin to be nominally at the bottom left corner the default values shown are appropriate.

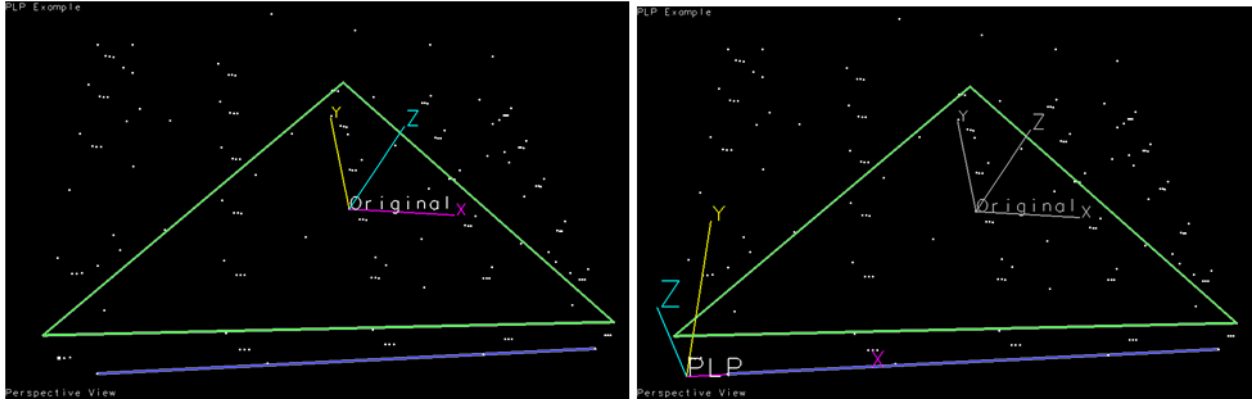


Figure 6: Plane-Line-Point alignment (before, left and after, right).

NOTE: The positive directions of the axes depend on the order in which you selected the points to make the plane and the line (Figure 6). Rather than try to describe these dependencies, it is better to use the flip buttons to flip the direction of the axes if they are not what you want.

Fixed Slow Opening and Closing with Anti-Virus Software

We discovered that anti-virus software (which most customers use) was causing V-STARS to take a long time to open and close. This is fixed. Opening and especially closing V-STARS should now be much faster.

Bug Fixes

The following bugs have been fixed in this release.

Probe Calibration Scale Error

In previous versions, the new Probe calibration routine did not properly scale the probe coordinates. This was not an issue if you were re-calibrating the probes because it would use the scale from the previous calibration which was good. It is only an issue on an initial calibration of the probes. Since probes are always initially calibrated by GSI, this would only be an issue if you were using your own custom-made probe. Now it is fixed for all situations.

Pressing OK button in probe calibration window can cause crashes

Fixed.

When exporting lines, the line length is now included

Fixed.

Tolerance bar in graphical view displays two values twice

Fixed.

Open GL crashes eliminated?

In previous versions, V-STARS would sometimes crash when doing various operations in the 3D graphical view (rotating the view, etc.). This should no longer happen.

Instability in M mode with Inca1s and Inca2s

In previous versions, when in M-Mode, the INCA1 and INCA2 cameras could disconnect if you triggered too fast. This is now fixed.

Switching ARM Baseline Regenerates Output files

In previous versions, if you changed the ARM baseline V-STARS did not generate new output files. This was confusing and inconsistent. Now it will generate new output files when a new baseline is chosen.

WARNING! The new output files will overwrite the old ones. Move or rename the old files if you want to save them.