

## LGO – POINTS, TRIPLETS, INTERVALS AND OBSERVATIONS: PART 2

Newsletter no. 15 explained the fundamentals of points, triplets, intervals and observations. If necessary, do refer to this newsletter in order to refresh the basics.

This newsletter will build on these basics and look at some use cases when working with points, triplets and observations inside LGO.

We will also cover the new features in the latest version (v1.1) of LGO, which allows **Reference** and **Measured** triplets to be re-assigned and to automatically merge **Reference** triplets during data import.

### A SHORT RECAP

You hopefully remember that for any point in an LGO project, more than one set of coordinates - a so-called triplet - can be stored. Each triplet represents a **Point Class**. The most important point classes are **Reference** and **Measured**. They also build the link to the observation, which always starts at a **Reference** triplet and ends at a **Measured** triplet.

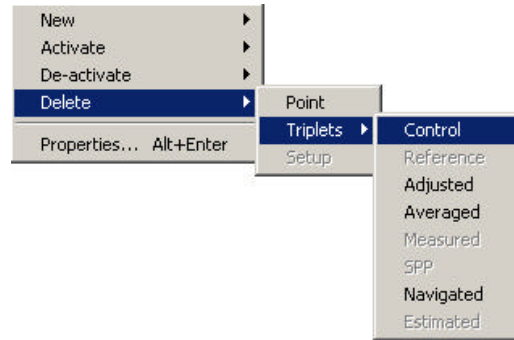
### USE CASES

The following examples highlight some realistic use cases related to the handling of points and triplets within LGO.

#### REMOVE A CONTROL TRIPLET

Imagine you have entered a **Control** coordinate triplet for an existing point and you want to remove this **Control** triplet from the database without deleting the entire point.

This can be achieved by selecting the context menu of the point (right click on the point) and select **Delete Triplets** from the menu and then choose **Control**. This will remove only the **Control** triplet.



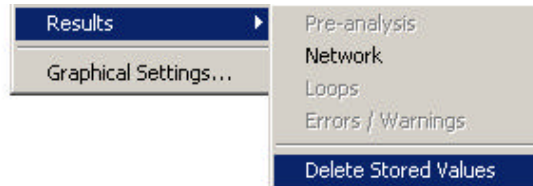
All other triplets stored with this point will remain.

#### UNDO AN ADJUSTMENT

Or imagine you want to undo an Adjustment computation.

You can achieve this by selecting all points (press CTRL-A) and then choose **Delete - Triplets - Adjusted** from the background context menu (right click in the background).

Note that for this operation there is another shortcut available: You can alternatively select **Results** and then **Delete Stored Values** from the background context menu in the **Adjustment** tabbed view.



#### UNDO PROCESSING RESULTS

Or now imagine you want to undo all of your GPS-Processing runs in a pure GPS project.

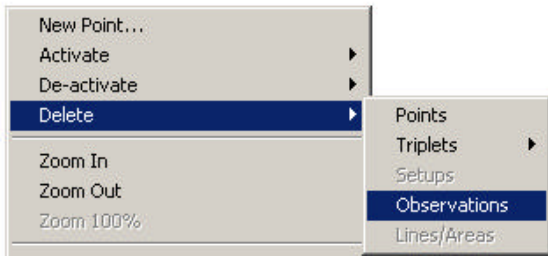
Again you can press CTRL-A in the **View/Edit** tabbed view to select all points and observations in the project. This time from the background context menu select **Delete** followed by **Observations**.

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This will remove the **GPS baseline vectors** (and TPS observations if they exist!) from the database. The corresponding **Reference** and **Measured** triplets will be removed as well.

If the baselines were computed inside LGO from raw data (and not just imported from an ASCII file), then the points will remain, because a **Navigated** triplet is still available. Also the **intervals** and the **GPS raw data** (the measurements to the satellites) will remain in the database, so that another processing run can be done.

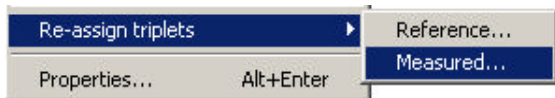
## NEW FUNCTIONALITY IN LGO 1.1

Now we will look at some use cases, which are covered with the additional functionality of LGO within version 1.1.

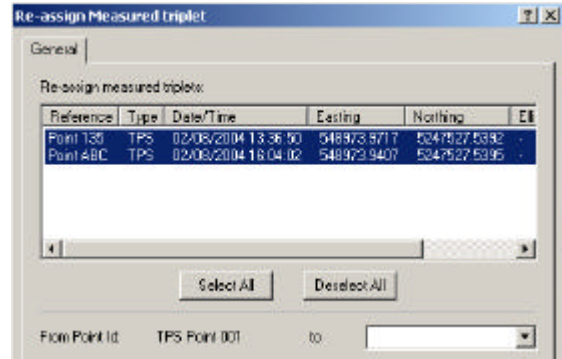
### RE-ASSIGN MEASURED

Imagine you measured a point with your TPS1200 and you had given a point the wrong point Id in the field. If you want to re-assign this measurement to an already existing point Id, then the Point Properties page cannot be used. You need to “move” the point triplet into the triplets of an existing point. Or imagine the case that your incorrect point Id resulted in an average being built, and you now need to re-assign one of these **Measured** triplets to the correct point Id.

This can be done with a new feature of LGO version 1.1. In the **View/Edit** tabbed view select the context menu of the point and select **Re-assign triplets** and then **Measured**.



If more than one **Measured** triplet is stored with the selected point a dialog prompt allows you to choose which **Measured** triplet shall be re-assigned.



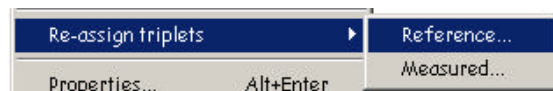
Together with the **Measured** triplet the connected observation will also be re-assigned to the new point. If other triplets are stored, they remain with the original point. GPS intervals would also remain stored with the original point.

### RE-ASSIGN REFERENCE

Now imagine you collected RTK data, but for the same reference point a different point Id was used during your survey work. Note, this can happen “automatically” if you do not stay long enough in the Survey application program such that the rover did not receive the true Point Id of the Reference - a dummy Reference point Id is then created.

When importing only the rover jobs, you cannot use the re-assign interval functionality to merge the references, simply because no interval exists for the reference.

With LGO 1.1 you can select the context menu of one of the reference points and select **Re-assign triplets** and then **Reference**. If you re-assign the reference to a point where a reference triplet already exists then the reference triplets will be “merged” and all observations will be connected to the one reference point.



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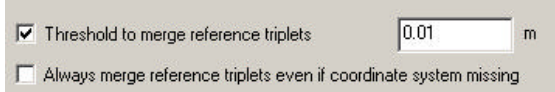
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The functionality can also be used if the actual reference coordinate triplets are different. LGO will calculate the difference between the old and the new reference coordinates and will apply the shift to all **Measured** point triplets of GPS rover and TPS target points that need to be re-connected.

The functionality is not only restricted to GPS references, but can also be used for TPS setup coordinates. You can even merge GPS and TPS references. When combining GPS and TPS you should note the following: GPS reference triplets are enforced to be stored in **WGS 1984**, whereas TPS reference triplets will typically be stored with **Local Grid** coordinates. To calculate the shift a coordinate system must then be attached to the project.

## MERGE REFERENCES DURING IMPORT

With LGO version 1.1 it is also possible to automatically merge reference triplets during the import of data into a project. Under **Tools Options** you can define a threshold, below which reference triplets will automatically be merged, if you are about to import reference coordinates for a point, which already has a reference triplet existing.



Be aware that a shift is applied to the **Measured** point triplets the same way as if you manually merge the Reference triplets using the **Re-assign Triplets** functionality.

If GPS and TPS reference triplets need to be merged automatically a coordinate system need to be attached to calculate the shift. The second option allows you to **always merge references** even if the coordinate system is missing. Note, any inconsistencies in the **Measured** coordinates should then be cleaned up with a subsequent Adjustment computation.

If the difference between the two **Reference** triplets is bigger than the specified threshold, a new point Id "Point A (2)" is created automatically. This is done because the **Reference**

triplet must remain unique for a specific point Id.

Note that the setting in **Tools Options** menu applies not only to the raw data import, but also to other operations, where Reference triplets need to be created – for example when you import baselines from ASCII files or when you drag and drop observations from one project to another.

## REMEMBER...

- Working with Point Triplets has many use cases. You can access the point triplets and remove single triplets from the database without deleting the complete point.
- With LGO version 1.1 you have the additional ability to re-assign a **Measured** triplet to another existing point Id. The connected observation will also be re-assigned.
- Also as a new feature of LGO version 1.1 you can re-assign the **Reference** triplet to another existing point Id. This will automatically merge the references and apply a shift in coordinates to all connected **Measured** triplets.
- Finally, LGO version 1.1 also offers a setting to automatically merge the references during import.



Please contact your local Selling Unit or local Leica dealer if there are specific topics you would like covered in these newsletters.

We welcome all suggestions for TPS1200, GPS1200, specific applications or LGO. We look forward to receive your idea.

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