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DAT/EM v.7.5 Interior Orientation Changes for Digital Cameras with Bonus Advice for Importing/Opening Third-Party Projects

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DAT/EM Version 7.5 Interior Orientation Changes

DAT/EM version 7.5 has shifted the interior orientation by ½ pixel for all digital cameras. This can affect the cursor position by up to ½ pixel, depending on where the cursor is in the image.

In addition, a new interior corrections library was applied, which improves Earth curvature and atmospheric correction calculations.

These changes are to better match the interior orientation used by Trimble Inpho, Hexagon Z/I SSK, and other brands of aerotriangulation software; however, they affect *all aerial projects that use a digital camera*, no matter whether Summit created the project or it originated with third-party software.

Projects with analog/film cameras are not affected.

Trimble Inpho-to-Summit Evolution Exported Projects

The greatest improvement will be seen with Trimble Inpho-to-Summit Evolution exported projects. Trimble and DAT/EM worked together on these corrections as a response to reported interior orientation mismatches.

- Trimble implemented two changes in their project exporter application, available in Inpho Photogrammetry Suite v.8.0.7 and UASMaster 9.0.
- DAT/EM implemented two changes in Summit Evolution: The ½ pixel shift and incorporation of an updated interior corrections library supplied by Trimble. This includes, but is not limited to, Earth curvature and atmospheric corrections.

All together, these updates now export and open a Summit project that very closely or even perfectly matches the original Inpho project.

It is important to use Trimble Inpho Photogrammetry Suite v.8.0.7 or higher, UASMaster 9.0 or higher, and DAT/EM v.7.5 or higher together for the closest match. There may be small improvements opening projects from older Trimble versions, but they will not be as complete.

Always check the interior corrections settings after opening a Trimble Inpho project. Please see the “Take Charge of Your Third-Party Project Import!” section below.

Summit > Import > Hexagon Z/I SSK Projects

Summit > Import Hexagon/ZI SSK now shifts the interior of the resulting project $\frac{1}{2}$ pixel for digital cameras. This will better match the interior used during Hexagon aerotriangulation. Measurements using Summit’s Move to Ground tool will be better at the control.

This change will affect all digital camera projects upon opening in 7.5, no matter which version imported them originally.

The interior match will never be perfect between Hexagon Z/I SSK projects and Summit Evolution, because they do not use the same code for Earth curvature or atmospheric corrections. Also, the user could set other interior correction choices, such as Dynamic Terrain, which are not available in the Hexagon software.

If you are currently working on a project that was imported by v.7.4 or older, you may notice a very tiny shift, which should improve the coordinates at the control. If for any reason this is not desired and you want to set the project back to the “old way”, contact DAT/EM Support for instructions.

Always check the interior corrections settings after importing a Hexagon Z/I SSK project. Please see the “Take Charge of Your Third-Party Project Import!” section below.

What if I don’t want the $\frac{1}{2}$ Pixel Shift?

If you are in the middle of a digital camera project when you update to v.7.5, or if you are using an aerotriangulation from a third party not mentioned above and control does not match well, there is a way to undo the $\frac{1}{2}$ pixel shift. Contact DAT/EM Support for instructions.

Always check control before and after shifting to see which is better.

Bonus Advice: Take Charge of Your Third-Party Project Import!

Importing a third-party project may seem like magic, but is it? You'd better check what you get!

Does your export/import third-party project magic...



...give you this



or this?



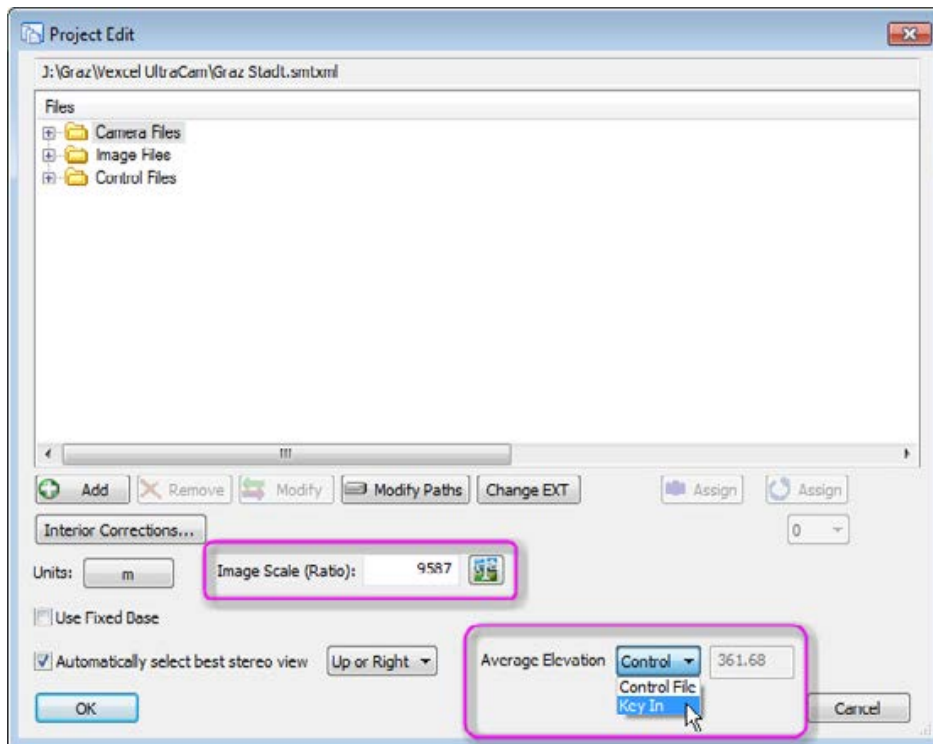
For any brand of third-party project, no matter whether that software exported a complete Summit project or Summit imported the third-party project format:

- **Always verify the interior corrections settings in aerial projects!**
- **Always visit ground control and make sure the project is within specifications!**

DAT/EM does its best to import third-party projects, and third parties do their best to export Summit projects, but any export or import process can make mistakes or apply outdated settings. It is up to you, the user, to check the Summit Evolution project before using it to digitize vectors.

DAT/EM recommends doing the following after importing or opening any third-party aerial project:

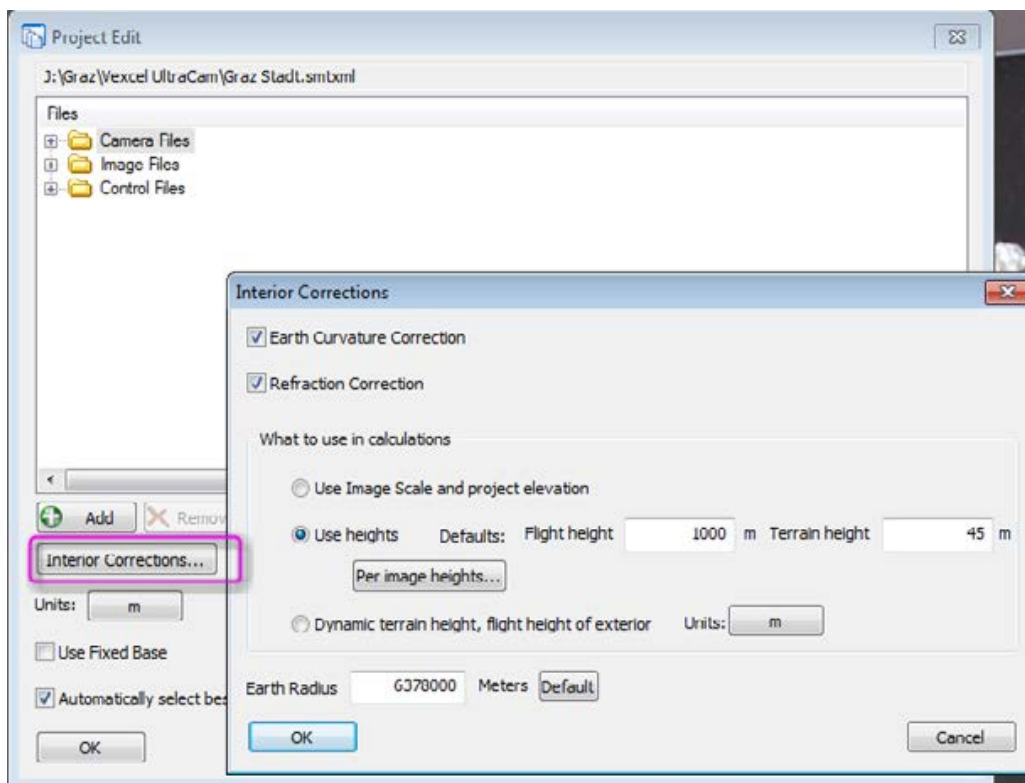
1. Select **Edit > Project**. Review the following on this dialog:



- ✓ **Image Scale ratio.** Is it right? The equation for it is:

$$\text{Photo/Image Scale ratio} = (\text{flight height} - \text{ground elevation}) / (\text{focal length}/1000)$$
 The flight height and ground elevation are in meters or must be converted to meters. The focal length is in millimeters. Your answer may vary depending on which ground elevation you use, but the value should be fairly close.
- ✓ **Average Elevation.** If there is no control file, set it to **Key In** and enter a good average elevation for the project. This is very important for Summit to be able to detect the correct extent of each model's stereo area.

Select the **Interior Corrections** button. Review the settings:



- ✓ **Earth Curvature Correction.** If it was on in the aerotriangulation software, it should be on here.
- ✓ **Refraction (Atmospheric) Correction.** If it was on in the aerotriangulation software, it should be on here.

✓ **What to use in calculations.**

- **Use Image Scale and project elevation:** If the project did not originate in Inpho software, it will probably be set to **Use Image Scale and project elevation**; you may leave it this way as long as control matches well. For steep or mountainous terrain, consider using **Use Heights** or **Dynamic Terrain**, but only if the control matches well with that setting.
- **Use Heights:** Trimble Inpho-originated projects will have **Use heights** on. Change it to **Dynamic Terrain** for steep or mountainous terrain, and optionally for any terrain type. Or, leave it on **Use heights** for flat and low terrain. If an average terrain height was used in Inpho, then **Per image heights** will show all the same **Terrain** elevation:
 - **Per image heights** need to be in meters, even if the project is in feet.
 - Make sure that **Terrain** elevation is a good average elevation for the project. If it is not, either return to Inpho to correct it and re-run the AT before re-exporting the project. Alternatively, set to **Dynamic Terrain**.
 - If **Terrain** shows different elevations for every image, that's good. Do not change them.
- **Dynamic Terrain.** Use this for mountainous terrain and optionally for any terrain. Best results will be with Trimble Inpho-originated projects, since they also use dynamic terrain in the AT processing.

- ✓ **Earth Radius.** This value may have been transferred from the third-party project, but only if it was listed there. It might be a default. The Earth is not a true sphere, so its radius depends on the geographic location. This value must be in meters. If you know the Earth radius used by the third-party software, compare it to this value. If you don't know it, you may keep the default value as long as it's in meters.

If **Earth Radius** is a number close to 209000000, it is incorrectly listed in feet or international feet and must be converted to meters. Small differences in radius choice won't make a lot of difference to the correction, but it will if it's mistakenly in feet.

2. Select **Summit > Tools > Move to Ground** and visit control points. If possible, visit control in the center and edges of models. Make sure the project is within specifications. Check out the various tabs in **Move to Ground** for more ways to view, report, and visit control.