USING IMAGESTATION AUTOMATIC TRIANGULATION (ISAT)

eTRAINING

Introduction

Performs automatic measurement of tie and pass points in the photogrammetric project.

Software

- ImageStation

Data

- Aalen Dataset

Transcript

0:09

Thank you for watching this Hexagon Geospatial eTraining module: Using ImageStation Automatic Triangulation. This eTraining module will walk you though the steps needed to perform Automatic Triangulation, including automatic point matching.

Before performing the automatic point matching, you will:

- Create a block of photos,
- Measure the control points for the block, and
- Define the ZIJobService login.

0:34

After performing the automatic point matching, you will:

- Merge the measurements back to the main project,
- Compute a final bundle adjustment, and
- Analyze the results.

0:44

This workflow begins with ImageStation open, a project created and the camera information defined. The first step is to create a block. ISAT processes photos in groups that are referred to as blocks. Large projects are often broken into smaller, overlapping blocks for project management purposes. This is a very small project so you'll create a single block that contains all photos.

1. Navigate to **ISAT** > **Block Preparation**.
2. Type any name for the **Block ID**, such as `all_photos`.
3. Click **Add All** to add all photos to the block, and then click **OK** to create the block and to close the dialog.

Point Measurement

1:24

Next, you'll use the **Point Measurement** command to measure the project's control points in the **Multiphoto Orientations** environment. While it is not mandatory that control points be measured before running the matching process, it's good practice so that you can determine if your input GPS/IMU or other exterior orientation, or EO, approximations have been entered properly.

4. Navigate to **ISAT** > **Point Measurement**.
5. Select all photos from the **Available Project Photos** list to add them to the **Selected Session Photos** list.
6. Select any two photos from the **Selected Session Photos** list to add them to the **Selected Display Photos** list, and click **OK**.
7. Open the **Advanced** dialog, select **All Points in Project**, and uncheck **User/Manual Points**, and click **OK**.
8. Select the first control point in the list, then click **Go To**.
9. Click **Yes Always** when prompted to save changes.

2:26

This causes all photos that the control point projects to, to be displayed at the control point's projected location.

10. In one of the Detail views, center the cursor over the target and click to record the measurement. ISAT will automatically transfer the measurement to the other photos.

If a point fails to transfer automatically, simply center the cursor over the target in the Detail view of the measurement that failed and record the measurement manually.

11. Repeat this process for the rest of the control points in the list.
12. When you have finished measuring all six points, click **Apply**, and then **Close**.
13. Use the **Footprint Viewer** to verify that all control points have been measured.
14. Click **Tools** > **Footprint Viewer**.

Configure ZIJobService

3:18

If the images for your project are on a remote server or system, you need to change the **Log On** settings for **ZIJobService**.

15. To do this, click the **Windows Start** menu button, and navigate to **Computer** > **Manage**. The **Computer Management** dialog opens.
16. Click **Services and Applications** and click **Services**. Scroll down and click **ZIJobService**. The **ZIJobService** properties dialog opens.
17. Click the **Log On** tab and change the log on account and password to a valid domain and username that has Read access to the remote system.
18. After making the changes, select and right click **ZIJobService**, and click **Restart**.

Automatic Tie Points

4:17

Next, use the **ISAT Control Panel** to execute and monitor the automatic tie point matching process.

19. Click **ISAT** > **Control Panel**.
20. For this project, under **Post Processing**, check **Stringent Matching**, and click **Thinning and Weak Areas** to open the dialog.
21. Under **Thinning Options**, select **Thin using 9x9 grid**, and check **Remove Single Rays in Strips** and **Remove 2-Ray Points in Triple or More Overlap Areas**.

4:49

22. Under **Weak Area Options**, select **Analyze using 3x3 grid**.
23. Click **Accept**.
24. Click **Submit** to begin the processing. A project of this size should finish in about 10 minutes. After the job goes from the Queued state to Running, you can use **View Log File** to monitor the process.

Verify and Merge the Results

5:16

When a block is submitted for matching, ISAT creates a sub-project in the project folder with the same name as the Block ID.

25. To verify the results of the matching, navigate to **ISAT** > **Set Active Project**, and select the sub-project.
26. Use the **Footprint Viewer** to check the Tie/Pass Point distribution.
27. In the **Footprint Viewer** dialog, check **Tie**, **Pass**, and uncheck **Labels**.

5:46

28. When a project has any weak areas, you would use **ISAT** > **Edit Weak Areas** to pick the points and let ISAT drive you to them so that you could add measurements to the weak areas.
29. To edit weak areas, click **ISAT** > **Edit Weak Areas**.
30. Use **ISAT** > **Set Active Project** to return to the master project.
31. Use **ISAT** > **Merge Block Measurements** to copy the results from the sub-project up to the master project.

For large projects that are broken into sub-blocks, you would use this command to merge them all back to the master project for a final bundle adjustment.

Final Bundle Adjustment

6:32

ISAT uses a bundle adjustment program that is referred to as **PhotoT** to compute adjusted object coordinates for the tie/pass points, and adjusted EO parameters for the photos. Blunder detection algorithms are also used to eliminate erroneous measurements and control points.

6:50

There are three ways to run the bundle adjustment in ISAT.

- Use **Orientations** > **Photo Triangulation** > **Triangulation**
- Use **ISAT** > **Point Measurement** > **More…**
- Use **Orientations** > **Multiphoto** > **More…**

7:05

The second two methods are exactly the same and have the advantage of allowing you to drive to points for re-measurement, when you find any that are suspect. The first method runs the same adjustment program but runs outside the point measurement environment. You'll use the third option.

32. Click **Orientations** > **Mutliphoto**.
33. Uncheck the **Adjust Displayed Photos Only** option, and click OK.
34. From the **Multiphoto Orientation** dialog, click **More**, and click **Options.**
35. Under **Adjustment Modes**, select **Absolute**.
36. In the **Adjustment Options** select, check **Enable Precision Computation** and **Enable Compute On Edit**.

7:45

37. In the **Given EO/GPS/INS Settings** section, check **Enable Given EO**.
38. In the **GPS Correction Setting**, check **GPS Correction**.
39. From the **Vertical** drop-down, select **Linear Shift Drift Per Strip**.
40. Under **INS Correction Settings**, check **INS Correction**, and then click **OK**.

8:08

41. Click **Compute** to run the bundle adjustment.
42. Navigate through the tabs to check the adjustment results.
43. On the **Point Statistics** tab, sort the points by the **V(xy)** column and find the worst point.
44. Click on it, and then click **Go To Point**.

8:32

45. Click in any of the Detail views to remeasure the point, or use the **Withhold** or **Delete** buttons to eliminate the point.
46. Click **Compute** to re-run the bundle adjustment and check the results.
47. When you are satisfied with the results, click **Apply** or **OK** to save the results.

Densify the Control Points List

8:51

This optional step is to write the adjusted tie/pass points' object coordinates into the Control file.

48. To do this, navigate to **Orientations** > **Photo Triangulation** > **Densify**, and click **OK** to update the Control point list.

49. When you open the **Footprint Viewer,** you can see that all the Tie/Pass points have been converted to Control points.

50. You can also view them by using **Edit** > **Control Points**.

9:31

This project is now ready for:

- Orthophoto production using ImageStation OrthoPro (ISOP),
- DTM extraction using ImageStation Automatic Elevations (ISAE) or ISAE Extended, or
- Stereo feature collection using ImageStation Stereo Display (ISSD) or ImageStation Stereo for GeoMedia (ISSG).

9:55

Thank you for watching this eTraining module from Hexagon Geospatial. For more eTraining, visit hexagongeospatial.com/eTraining.