

Practical 2

• PanZhiQing 24037665g

1. Present, analyze and compare the two (4 control points and control plus auto-tie points) bundle adjustment results.

- For the 4 control points bundle adjustment, the Total image Unit-Weight MSE is 0.8468. While for the control plus auto-tie points bundle adjustment, the Total image Unit-Weight MSE is 0.4333. The control plus auto-tie points bundle adjustment has a lower Total image Unit-Weight MSE, which indicates a better adjustment result.

control points

Triangulation Summary

Triangulation Iteration Convergence: Yes

Total Image Unit-Weight RMSE: 0.8468

Control Point RMSE:

Check Point RMSE:

Ground X: 0.0000 (4)

Ground X: 0.0000 (0)

Ground Y: 0.0000 (4)

Ground Y: 0.0000 (0)

Ground Z: 0.0000 (4)

Ground Z: 0.0000 (0)

Image X: 0.5031 (8)

Image X: 0.0000 (0)

Image Y: 0.3247 (8)

Image Y: 0.0000 (0)

RMSE Significant Digits: 4

Close

Update

Accept

Report...

Review...

Help

control plus auto-tie points

Triangulation Summary

Triangulation Iteration Convergence: Yes

Total Image Unit-Weight RMSE: 0.4333

Control Point RMSE:

Check Point RMSE:

Ground X: 0.0000 (4)

Ground X: 0.0000 (0)

Ground Y: 0.0000 (4)

Ground Y: 0.0000 (0)

Ground Z: 0.0000 (4)

Ground Z: 0.0000 (0)

Image X: 0.5620 (8)

Image X: 0.0000 (0)

Image Y: 0.3673 (8)

Image Y: 0.0000 (0)

RMSE Significant Digits: 4

Close

Update

Accept

Report...

Review...

Help

Table 1. Bundle Adjustment Results for 4 Control Points

Row #	Image ID	Image Name	Number of Intended Points	Number of Found Points	Number of Patterns	Point Success Rate %	Pattern Success Rate %
1	1	A434207_14.jpg	25	23	25	92.00	60.00
2	2	A434207_15.jpg	25	23	25	92.00	56.00

Table 2. Control Points Bundle Adjustment Results

2. Present at least two screen captures of 3D model that best illustrate the work you have done. Explain the positive and negative features of your photogrammetric products.

- Positive Features:
 - Detailed 3D Representation: The photogrammetric products provide a detailed 3D representation of the surveyed area, allowing for visualization and analysis of the terrain.
- Negative Features:
 - Accuracy Limitations: The photogrammetric products may have limitations in accuracy, especially in complex environments (e.g., high buildings, dense vegetation).
 - Processing Time: The processing of photogrammetric data can be time-consuming. To get this result, it took about 10 minutes to process the data(not including the time for other pre-processing steps).

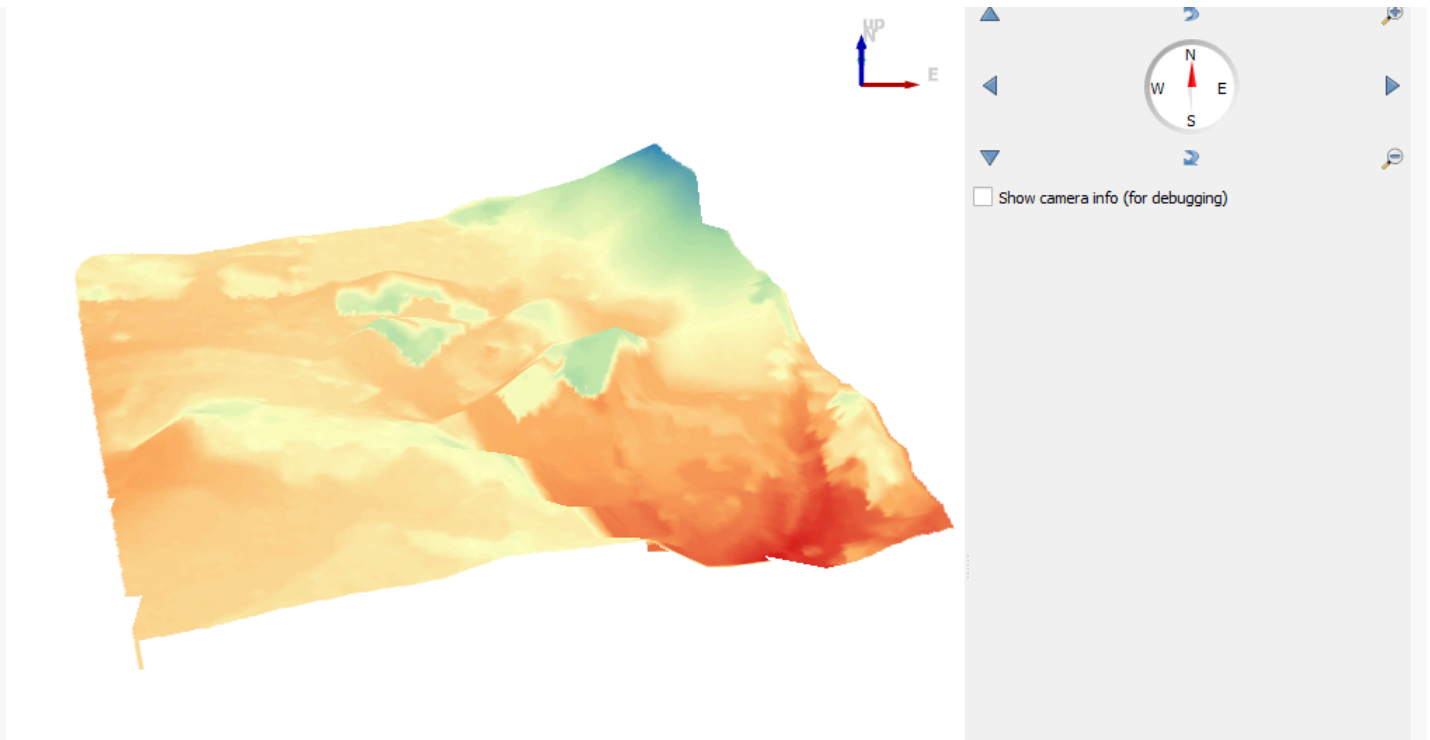


Figure 1. Digital Terrain Model (DTM) of the Surveyed Area

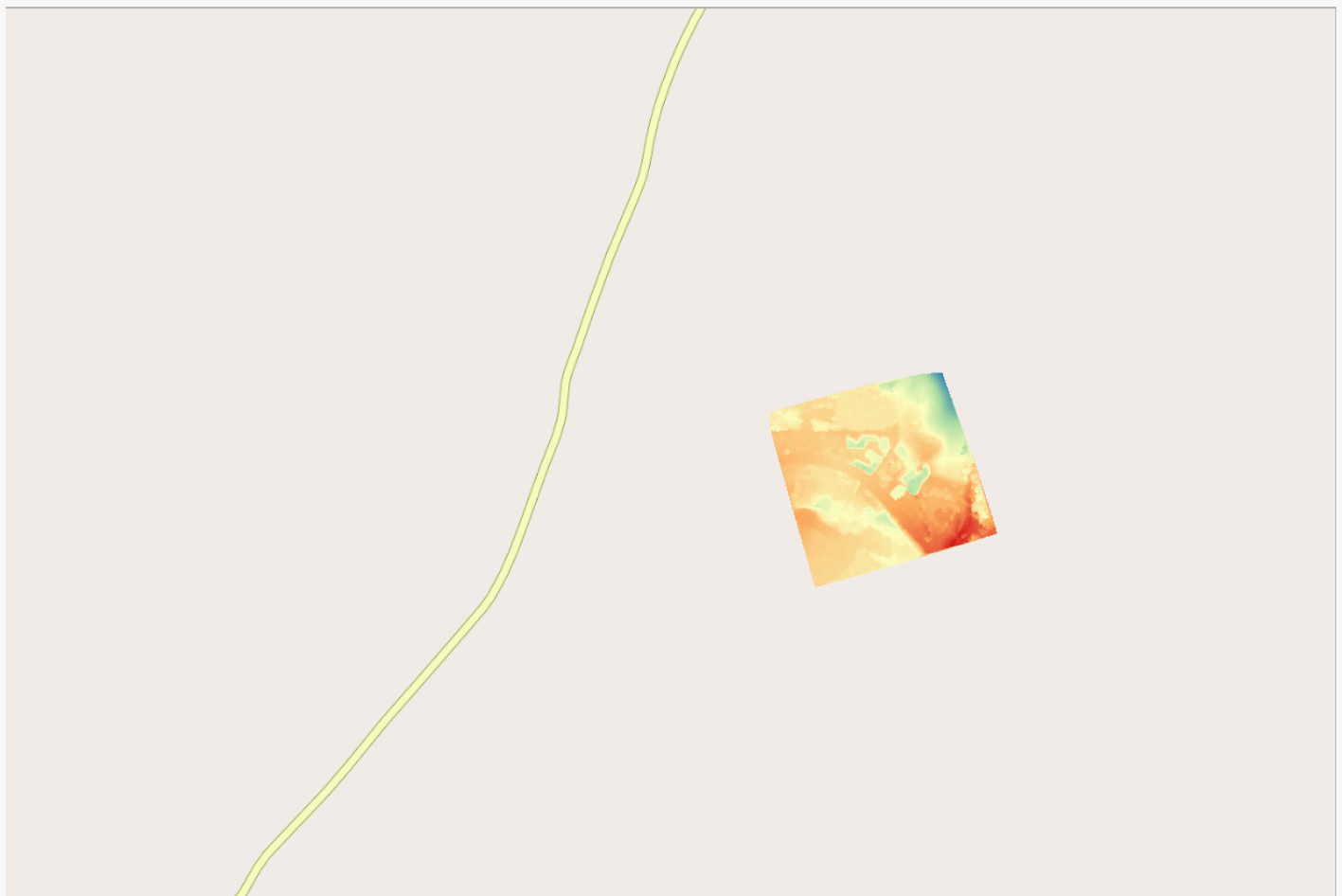


Figure 2. Researched Area with Base Map

3. Discuss the advantages and disadvantages of this method (stereo photogrammetry) compared to other methods you know for generating data.

1. Positive Features:

1. Rapid Data Collection & Cost-Effective for Large Areas: Photogrammetry can cover large areas quickly, making it efficient for projects requiring extensive data collection. When surveying large areas, photogrammetry can be more cost-effective

than using total stations, which require more time and labor.

2. **Non-Contact Method:** It allows for data collection without physical contact with the object or terrain, which is beneficial in sensitive environments.
3. **3D Visualization:** The method provides a rich 3D representation of the surveyed area, which can be useful for analysis and presentations.

2. Negative Features:

1. **Accuracy Limitations:** While photogrammetry can provide good accuracy, it may not match the precision of total stations, especially in complex environments.
2. **Sensitivity to Environmental Conditions:** The method can be sensitive to environmental factors such as lighting, weather, and terrain, which can affect the quality of the data.
3. **Processing Time & Equipment Requirements:** Because of the large amount of data involved, photogrammetry processing can be time-consuming, requiring specialized software and hardware. It can be considered as a technologically-intensive method (e.g. the need for high-performance computers and software rather than low-tech tools like tape measures and levels).