**Appendix I: How to Create a Dense Pointcloud, Mesh, and Digital Elevation Model (DEM) in Agisoft *Metashape Professional* v1.7.5**

You can convert your aerial digital landscape photos into a scalable 3D model.6

1. Create a new project (File=>New from *Metashape*’s top-line menu).
2. Add photos (Workflow=>Add Photos…=>select photos to add=>click the “Open” button).
3. Align the photos (Workflow=>Align photos…). Accuracy = High. Reference preselection = Estimated (but should this fail, try either of the two other options in the drop-down list). All three Accuracy boxes should be ticked. Click on the arrow to open the Advanced area. Key point limit = 100,000. Tie point limit = 0. Tick the box for “Exclude stationary tie points.” Click “OK”.
4. Build the dense point cloud (Workflow=>Build Dense Cloud…). Quality = High or Extra High. Click on the arrow to open the Advanced area. Depth filtering = Mild. Tick the box for “Calculate point colors.” Click “OK”.
5. Build the mesh (Workflow=>Build Mesh…). Source Data = Dense cloud. Surface Type = Arbitrary (use 2.5D to reflect the actual nature of the digital landscape, but 3D will also give similar results). Face Count = Medium or High. Click on the arrow to open the advanced area. Interpolation = Enabled (default). Tick the box for “Calculate vertex colors.” Click “OK”.
6. Build the texture (Workflow=>Build Texture…). Texture Type = Diffuse map. Source Data = Images. Mapping Mode = Keep UV (although “Generic” also works). Blending Mode = Mosaic (default). Texture Size/Count = 6,000 x 1. Click on the arrow to open the advanced area. Tick the boxes for “Enable hole filling” and “Enable ghosting filter.” Click “OK”.
7. Save your work (File=>Save).
8. Scale the model by first opening the Photos panel (View=>Photos). Next, open the Reference panel (View=>Reference). Find an image in the Photos panel that has a feature for which you know (or can estimate) the length or width. Double-click on the image. Right-click on one end of the feature and choose “Add marker.” Right-click on the other end of the feature and choose “Add marker.” In the Reference panel, select both markers so they are highlighted, and then choose “Create scale bar.” Double-click on the Distance(m) column in the new scale bar entry in the Reference panel. Enter the unit. Click the Update Transform button (circle containing two blue arrows) at the top of the Reference panel.
9. Create the DEM for use in GIS software (Workflow=>Build DEM…). Type = Geographic. Choose “Local coordinates (m)” from the drop-down list. Source Data = Dense cloud. Keep the rest of the default entries and click “OK”.
10. Export the DEM for use in GIS software (File=>Export=>Export DEM=>Export TIF/BIL/XYZ…). Keep the defaults and click “OK”. Name the file and select the filetype (TIFF is the default), then click “Save”.