(a) Point Cloud Dataset (**Deliverable**). The contractor shall provide a digital surface model (an elevation model that represents the earth's surface and includes all objects on it) using an industry standard algorithm (such as Semi-Global Matching software). The point clouds shall be derived from the native resolution of the imagery, with nominal point spacing no greater than double the native imagery resolution (e.g. 80 cm spacing for 40 cm imagery). The native resolution refers to the resolution at which the imagery is collected, not the resolution of the final orthorectified imagery delivered; if pan sharpening is used, the highest resolution band would be used in determining the native resolution. Color digital number (DN) values shall be embedded in the LAS file (point data record format 8) and not stored as separate files. It is the Government's preference to have a single dataset with 4-band DN values, in red, green, blue, and near infrared (RGBN) band order, but two datasets, one with embedded natural color the other with embedded color infrared, is acceptable. The dataset shall not have gaps in coverage either along flight lines or between flight lines except over water.

(1) Accuracy. The dataset shall have the same horizontal accuracy as the digital orthorectified imagery. There is no vertical accuracy specification for the dataset.

(2) Point Classification. The point cloud dataset shall be unedited. All points shall all have the same default classification of 0 (unclassified) or 2 (ground).

(3) Overlaps: The dataset shall have the same overlaps as the stereo option stated in paragraph C-4.2(a)(3), Overlaps.

(4) File Format. The point cloud data shall be a compressed (LAZ) file format and must conform to the ASPRS LAS 1.4 specification (dated Jul 15, 2013).

(5) Dataset Structure. Point cloud data shall be delivered in a directory structure that separates files by block, flight lines within a block and individual LAZ segments within a flight line.

Example:
\AZ_A_z12_AT
\001_512_150530_1601_
\002_512_150530_1622_
\FCIR_002_512_150530_1622__1_5856_2784.laz
\FCIR_Thinned_002_512_150530_1622__1_5856_2784.laz
\RGB_002_512_150530_1622__1_5856_2784.laz
\RGB_Thinned_002_512_150530_1622__1_5856_2784.laz
.
.
.
\FCIR_002_512_150530_1622__1_12000_2784.laz

(6) Naming Convention. The dataset shall use the file naming specified in Attachment 6, File Naming Convention. File names shall be in lower case only.

(7) Metadata (**Deliverable**). The Contractor shall create ISO compliant, per the ISO 19115-2 standard, metadata file for each point cloud. Metadata files shall use the Extensible Markup Language (XML) file format and use the same naming convention as the image

tile but with an "xml" extension. A Government provided template will not be provided.

(b) Shapefile Index (**Deliverable**). The contractor shall provide an Esri® compatible polygon shapefile index of all the LAZ files within the block. Polygons shall be a minimum bounding rectangle (MBR) of all the points within each LAZ file.

(1) File Format. Shapefile format compatible with Esri® ArcGIS 10.3 or newer version and Esri® ArcGIS Pro 2.5 or newer version software.

(2) Naming Convention. The dataset shall use the file naming specified in Attachment 6, File Naming Convention. File names shall be in lower case only.

(3) Metadata (**Deliverable**). The Contractor shall create ISO compliant, per the ISO 19115-2 standard, metadata file for each shape file. Metadata files shall use the Extensible Markup Language (XML) file format and use the same naming convention as the image tile but with an "xml" extension. A Government provided template will not be provided.

(c) Rasterized Image (**Deliverable**). The contractor shall provide a rasterized version of the point cloud dataset for each block. The image shall be a single-band, 32-bit floating point, georeferenced image file. Use of nearest neighbor interpolation is recommended when creating the rasterized image. The raster post spacing shall be equal to the base orthorectified tile GSD, see paragraph 3.3(b), Ground Sample Distance.

(1) File Format. The image file shall be georeferenced and in ERDAS IMAGINE file format (*.img) with the no-data value defined in the header.

(2) Naming Convention. The *.img file name shall include the block name.

(3) Raster Support Files. The Contractor shall include image pyramids that are readable by Stereo Analyst extensions for ERDAS IMAGINE and Esri® ArcGIS.

(4) Metadata (**Deliverable**). The Contractor shall create ISO compliant, per the ISO 19115-2 standard, metadata file for each image file. Metadata files shall use the Extensible Markup Language (XML) file format and use the same naming convention as the image tile but with an "xml" extension. A Government provided template will not be provided.

(d) Media Requirements. Point cloud, shapefile, rasterized image, and associated metadata files shall be delivered electronically as defined in the contract Section A-1, Media Shuttle.