Photogrammetry is the science and technology of obtaining reliable information about physical objects and the environment by recording, interpreting, and measuring aerial imagery.

The NCDOT Photogrammetry Unit produces digital spatial information products georeferenced to the North Carolina State Plane Coordinate System. Digital image mosaics and digital orthophotography produced in the Photogrammetry Unit are used for transportation planning and functional design. Topographic mapping is produced for preliminary design and public hearings. Highly detailed base plan sheets are produced for final design.

Digital Elevation Models (DEM) and Digital Terrain Models (DTM) are produced to support design activities of the department and select construction projects. Earthwork volumes for selected construction projects are also calculated using the digital elevation data.

The Photogrammetry Unit is organized into operational groups responsible for aerial imagery acquisition, digital geospatial data generation, and digital geospatial map editing and production. These operational groups are imagery assets, engineering, and stereo compilation. Duties of each squad are highly specialized and integral to the services provided by the unit. All staff is based in the NCDOT Century Center complex located in Raleigh.

Requests for photogrammetric mapping services come from many customers within NCDOT and other NC State agencies. Upon receipt of a request for services, engineering staff perform detailed studies to develop the required mapping specifications. Flight planning, ground control planning, and coordination with field and aircraft operations are necessary for successful aerial imagery acquisition.

The Photogrammetry Unit coordinates with the Aviation Division in the acquisition of aerial imagery at the altitudes required to meet the mapping specifications. Aerial imagery is currently collected using an Intergraph DMC digital mapping sensor. The aerial sensor is interfaced to an Applanix Global Positioning System/Inertial Measurement Unit (GPS/IMU) for precision aerial imagery operations. The GPS/IMU data is used to recreate the coordinates and attitudes of each aerial image. Aerial imagery flight operations are based from the NCDOT Aviation Division hanger located at Raleigh Durham Airport.

After completion of an aerial imagery mission, the raw digital imagery, along with the GPS/IMU data are post processed into aerial digital images and associated image positions and attitudes. All aerial imagery missions are indexed for future use. The aerial imagery is stored and accessed through computer servers and networks utilized within the Photogrammetry Unit. Hard copy reproductions of the aerial imagery, along with digital mapping products, can be produced.

Engineering squads assemble and prepare a variety of materials for use by the stereo compilation squad. Stereo compilation squads use Intergraph ImageStation soft copy stereo plotting instruments to perform aerotriangulation, planimetric map compilation, base plan sheet compilation, and digital terrain data collection. The stereo plotting instruments utilize the digital aerial imagery within specialized software applications to generate a three-dimensional (3-D) image of the terrain that is viewed on a high-resolution computer monitor. Horizontal and vertical data measurements are digitized within the stereo plotting instruments. These

measurements are the basis of the mapping products produced by the Photogrammetry Unit and they are transmitted to the unit's engineering squads for further analysis.

The engineering squads merge and analyze the geospatial data provided by the stereo compilation squads. In some cases, both planimetric and terrain ground survey data received from the field is also merged and analyzed. Engineering squad staff often add descriptive feature information text, field surveyed graphic utility, and property data to produce planimetric maps and base plan sheets. The engineering squads also produce digital aerial mosaics and digital orthophotography. The engineering squads ensure overall product quality and deliver all georeferenced digital geospatial information products to the Photogrammetry Unit's many customers.