

# Basic Geodesy

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## Lambert Conformal Conic Projection

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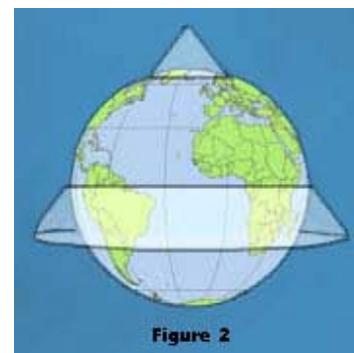
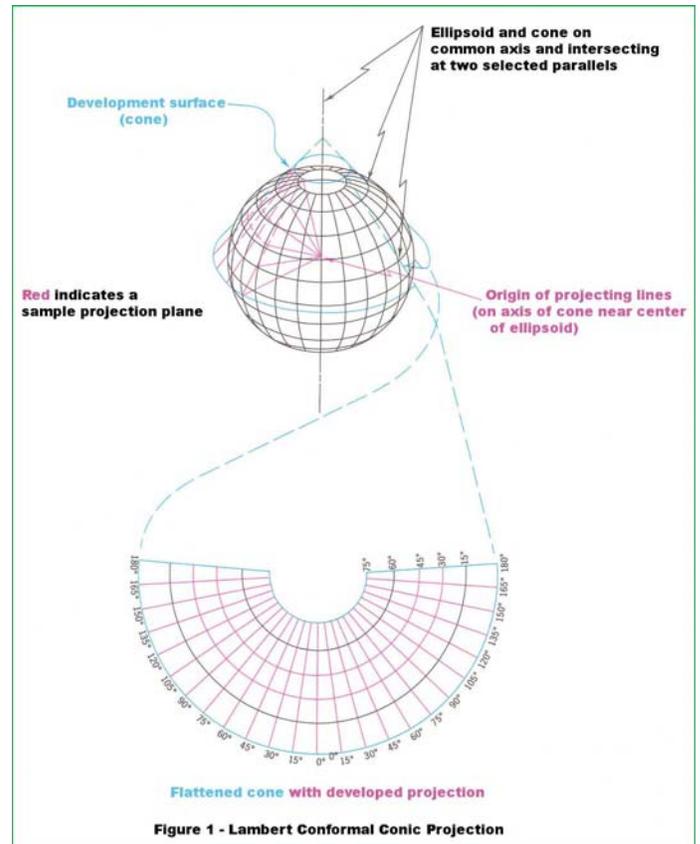
This is the third article in a series of four discussing the projections predominately used by NGA. The Lambert Conformal Conic projection is often used for small scale mapping and aeronautical charting, especially when the area being mapped has a large East-West extent.

This conformal projection can be visualized as the projection of the ellipsoid onto a cone with the cone's axis parallel to the ellipsoidal polar axis. Usually, the cone is secant to the ellipsoid, intersecting along two parallels of latitude. These two latitudes are referred to as the upper and lower standard parallels. Figure 1 is a graphic representation of a Lambert Conformal Conic projection. (NOTE: Since it is difficult to see the cone outline in Figure 1, the Figure 2 diagram is included to better illustrate the cone in the secant condition.)

Meridians appear as straight lines and converge at the pole. As can be observed in the bottom half of Figure 1, the meridians are converging at the North Pole, even though the North Pole is not shown on the final map. Parallels appear as arcs of concentric circles. Also, none of the parallels appear on the final maps and charts in their exact projected positions; they are adjusted to enforce the property of conformality. Enforcing this property means that shapes are portrayed correctly. (Wording is either directly from or paraphrased from DMA TM (Defense Mapping Agency Technical Manual) 8358.1 DATUMS, ELLIPSOIDS, GRIDS, AND GRID REFERENCE SYSTEMS, Edition 1, various authors, page 2-14)

Some GIS software programs use an alternative method to define the Lambert Conformal Conic projection. This method has 1 standard parallel and a scale factor less than 1. Mathematically, this is

the same as the two standard parallel projection with scale factors equal to 1.



## Next Article

The next article will discuss the Transverse Mercator projection which is frequently used by NGA for large and medium scale topographic mapping.