1086-H5-1393 **Michael A Brilleslyper*** (mike.brilleslyper@usafa.edu). *Seeing the World Differently: Mapping the Earth's Terrain with Elevation Angles and Why it Matters.* Preliminary report.

Much of what we have learned about the Earth in recent years has come from space. Indeed, satellites have revolutionized scientific exploration, weather prediction, and even many everyday tasks. The best such example is the Global Positioning System of satellites (GPS) that we rely on for tasks from the mundane getting directions, to highly precise scientific explorations, to countless military operations. In order for GPS to operate correctly the user must have direct line of sight to the satellites. This is no problem in places that are very flat, but it is not so in mountainous regions or in deep valleys. Yet, standard performance models for how well GPS operates assume that the Earth is smooth like a billiard ball. This talk provides an overview of how actual elevation data of the Earth's terrain was integrated into modern performance models. The work involves manipulating massive data sets, data-visualization, and the repeated use of some very elementary mathematics. Unexpectedly, the work yielded a new type of map that represents a different view of our planet in terms of elevation angles to the horizon. Many of the ideas and methods are easily incorporated into college-level mathematics courses and could make interesting projects. (Received September 21, 2012)