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Katja D Vassilev* (kdv@princeton.edu), 5073 Frist Center, Princeton University, Princeton, NJ 08544, and **Lily Seitelman, Maria Warns** and **Lawrence Seminario-Romero**. *Bifurcation Properties for Navigation Constellation Design*.

The Aerospace Corporation continually advises the Air Force on satellite improvement and maintenance for the Global Positioning System (GPS). The performance of GPS-like satellite constellations, referred to as Walker or Modified Walker Constellations, are of particular interest to the Aerospace Corporation. A Walker Constellation is a system of symmetrically spaced satellites designed for even coverage. They can be modified by altering the number and spacing of satellites and part of our research involves providing methods for modification of Walker Constellations. Our research involves analyzing how adjusting the semi-major axis and inclination of these GPS-like constellations affects the visibility and geometry of each constellation. A cost analysis determines the number of satellites that were viable at each semi-major axis. By varying the semi-major axes of these constellations, we find the bifurcation points corresponding to the number of satellites in a constellation required to achieve adequate visibility, geometry, and cost effectiveness. (Received September 22, 2017)