

1096-F1-2326 **Christina M. Selby*** (selby@rose-hulman.edu). *“Where Am I?” A Change of Basis Project.*

Linear algebra students are typically introduced to the problem of switching from one coordinate system to another in an abstract way. Often two bases for a vector space are provided and students are taught how to determine a transition matrix to be used for changing coordinates. If students are successful in memorizing this mathematical process, then they are successful at completing such problems. However, students may not be exposed to a physical interpretation of what is accomplished through changing coordinate systems or why one may desire to do so. Based on personal NASA industry experience, a linear algebra project has been developed which involves physical interpretation of changing bases. A space satellite with a payload is modeled with many coordinate systems. Each onboard instrument has at least one associated coordinate system, as does the spacecraft itself. A point in space must be interpreted relative to these different coordinate systems in order to accurately analyze data that is collected. The physical nature of this project provides motivation for the change of basis topic in linear algebra, and also provides students a better intuition of what it means to change basis. (Received September 17, 2013)