1077-G5-2293   **William S. Barfield*** (`wsbarfield@cox.net`), 5010 Portsmouth Rd., Fairfax, VA 22032. *Using Regression to Determine Cost Estimating Relationships for Costing of FAA Software.*

Estimating the development cost for expensive large-scale software is difficult and may employ analogous actual costs, parametric modeling, and inferential statistics on regression of relevant financial data. Cost Estimating Relationships (CERs) are regression equations that typically use normalized actual costs of prior analogous software development. CERs were determined for nine essential Federal Aviation Administration (FAA) Work Breakdown Structure (WBS) elements pertaining to software development and related life cycles activities. The CERs are based on the largest set of well-maintained cost data available within the FAA. Depending on hypothesis for each type of CER, its source data set is derived from 52 to 83 FAA programs of less than 1 million dollars to greater than 500 million dollars life cycle cost. We show the methodology, regression results and statistical accuracy of the new CERs. The determination of these CERs from using inferences about the data variables may be considered, from a purely mathematics perspective, as a regularized ill-posed and ill-conditioned inverse modeling problem in calculating the values of the CER parameters obtained from the budget data. This is an excellent example of using applied statistics in business, industry, and government. (Received September 22, 2011)