**Costing at the Speed of Light: How Your Concurrent Engineering Design Team Can Bootstrap Your Organizations Programmatic Capabilities**

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Developing space missions and especially space science missions presents many programmatic challenges. Foremost is that there are not that many missions from which to learn and that science missions typically have significant unique elements, especially planetary missions. Clearly, it is very difficult to estimate and plan any project with major unique and new elements. So, what do you do when it is necessary to generate at least reasonable cost estimates at the earliest Concept Maturity Levels (CML 1 and CML 2) and you never flew anything like this before? What do you do when you have so few historical data points that they do not span the design-cost parameter space? For example, all of ones past missions are orbiters and now we need to design and cost a lander, a rover, or an orbiter with probes. For organizations with early concept design teams such as JPL’s Team X that include cost estimates as one of their products you can ‘bootstrap’ your available parameter reference set by combining technical and cost parameters from historical actuals, high quality design studies, and winnable proposals into a single database. The data from these not flown concepts have informational value but with greater uncertainty then historical data. They provide insight into technical and cost parameter combinations associated with mission designs that are in the ‘ballpark’. This data can be used to improve our ability to estimate cost and technical parameters by providing a source of analogies as well as the ability to develop, calibrating and with the actuals validating the performance of a wide range of models. Models that use a small number of inputs with wide confidence intervals and model with greater fidelity and tighter confidence intervals. In this paper we will describe (1) the integrated Team X design-costing process, (2) the web-based database that is under development along with how the data is obtained, vetted and processed, (3)m the complete set of analogy tools, rule-of-thumb and parametric models that are maintained, (4) how everything plays together nicely (most of the time), and finally (5) the algorithms and methods used to enable combining data from different sources. Most of what is described is to varying degrees reproducible in other organizations.