11. Project and Program Statistics Calculations Overview

A numerical evaluation and comparison of each project within the program areas necessitates a statistical comparison of the projects utilizing specific criteria. A representative set of reviewers was selected to evaluate each project based upon the criteria. Given this information, each evaluation criterion's sample mean and variance can be calculated utilizing the following formulas respectively:

$$\bar{x}_j = \frac{1}{n}\sum_{i=1}^{n} x_{ij}$$

$$Var(\bar{x}_j) = s_{\bar{x}_j}^2 = \frac{1}{(n-1)}\sum_{i=1}^{n}(x_{ij}-\bar{x}_j)^2$$

where x_{ij} is an individual reviewer's score for that criterion and n is the number of reviewers for the given project. These values can then be used to extend the evaluation to the entire program. The sample mean for each project criterion is represented in the graph by their respective bar value.

The program area mean and the average of the project variances for each evaluation criterion were then calculated as follows:

$$\bar{X} = \frac{1}{m}\sum_{j=1}^{m} \bar{x}_j$$

$$E[Var(\bar{x}_j)] = \frac{1}{m}\sum_{j=1}^{m} Var(\bar{x}_j)$$

where m is the number of projects in a program area. This method of calculation allows each project to weigh evenly on each evaluation criterion of the program area. The criteria means and average of the project variances values for each subprogram area (e.g., Hybrid and Vehicle Systems Technologies, Advanced Combustion Engine Technologies, Technology Integration, etc.) are represented on each project graph as the Program Area Average line and the red error bar ranges, respectively. In some sense, the red error bars provide a range by which projects can be evaluated by their criteria with respect to an entire subprogram area's performance.

These calculations were only performed for the numeric values supplied for questions 2 through 5. Questions 1 and 6 are represented by pie charts below the combination bar/line graph.