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**Impacts of Software Reuse Using COCOMO II**

This study provides a software cost estimation methodology for bounding size growth uncertainties. After defining typical assumptions for a high-performance satellite ground system, the study investigates code growth due to increased modifications, overestimate of reuse code quality and understandability, and/or unavailability of the heritage software designers.

Increased modifications of reuse code are likely with the volatile requirements and immature operational concepts of cutting-edge systems. When only a single point software reuse size estimate is available, this methodology provides multipliers for potential code growth. By selecting the appropriate COCOMO II reuse parameter values, the cost estimators can compute potential code growth for their programs.

This study uses COCOMO II to analyze the cost growth impacts as a function of equivalent code growth when assumptions change during software development. The study postulates three candidate baselines for reuse – reusable code, high-quality code and nominal code.

Using COCOMO II reuse equations from the 1999 COCOMO II Model Definition Manual on the USC CSE web site, the study examines the impacts of having fewer heritage programmers available for the reuse code implementation, have slightly more modifications than planned or having both conditions occur.

Also, since the most substantial reuse code grown occurs when the initial software quality and understandability are overestimated, the study analyzes the cost impacts of increasing the level of candidate reuse module pre-screening. For new, innovative programs where the heritage code quality is not well understood, additional reuse candidate pre-screening may be a cost effective approach to lowering the risk and reuse costs.