

SPACE SYSTEMS SYMPOSIUM (D1)
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ADJUSTING COST ESTIMATION MODELS FOR INDIGENOUS APPLICATIONS USING
TECHNOLOGY READINESS LEVELS

Abstract

Cost Estimation Models are essential for systems engineers and project managers. Without these seemingly simple tools it is very difficult to plan complicated space endeavors. Although these models are in use for many years now, it is very difficult for developing countries to put them in direct use. It is now well known that these models would predict much bigger figures for a project like Mangalayan in case of India. This holds true for most other developing countries like Iran. On the other hand, forsaking them altogether is not a wise action because of the wide range of experience and actual mission data behind them.

In this paper, the results of some recent studies and data analysis for the case of micro and small satellites developed in Iran are reported. It is observed that using well-known cost estimation models developed by leading space agencies like NASA would predict costs that are considerably bigger than the actual cost. Some of the factors behind this discrepancy are cheaper work-force, smaller space organizations, lower standards and different technology readiness levels (TRLs). The last factor appears to have the reverse effect of inflating the costs in some cases as well.

As the case might be, TRL as a quantitative factor that is in its turn a composite of several critical parameters is the best candidate to be used for cost-estimation model modification. The cost of subsystem development is directly linked with the TRL of technologies associated with that subsystem. The COTS parts follow the market pattern, but indigenously developed parts can have lower or higher costs according to their TRL. Considering this new parameter, it has been shown that the common cost models can be properly modified and used with a surprising accuracy.