

SUPPLEMENT 14-A

TECHNICAL PERFORMANCE MEASUREMENT

Technical Performance Measurement (TPM) is an analysis and control technique that is used to: (1) project the probable performance of a selected technical parameter over a period of time, (2) record the actual performance observed of the selected parameter, and (3) through comparison of actual versus projected performance, assist the manager in decision making. A well thought out program of technical performance measures provides an early warning of technical problems and supports assessments of the extent to which operational requirements will be met, as well as assessments of the impacts of proposed changes in system performance.

TPMs generally take the form of both graphic displays and narrative explanations. The graphic, an example of which is shown in Figure 14-2, shows the projected behavior of the selected parameter as a function of time, and further shows actual observations, so that deviations from the planned profile can be assessed. The narrative portion of the report should explain the graphic, addressing the reasons for deviations from the planned profile, assessing the seriousness of those deviations, explaining actions underway to correct the situation if required, and projecting future performance, given the current situation.

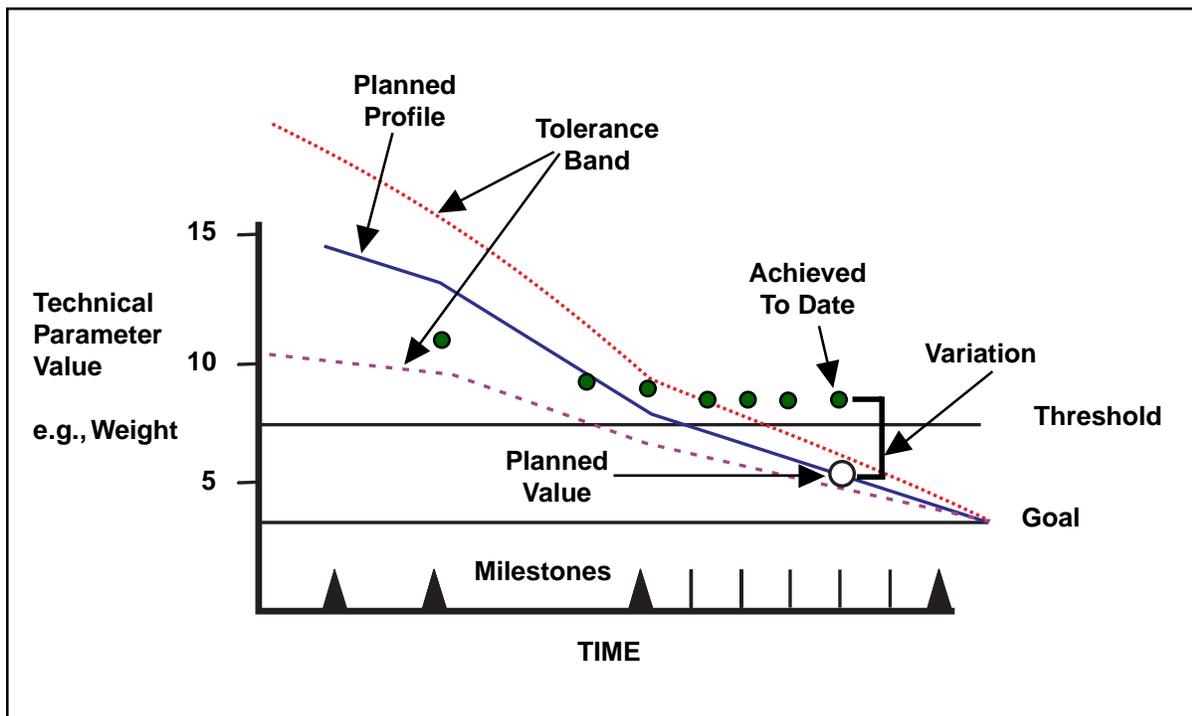


Figure 14-2. Technical Performance Measurement – The Concept

Parameters to be tracked are typically based on the combined needs of the government and the contractor. The government program office will need a set of TPMs which provide visibility into the technical performance of key elements of the WBS, especially those which are cost drivers on the program, lie on the critical path, or which represent high risk items.

The TPMs selected for delivery to the government are expected to be traceable to the needs of the operational user. The contractor will generally track more items than are reported to the government, as the contractor needs information at a more detailed level than does the government program office.

TPM reporting to the government is a contractual issue, and those TPMs on which the government receives reports are defined as contract deliverables in the contract data requirements list. Which parameters are selected for reporting depends on a number of issues, among which are resources to purchase TPMs, the availability of people to review and follow the items, the complexity of the system involved, the phase of development, and the contractor's past experience with similar systems.

A typical TPM graphic will take a form somewhat like that previously shown. The actual form of the projected performance profile and whether or not tolerance bands are employed will be a function of the parameter selected and the needs of the program office.

Another important consideration is the relationship between the TPM program and risk management. Generally, the parameters selected for tracking should be related to the risk areas on the program. If a particular element of the design has been identified as a risk area, then parameters should be selected which will enable the manager to track progress in that area. For example, if achieving a required aircraft range is considered to be critical and a risk area, then tracking parameters that provide insight into range would be selected, such as aircraft weight, specific fuel consumption, drag, etc. Furthermore, there should be consistency between TPMs and the Critical Technical Parameters

associated with formal testing, although the TPM program will not normally be limited just to those parameters identified as critical for test purposes.

Government review and follow up of TPMs are appropriate on a periodic basis when submitted by the contractor, and at other major technical events such as at technical reviews, test events, and program management reviews.

While TPMs are expected to be traceable to the needs of the user, they must be concrete technical parameters that can be projected and tracked. For example, an operational user may have a requirement for survivability under combat conditions. Survivability is not, in and of itself, a measurable parameter, but there are important technical parameters that determine survivability, such as radar cross section (RCS) and speed. Therefore, the technical manager might select and track RCS and speed as elements for TPM reporting. The decision on selection of parameters for TPM tracking must also take into consideration the extent to which the parameter behavior can be projected (profiled over a time period) and whether or not it can actually be measured. If the parameter cannot be profiled, measured, or is not critical to program success, then the government, in general, should not select it for TPM tracking. The WBS structure makes an excellent starting point for consideration of parameters for TPM tracking (see Figure 14-3).

A substantial effort has taken place in recent years to link TPMs with Earned Value Management in a way that would result in earned value calculations that reflect the risks associated with achieving technical performance. The approach used establishes statistical probability of achieving a projected level of performance on the TPM profile based on a statistical analysis of actual versus planned performance. Further information is available on the Internet at <http://www.acq.osd.mil/api/tpm/>.

In summary, TPMs are an important tool in the program manager's systems analysis and control toolkit. They provide an early warning about deviations in key technical parameters, which, if not controlled, can impact system success in meeting user needs. TPMs should be an integral part of both

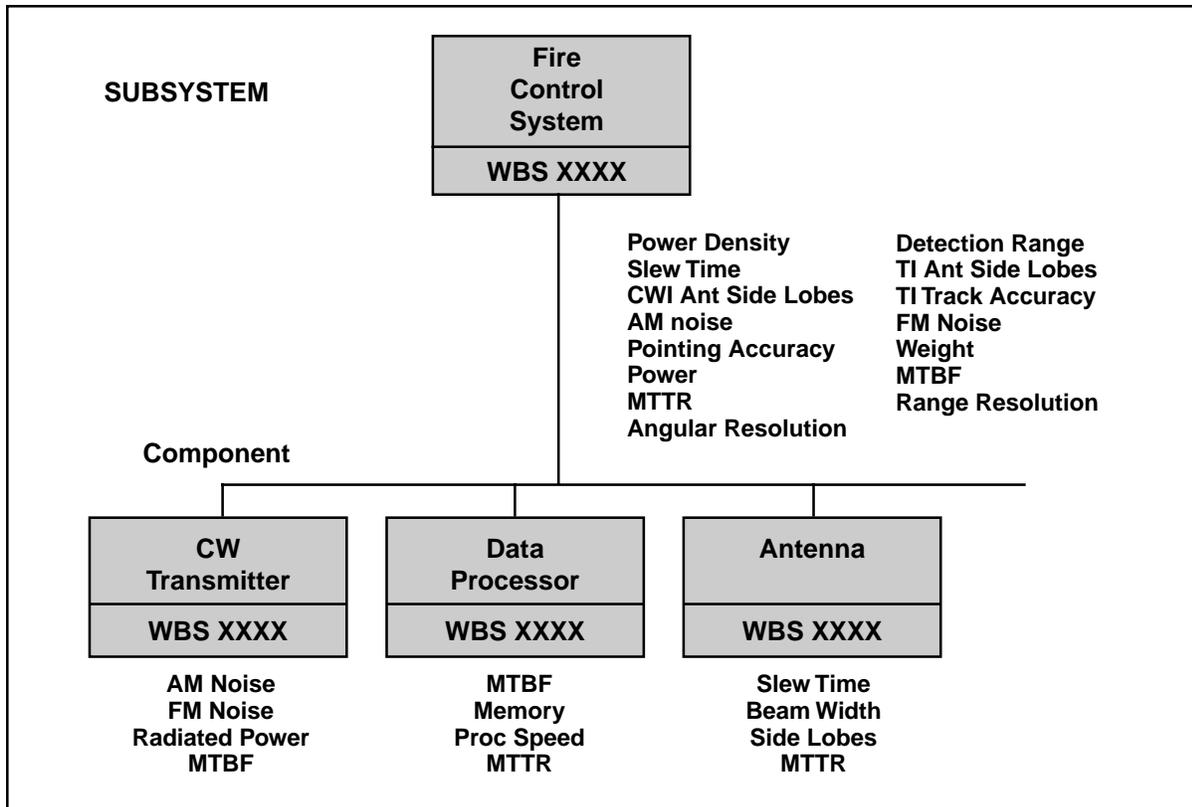


Figure 14-3. Shipboard Fire Control System (Partial)

periodic program reporting and management follow-up, as well as elements for discussion in technical reviews and program management reviews. By thoughtful use of a good program of TPM, the

manager, whether technically grounded or not, can make perceptive judgments about system technical performance and can follow up on contractor plans and progress when deviations occur.

Relevant Terms

Achievement to date – Measured or estimated progress plotted and compared with planned progress by designated milestone date.

Current estimate – Expected value of a technical parameter at contract completion.

Planned value – Predicted value of parameter at a given point in time.

Planned profile – Time phased projected planned values.

Tolerance band – Management alert limits representing projected level of estimating error.

Threshold – Limiting acceptable value, usually contractual.

Variance – Difference between the planned value and the achievement-to-date derived from analysis, test, or demonstration.