The T&E Decision Environment

Presented At
Second Economics of T&E Conference
At Georgia Institute of Technology

Authors
Martin Prehm
Roger Bergstrom

NUWC Division Keyport
610 Dowell Street
Keyport, WA 98345

Email
mprehm@kpt.nuwc.navy.mil
rbergstrom@kpt.nuwc.navy.mil

November 1999

T&E Decision Environment

Purpose.
Organizations, and particularly T&E or technically oriented organizations, have demonstrated not only a resistance to change, but an active opposition to differing from existing processes. This can often lead to a failure to modify or change the organizational culture to one that is more modern or reflects some of the process/business/customer orientations professed today. This failure to shift the daily mechanisms in a manner to move the organizational culture is cited as a common cause of failure. Because of the difficulty for people to make this transition an intermediary step could help. This paper describes one such intermediary step that is intended to begin by getting people thinking about how they make decisions.

The decision environment defined in this document can be used directly as a step on the path towards any of several systems engineering disciplines. Examples of where these paths could progress to include Total Quality Management, Capability Maturity Modeling, Reliability Engineering, or other disciplines. What is intended by this paper is to show that to get to any of these paths there are certain thought patterns that would be useful to have in place before attempting the cultural change. It is proposed that this shift can be the beginning of the change for a technical or T&E organization towards one of the more disciplined management techniques. And finally, this can lead to the mindset that is required to complete a cultural change within the organization.

Background.
Over the past six months a small team at the Naval Undersea Warfare Center Division Keyport looked at how DoD and primarily the Naval Sea Systems Command (NAVSEA) accomplishes placing a value on the T&E portion of the acquisition process. The purpose was to see if there was a way to help the program offices make better and more economically sound decisions. Document searches and interviews of T&E decision makers and influencers at various levels were used as sources. The majority of the interviews were in the undersea warfare discipline with a very few at the DoD level.

A major finding of the study was that there did not appear to be any universally accepted methodology for determining the value of T&E to an organization by any of the people interviewed. In fact most people did not even calculate, or worry about

calculating, the value of T&E to their organization or processes. The focus of the acquisition people, including the T&E people, was on successful completion of OPEVAL and thus Milestone III. The priority was to "field a system". No one appeared to be taking on the difficult job of attempting to estimate the total T&E costs, including the cost of failures, ahead of time. But at the same time both industry and DoD expressed the thoughts that they were searching for T&E Best Practices.

Another observation that appeared as a profound statement of fact was that the politics surrounding a decision had as much influence as the costs of the decision or other business related aspects. This may very well be a function of today's more austere environment, or it may have always been a fact that people tended not to acknowledge. Whenever this observation was restated, it was acknowledged as fact by people at all organizational levels.

The combinations of the lessons learned produced a set drivers that can be used to refer to the items surrounding a T&E decision. These drivers are used here as the definition of the T&E environment and will be defined in the remainder of this paper. For ease of discussion the drivers will be referred to as the 4 pillars of the environment, and consist of:

- Human (Decision Maker),
- Business,
- Political, and
- Technical.

It was also observed that an analysis of how an organization responds to situations, or the organizational culture, is defined to a large part by the response to and knowledge of these drivers. Thus these drivers not only describe the culture of the organization, but the environment that surrounds its decisions, especially the T&E decisions.

Today's Environment.

Today there are many difficulties that are taken for granted by decision makers, that were not always the case. These items add to the difficulty in making timely and correct decisions relative to T&E. Some of the more influential factors include:

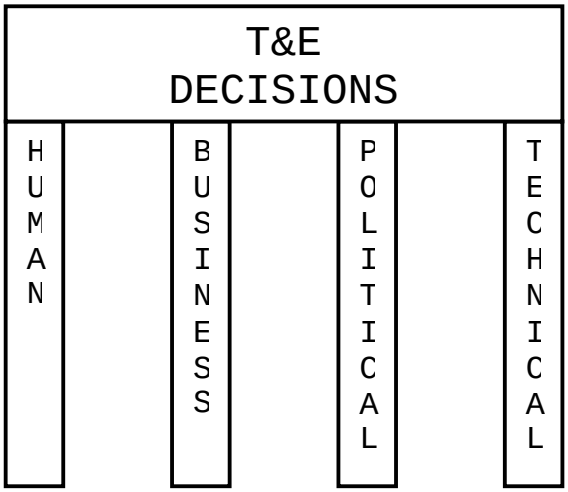
- Constantly changing program requirements,

- Struggling T&E infrastructure,
- Diminished resources with intense resource competition,
- Acquisition reform, and
- Success or perish mentality.

When approaching a decision that must be made quickly it is very easy to overlook one or more factors that in the end could be very influential upon the decision. This points to the fact that it is very important that the environment surrounding each decision is understood. What was observed during the study team's research was that there was often not an organized or consistent approach to the decision making process.

Defining the Decision Environment.

Now progressing on to the pillars that hold up our decisions and



their usage. It must be noted that this is a work in progress and that there have been no validations of these concepts. As always, suggestions for making this a workable and useable model are solicited. Now to begin the definitions for each of the pillars.

Human (Decision Maker) Driver. This driver is intended to allow the decision maker to understand how they work as a human being. Here there are several important things to be aware of. Guiding factors include the decision maker's risk tolerance, professional experience, personal goals, and their effectiveness at making their decisions hold firm. Each person must understand these things about themselves before they can become

effective decision makers. Understanding how personal experiences away from the professional world influence professional decisions also helps to define some of the human drivers.

The key for this pillar in the decision making environment is to understand exactly which items about the decision maker's humanness will contribute to each decision. If these factors are understood, they can be used to later compare and normalize the decisions made by different individuals. This becomes very useful for determining successful decision processes without having to model each individual.

An example of understanding the human factors surrounding a decision would be exhibited by enumerating the experiences that the decision maker had in the past in similar situations and attempting to determine any biases that could be attached to these experiences. This could include the understanding of why the decision maker was successful in the past by making decisions that turned out to be praised by others.

Business Driver. This includes those items that are related to the application of business practices. This can be further divided into two major areas; the first of which is the continued viability of the program that the decision maker is working on, and the second being the viability of the organization(s) that the decision maker is in or supporting. Each of these areas defines the business aspects of the decision. Without either a program or an organization the decision maker would have no decisions to make or purpose for employment.

Program viability can be described in many ways. In the business sense analogies to profit, return on investment, and cost/benefit analysis could all be imposed. But, in the end there is often a fixed budget associated with any T&E phase of a program and if this budget is exceeded by an often unexpressed set amount the program is considered nonviable and will end up being cancelled. Thus the decision maker must be aware first that there is a limit and second what the limit is. Without this knowledge all of the business calculations done will not save the program in the event of a poor decision.

Organizational viability is the other business pillar factor. If the organization that the decision maker is part of should loose its viability then the decision maker will loose the program. In order to maintain this organization, or the

organizations positioned to be working for the decision maker, there must be an infrastructure. This infrastructure must be first sustained into the future and then investment must be made so that it will be maintained. Thus there are competing business interests for the money that could be applied to doing the next T&E function that must be used to maintain the organizations supporting the decision maker.

Political Driver. This is a set of drivers that people have alluded to, but no direct addressing of them was discovered. People did address the fact that the political atmosphere surrounding T&E decisions often times has more influence on a decision than cost issues. This set of drivers must include an examination of the political risk and ramifications of every aspect of the decision at every step of the way. This includes appropriate analysis at all levels from the Executive branch, to Congress, to DoD, to the services, to the local activity and customer, down to the managers related to the tasking and decision. The motivations as well as the inclinations must all be examined for relevant information. Care must be used to look at accurate predictions and analysis of situations because in this arena there is often conflicting information that can create false impressions.

The politics associated with a T&E decision can and should include examinations of motivations for the customer, the stakeholders, and the management chain within all producing organizations. Each of these aspects contains political factors that influence the outcome of decisions. There is especially influence over the longevity of a program because of politics. It is totally possible *to win the battle and loose the war*, or in this case the entire project.

The decision maker must make decisions understanding the policy and guidance that is provided from superiors who have differing goals. The decision maker must also understand the goals and objectives alignment that provider organizations have with the goals and objectives of the decision maker. The decision maker is in a unique focal position where policy and guidance from above is focused on that position and the supplier organizations for the decision maker rapidly spread out with their own goals and objectives. It is analogous to an hour glass where the decision maker is at the center and as one moves away from the center the goals of the participants diverge from those of the decision maker. The understanding of this concept is the essence of the political driver; both internal or in-house politics and politics on the grander scale.

An example of understanding the political environment could be as simple as the decision maker understanding the driving forces involved with the decision from “up-the-chain”. Knowing how the decision impacts those within the sphere of influence of the decision maker view the program can go a long way towards understanding the political drivers involved with a program.

Technical Driver. This driver includes an analysis of all the technical issues and technical risks at each step of the process. This also is a valid place to examine various technical alternatives for the decision and to understand what the relative merits of each alternative are. This is the area that scientists and engineers feel the most comfortable with, but by the same token often times it is glossed over ignoring the multiple depths included in this issue.

One of the critical technical items is the demonstration of the exit criteria. For many acquisition projects this is viewed as successfully completing OPEVAL. Often times it is necessary for the decision maker to focus on other intermediary demonstrations, but at all times the final exit criteria, system retirement, should be viewed. It is only when a system has been retired that the final exit criteria has been achieved, with all other criteria being intermediary—including OPEVAL.

There are entire disciplines devoted to risk management. Some organizations accomplish these tasks well, others not so well. The ability to distinguish risks and set up responses for the risks are an important technical driver issue. Many people actually define T&E as a risk mitigation program for the acquisition process. Thus it is imperative for an organization to pay particular attention to this factor.

Driver Use.
The next step is to see how these pillars can be used to help make better T&E decisions. The purpose of going to the effort to examine the T&E environment surrounding a decision is twofold. The first being so that a shift in personnel does not leave a gap in the logical progression to the accomplishment of goals. And the second is so that in the future a thorough examination can be done looking back and recognizing analysis errors so that improvements can be built into other projects. The entire purpose here is to learn to manage your decisions using logical analytic formats that can be used by even moderately technical managers in an intuitive manner to make very technically oriented decisions with successful outcomes.

Here success must be defined by the particular organization involved.

This has not been developed as a model, that is perhaps work for the future, what has been done is to suggest that there are some basic areas to be investigated before finalizing a T&E decision. These areas are represented by the pillars or drivers. The format for the investigation could be a set of standard questions in a worksheet type format as suggested in Appendix A, or it could take on a more automated format. The manner of the analysis is not as important as the fact that the analysis was actually accomplished. Without this analysis completed, a review in the future to determine shortcomings, successes, and process management is lost. The worksheet or set of questions is viewed as requiring construction for each individual organization. This then can take into account the organizational culture of the individual organization. This is in opposition to building a set of questions for each process. It is felt that the responses, though related to a specific process and decision, are more organically and thus organizationally oriented. The weaknesses and strengths in the areas of the pillars relate more to an entire organization than they do to specific processes.

Conclusion.

A methodology is suggested whereby specific drivers are examined for each T&E decision that is to be made. These drivers are believed to hold the keys to making decisions that will result in accomplishing the goals of an organization through valid decision making. This methodology also leaves the decision makers with a defined environment that can be validated over repeated usage for specific customers. This can lead to an institutionalized set of responses for specific customers that can open up task management to many more individuals within an organization.

Using this framework can help to move an organization towards one of the more institutionalized systems engineering disciplines. This framework can act as a stepping off point by putting in place a set of concepts that can be related back to concepts that decision makers at all levels understand. These concepts also should be easily integrated into modern management techniques.

APPENDIX A

Decision Environment Worksheet

T&E Question: _____
_____
_____

Topics for Review

I. Human Drivers

A. What process do I use to make decisions?

B. What similar experiences have I had? What were the responses?

C. What has my risk tolerance been relative to this type fo decision? Was it justified?

D. What biases do I bring to this decision that can have impact on my opinions? Personal goals, expectations, etc.

E. Are there any personal gains that can be achieved by anyone in the customer or activity based on this decision? How can/will this affect the decision?

F. Other: _____

II. Business Drivers

A. What is the maximum financial allotment for this decision? Is there any play in the budget?

B. Is there any direct effect of this decision on program fiscal viability in the future?

C. Will this decision impact the ability of the T&E infrastructure to maintain itself and remain viable for future projects?

D. Is there any need or desire to invest in the infrastructure for the future to keep the organization viable for future T&E?

E. What research has been completed to validate the costs and the benefits associated with this decision?

F. Other: _____

III. Political Drivers

A. Are there any political ramifications or issues at the Congressional, DoD, Service, SYSCOM, Activity, or management levels? Describe each.

B. Are there any perceived values based on politics alone related to this decision?

C. Does this decision fall into anyone's "hot topic" area?

D. What research has been accomplished to validate the political climate surrounding this decision?

E. Other: _____

IV. Technical Drivers

A. What are the exit criteria for this decision/phase? How can they be met?

B. What alternatives are available to respond to this question/decision?

C. What technical risks are associated with each decision that could be developed?

D. What technical issues, beyond risk, are associated with this decision?

E. What research has been accomplished to validate the technical issues/risks?

F. Other: _____