EVOLUTION OF CONFIGURATION MANAGEMENT

Challenges/Growing Pains at Edgewood Research, Development and Engineering Center

William J. Semiatin • Thomas C. Hoff

For almost a year, management told us that the U.S. Army Chemical Research, Development and Engineering Center (CRDEC) had to reorganize — change our way of doing business — just to survive.

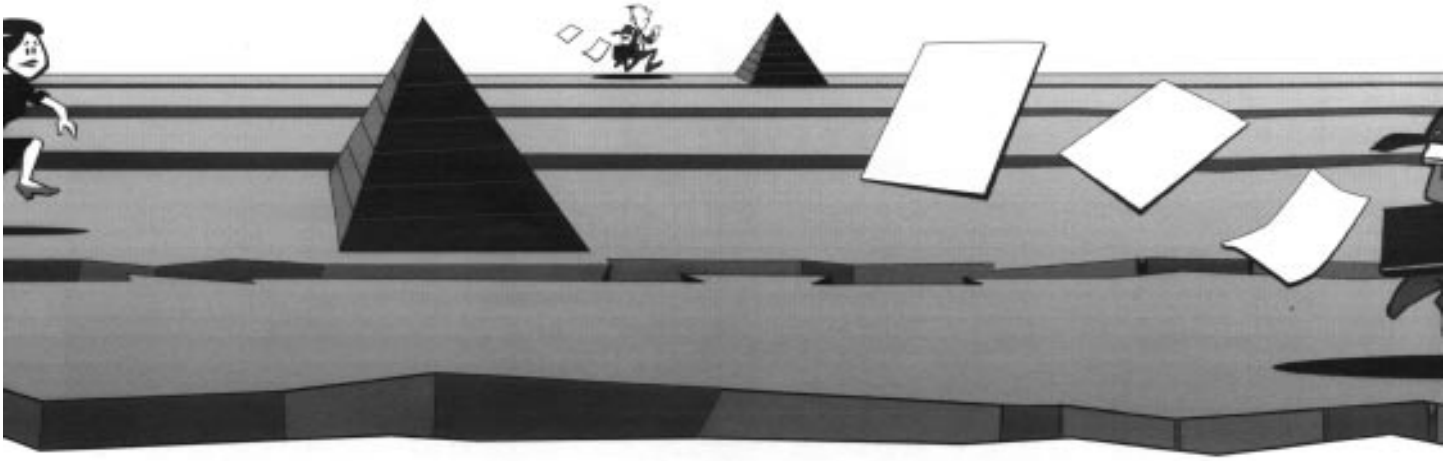
Rumors abounded. However, the corporate board leadership, early in the reorganization effort, shared the visions and values of the new Center (renamed Edgewood Research, Development and Engineering Center — ERDEC) with the workforce. The vision was for the Center "to be the recognized world leader in chemical and biological-related science technology, engineering and service by 1) anticipating and exceeding customers' needs; and 2) providing an environment that encourages and enables people to excel." The board developed four core values to attain the vision:[1]

- *People* (the workforce above all else)
- *Customer commitment* (interaction of the workforce with customers to assess and ensure complete satisfaction)
- *Innovation* (breaking the mold to realize potential)
- *Continuous improvement* (striving for excellence)

Training became a priority. We were taught how to "break the mold" — break away from our directorates, divisions, branches and sections, and how to form project teams. Management held process action team meetings to facilitate the changes, and electronic mail and bulletin board postings to inform and involve the CRDEC personnel of the direction and progress of the reorganization.

Mr. Semiatin is a mechanical engineer at the U.S. Army Edgewood Research, Development and Engineering Center (ERDEC), Aberdeen Proving Ground, Md.

Mr. Hoff is a general engineer who currently serves as the Rapid Obscuration System Manager, ERDEC.



And, just as important, encouragement from the very top — the new Commander — lent credibility and reaffirmed our resolve to make it all work.

CRDEC Yesterday

Previously, the program management for configuration items had been aligned with applicable directives, regulations and standards, and CRDEC was structured accordingly. Functional areas had equal levels of authority, such as development engineering, producibility engineering and quality engineering, and each project representative had a pyramid to climb and descend for official interaction with one another.

Typically, the producibility engineer, through a senior engineer, section chief, branch chief and division chief/director would send a request to the quality engineer — via the director, division chief, branch chief and senior engineer. The response, of course, was the reverse.

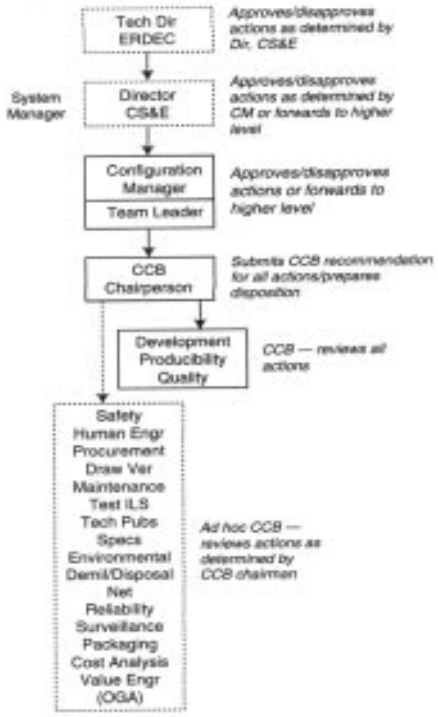
For configuration management items, the senior engineer was the signatory authority on the Level 2 Configuration Control Board (CCB), the division chiefs or directors composed the Level 1 CCB, and the director of the hardware organization was the configuration manager. Disposition of configuration management actions was sometimes cumbersome.

Functional areas had equal levels of authority, such as development engineering, producibility engineering and quality engineering, and each project representative had a pyramid to climb and descend for official interaction with one another.

Teaming

In the reorganization, functional area representatives would be co-located to support one project (or one group of similar projects). This project team would all have the same boss — the team leader. Through teaming we would be an organization in which team members would "achieve common goals and share ownership and responsibility for their results, while considering the needs of all stakeholders."

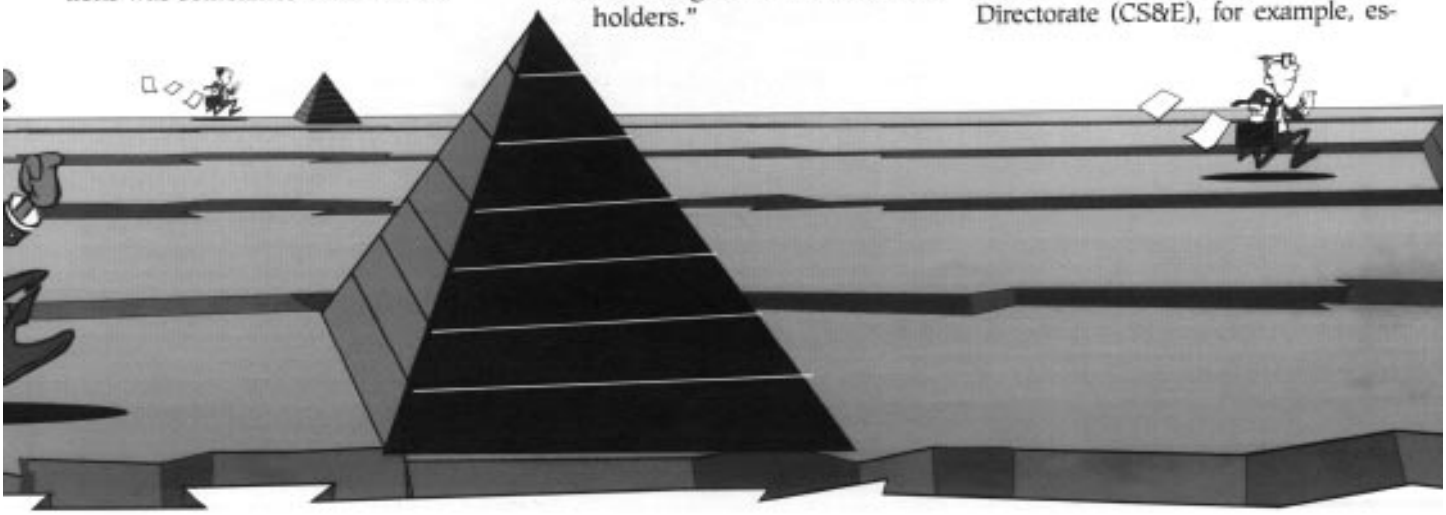
FIGURE 1. Configuration Management Structure



Empowerment

The teams would be empowered "with the freedom, responsibility and ownership needed for innovation and risk taking within defined operation parameters."[2]

With empowerment came accountability. A project team within the new Concurrent Science and Engineering Directorate (CS&E), for example, es-



tablished a baseline schedule, funding profile and exit criteria for approval of the Director, CS&E. The team leader would then be free to operate within the limits of this agreement.

Case of the XM6 Discharger

The configuration management plan for the XM6 Discharger, a typical CS&E program, reflects the visions and values of the new organization. The XM6 Discharger consists of four fixed tubes for launching smoke grenades for the defensive obscuration of military vehicles. "Usual" project engineering personnel participated in the program development, producibility, quality, test, logistics, reliability, safety, etc. The program was in the last year of its development (6.4 phase) when the reorganization went into effect.

CONFIGURATION MANAGEMENT

A discipline applying technical and administrative direction and surveillance to—

- identify and document the functional and physical characteristics of a configuration item;
- control changes to those characteristics; and
- record and report change processing and implementation status.

According to the new configuration management structure (Figure 1), the XM6 team leader has configuration management responsibility, and thereby approval authority for all actions (engineering change proposals, value engineering change proposals, requests for deviations, requests for waivers) not affecting the baseline agreement between the team and the Director, CS&E. A provision is also allowed for involvement of the Technical Director, ERDEC, depending upon the impact. The team leader is also responsible for keeping CCB members cognizant in their respective functional areas. The team leader (and typically, the team) will periodically brief the Director, CS&E on all current configuration management actions.

The CCB chairperson is designated by the team leader. The chairperson convenes the Board to review actions, consolidates and submits recommendations to the configuration manager, and prepares disposition for procurement implementation and/or engineering release into the technical database. The CCB members are the team members who maintain cognizance in their respective functional areas. Figure 2 depicts this "evolution."

For a program like the XM6 Dischargers, the new configuration management is a much more practical way of doing business. No longer would a hierarchy of managers be needed to "sign off" on the day-to-day business of materiel acquisition, nor would arbitrary limits be set on a team leader's authority. Therein lies the strength of configuration management — teaming and empowerment.

However, teaming may result in loss of functional area expertise. In the past, the quality engineer, for example, worked side-by-side with other quality engineers, as well as product quality managers (who had inspection expertise) and technicians (who maintained regulations and policies governing quality assurance activities). This group would typically have a few senior engineers who had expertise in the section's hardware specialty area.

For incoming personnel, a high level of competency in a functional area could be achieved quickly because the group of quality engineers, product quality managers, technicians and senior engineers provided sound guidance and direction.

ERDEC Now

Today, the evolution of configuration management at ERDEC continues — including the growing pains — as the next generation learns through teamwork, empowerment and accountability.

Endnotes

1. CBDA/ERDEC "Corporate Vision and Values," February 1993.

2. CBDA/ERDEC Information Note No. 3, "Command Vision, Values and Behaviors," 23 June 1993.

FIGURE 2. Evolution of Configuration Management

	10 Years Ago (CSL)	5 Years Ago (CRDEC)	Today (ERDEC)
The Configuration Manager was/is:	Munitions Division Chief Physical Protection Division Chief Detection and Alarms Division Chief	Producibility Division Chief(s)	Team Leader(s)
Configuration Control Board (CCB) members were/are:	Level 1 - Commander/Technical Director and Division Chiefs Level 2 - Branch/Division Chief and Development Engineer, Producibility Engineer, Quality Engineer, Test Engineer...		The Team
Limitations to Configuration Manager authority were/are:	Impact of 6 months/1 year or $500k/$1M to program	Impact to the baselined agreement of program schedule and funding profile between team and Director, CS&E.	