Government/Contractor Partnerships for Continuous Improvement

A Goddard Space Flight Center Example

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ABSTRACT

This paper discusses the efforts of a government organization and its major contractors to foster a continuous improvement environment which transcends the traditional government/ contractor relationship. This relationship is aimed at communication, partnership, and trust -- creating benefits for all involved.

1.0 Introduction

Continuous Improvement (CI) activities on an informal basis have been an integral part of the Goddard Space Flight Center's Mission and Data Operations Directorate (MO&DSD) for many years. These efforts derived from our employees' desire for technical excellence, an ever-increasing demand for quality services from our users, and the necessity for improved productivity in the face of decreasing budgets.

In 1991, concurrent with the Center's pilot application for the President's Award for Quality and Productivity and the subsequent evaluation by the NASA wide review team, these improvement efforts were formalized and a CI program was established.

In a September 1991 message to Center senior management, Center director Dr. John M. Klineberg stated that "the Center's strategy for excellence is to improve continuously the Center's products, services, and work processes .... now is the time for us to formalize our processes to undertake this mission." Coinciding with this message was the publication of the GSFC Strategic Plan, which set Center-wide goals and strategies for excellence and continuous improvement.

As Associate Director of the MO&DSD and Technical Officer for the directorate's two major contracts, the author began generating interest in CI in early 1991 by establishing informal meetings with management and representatives from each contract. The group, known as TQM.500, brainstormed ideas, exchanged experiences, and identified potential advocates (''quality champions'') within the divisions. Within a short period of time, additional government employees joined the group.

The major groups represented by TQM.500 are:

a. The MO&DSD civil servant organization (650 employees).

b. The Network and Mission Operations Support (NMOS) contract, held by the Bendix Field Engineering Corporation (BFEC) (2,300 employees).

c. The Systems, Engineering, and Analysis Support (SEAS) contract, held by the Computer Sciences Corporation (CSC) (1,500 employees).

The government/contractor organizational structure will be discussed in paragraph 1.1.

1.1 Background

The Mission and Data Operations Directorate is one of nine directorates that comprise the Goddard Space Flight Center in Greenbelt, Maryland. The MO&DSD's ten divisions and offices are responsible for developing and operating mission operations and data systems. The MO&DSD provides telemetry, command, tracking, data acquisition, data processing, and communications support services for low-earth orbiting spacecraft missions and for GSFC flight projects that require major data system support.

In 1987, the MO&DSD combined nine support contracts into two major 10-year contracts: SEAS, the systems development contract, managed by CSC; and NMOS, the operations and maintenance contract, managed by Bendix. These two contractors, and their associated subcontractors, provide the main support to the directorate.

Both the NMOS and SEAS contractors had a long history of service at GSFC, and both had active CI (or TQM) programs. The NMOS TQ activities evolved from its Productivity Improvement and Quality Enhancement (PIQE) program that had received two Goddard Excellence Awards, the U.S. Senate Productivity Award for Maryland, and three-time finalist status for the George M. Low Trophy/NASA Excellence Award.

SEAS was actively involved in a very ambitious TQM program that featured full training and participation of its workforce and improvement initiatives on all of its many tasks.

The NMOS and SEAS organizations essentially mirror the MO&DSD structure. This structure is shown in Figure 1, which also shows additional support areas necessary to accomplish MO&DSD's missions. The two contracts interface with the government at all technical levels. Within each division, there is a separate Assistant Technical Officer for NMOS and SEAS.

The author is Technical Officer and Performance Evaluation Board (PEB) Chairman for NMOS and SEAS. These roles give him a broad view of the business and technical aspects of

each contract, and allow rapid access to both Program Managers and their resources and expertise.

Of major concern, besides meeting the cost, performance, and schedule objectives of these contracts, is the smooth transition of newly developed systems into the operational environment with good teamwork between the government and each contractor and between the two prime contractors. It was this concern that fostered the continuous improvement partnerships among all of these elements.

GSFC also began to foster continuous improvement awareness at the Center through symposiums and communication of TQ information. The Center Director established a team to recommend the direction the center should take in the CI effort. Another team led by NASA Headquarters evaluated the NASA centers to provide a baseline from which to start. This evaluation was baselined against the Presidential Award criteria.

The MO&DSD used the assessment to begin the first steps in providing TQM awareness, its attributes, and potential benefits. Champions were identified, various government and industry activities were observed, and a number of teams were started within the directorate. TQM goals were established in performance plans and the foundation for CI was started.

The Center Director also established a TQ Working Group, made up of senior managers from all of the directorates and major contractors. The author serves as a member of this group, which is leading the effort toward implementation of CI throughout the Center.

1.2 Objectives

TQM.500 was formed to stimulate learning and idea sharing, and to create an effective partnership (win-win) environment. Both of the contractors involved came into the group with some CI and TQM experiences, and these experiences were used as the basis for identifying issues and challenges in establishing effective government/contractor partnerships.

The primary objectives of TQM.500 were to:

a. Create an environment where continuous improvement is expected as an element of each employee's task.

b. Share lessons learned between contractors and government personnel.

c. Address issues that can benefit from government and contractor teamwork.

d. Establish a recognition system that results in a win-win situation.

e. Foster joint teams (NASA/NMOS/SEAS) to improve processes

2.0 Establishing the Foundation

There were a number of challenges and barriers associated with establishing a CI partnership among the various MO&DSD elements. Barriers and challenges included a normal resistance to change, traditional government/contractor relationships, a need for CI understanding and

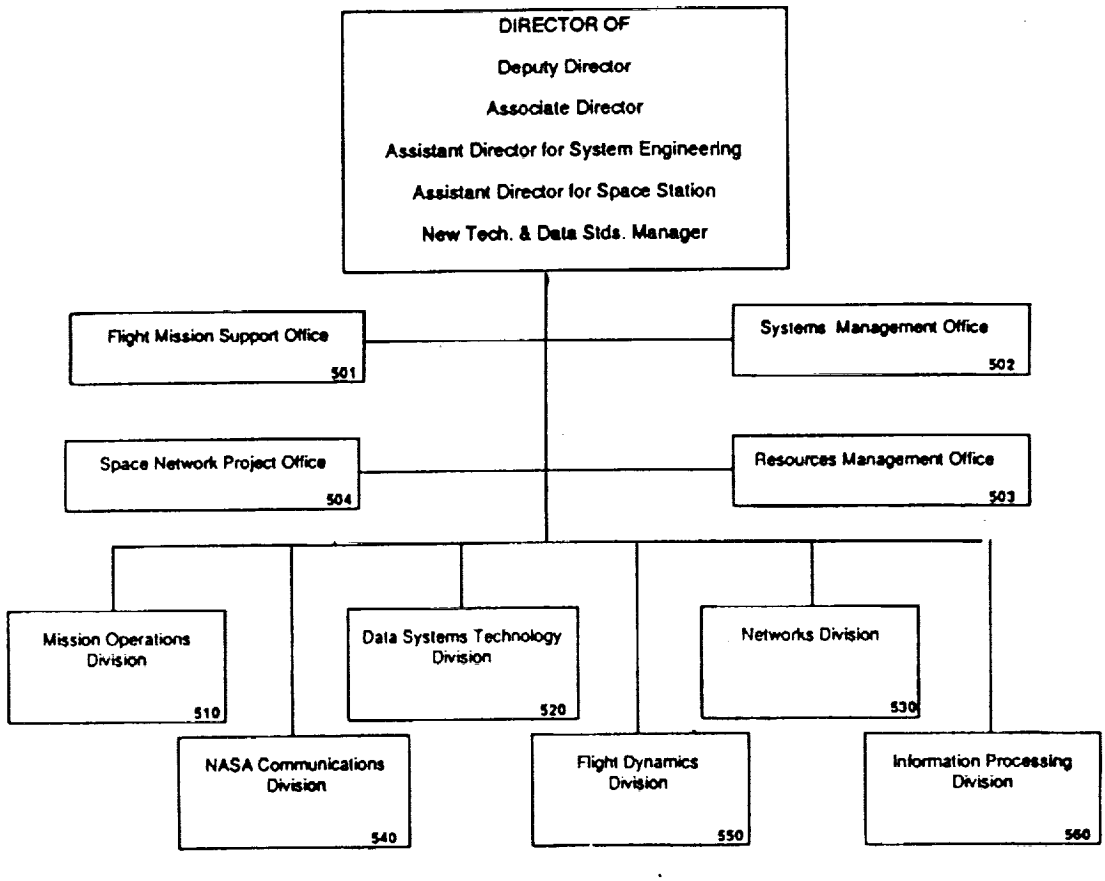

Figure 1. The MO&DSD organization, which is mirrored by the NMOS and SEAS contracts.

training, and some organizational complacency. However, there were also significant supporting factors which tended to offset these negative elements. Some of these factors were:

a. History of shared successes. Many of the government and contractor personnel were spaceflight pioneers, who worked as partners in the past to ensure the successes of the flight projects of the 1960's and 70's and into the Shuttle era and beyond.

b. Relationship of Trust. These many past experiences have developed into relationships of confidence and trust.

c. Clear Contract Roles. The definitions of the SEAS and NMOS contracts provided each contractor with clear, complementary roles, thus minimizing competition.

d. Common Technical Officer. SEAS and NMOS report to the same MO&DSD Technical Officer and PEB Chairman, who was instrumental in initiating these CI partnerships. This relationship ensured consistent values, goals, and approaches on both contracts.

e. Management Commitment to CI. CI and teamwork were already emphasized in both contractor organizations, and the message of commitment to CI was becoming clear from NASA, GSFC, and MO&DSD management.

f. Contractor Experience. Since both major contractors had experience in implementing CI processes, some traditional pitfalls and roadblocks were avoided. These pitfalls included lack of demonstrated management support, "bottom up" implementation, and a fear of risk taking.

MO&DSD, NMOS, and SEAS representatives began meeting on a weekly basis in early 1991. An early activity was a CI awareness process to seek out and publicize current efforts. Many successes were already being achieved around the directorate, both by civil servants and contractor teams. These existing successes and "best practices" were shared throughout the directorate and formed the basis for the directorate's input into the GSFC pilot application for the President's Award.

The roles of key individuals in the CI process were considered. In addition to the central role played by top management, there was an important role for advocates or champions within each organization. The long-term commitment to CI requires the energy of enthusiastic self starters who can help overcome barriers and start pilot projects. CI advocates were identified and brought into the TQM.500 partnership process.

Initial actions and pilot projects were considered and developed by applying some basic CI principles to the government/contractor partnership concept:

a. The needs of customers and users are the primary consideration.

b. Government representatives steer the change process and create linkages.

c. Government representatives encourage contractors to take the initiative in process improvement that increases the value of products and services delivered.

d. Each employee (government and contractor) is encouraged to make improvements.

e. The focus is on the mission of the organization.

f. Contractors feel integral to the success of the directorate.

g. The primary investment is in problem prevention rather than problem solving.

3.0 Advocate and Share Ideas Stage

The TQM.500 team recognized that communication - "getting the word out" - was critical to the success of the CI partnership.

The CI message was communicated through in-place vehicles, such as the NASA Select TV, the GSFC Strategic Plan, Goddard News, electronic mail, directorate and contractor newsletters, and other traditional sources. But more focused approaches, specifically designed for CI, were needed.

On April 22, 1992, NASA GSFC management and the major contractor management met to explore fostering and developing CI to accomplish the center's mission. The symposium focused on four primary areas of CI: lessons learned in getting started, empowerment of

employees within organizations, customer involvement which brings better focus on excellence, and best practices which they considered in developing a CI community. Sixteen speakers made presentations on the four areas, and then the attendees became active participants in workshops to discuss the presentation information, and make recommendations for further action.

Another major effort involves the MO&DSD Lecture Series which provides a platform for Code 500 communications. Originally, the lecture series was restricted to civil servants, but we fostered greater participation by encouraging contractors to attend and eventually to present. Presenters are now alternated between government and contractors. Presentations are videotaped and made available upon request. CI sharing presentations have been scheduled well into 1993.

4.0 Networking

It is essential that TQM.500 interact with ongoing TQM and CI programs and activities in the government and industry. Networking with other TQ advocates produces the fresh ideas and concepts essential to continuous improvement.

Among these important interfaces are:

a. NASA Headquarters Office of Continuous Improvement and its annual NASA/Contractors Conference.

b. The Federal Quality Institute, administrator of the President's Award.

c. GSFC TQ Working Group.

d. GSFC Contractors Association.

e. The Maryland Center for Quality and Productivity, University of Maryland.

f. Corporate TQ programs of the NMOS and SEAS contractors.

5.0 Fostering Improvement Initiatives

Success of TQM.500 depend to a large extent on the ability to create cohesive teams in which members, from both government and contractor organizations, enhance each other's ideas and efforts. Teambuilding is developing gradually, and successes are occurring.

Across the directorate, CI activities involving joint action teams are taking place. These joint team efforts are dealing with such diverse topics as compatibility testing on the Space Network, division requirements process, better identification of operations problems within and between the network and its customers, better efficiency of the configuration control process, efficiency of routine TDRSS testing, and the process of software size estimation.

6.0 Early Results

There has been noticeable progress since the beginning of the TQM.500 team activities. Advocates successfully fostered the team concept, and throughout the directorate there are process action teams comprised of NASA, NMOS and SEAS personnel.

Productivity improvements and cost savings are visible results. Each main contractor collects and highlights cost savings resulting from process improvement teams and/or individual suggestions.

Support improvements are being accomplished through better utilization of resources, especially labor hours. One key example is the formation of a 10-person Ground Network mission support team, which utilizes technical innovations and CI techniques to perform functions previously done by 23 employees. This improvement was accomplished through an intense cross training effort, process analysis which recognized essential and value added activities, and the empowerment of specialized personnel.

Another major innovation is the development of a Computer Aided Logistics System (CALS) by the MO&DSD, its logistics contractor, Raytheon Service Company, and supported by other contractors. CALS allows for a significant reduction of cycle time in the acquisition and world-wide distribution of equipment and parts, and provides ongoing opportunities for process improvements and cost savings.

In the NASA Communications Division, a significant CI activity is directed toward streamlining the process for testing new systems and releases of operational systems. Under the direct sponsorship of the Division Chief, the team addressing this objective is composed of government staff and supported by SEAS and NMOS personnel.

A government/contractor software development team in the Information Processing Division conducts Defect Casual Analysis after each build of a system to examine the causes of problems found during system testing. This knowledge is fed back into the development of subsequent builds.

The Spacecraft Control Programs Branch has established a joint NMOS/SEAS test team to provide both independent tests and on-site acceptance tests of mission support software. The process has reduced the time required for the test team to "come-up-to-speed" on system releases, fostered the exchange of technical information, and reduced programmer errors.

7.0 Future Vision

Greatly increased demands on space operations and MO&DSD mission support capabilities in the 1990s and beyond adds pressure to the capacity of space and ground networks and communications and data processing. MO&DSD management recognizes the potential impact that CI can have on these demands.

Based on future demands and challenges, the following steps need to be taken in the future to see our vision fulfilled:

a. We must continue building the partnerships between government and contractors. All sides must be patient, and recognize the importance of "little steps" forward.

b. All areas must focus on the common mission. This will foster the team spirit.

c. NASA, NMOS, and SEAS must continue to share ideas, and provide an open forum for process action teams. All sides must work to increase trust between organizations, creating and fostering "win-win" situations.

d. We must consistently look for success stories, and allow people to share their knowledge and assist other areas.

e. We must provide training and expand participation within the directorate. We must ensure all levels of management and employees receive the necessary training.

The last step is to assess the organization as a whole against the President's Award criteria. This should be done periodically. Products of this assessment will be action plans to move forward on the continuous improvement path.