SPACE BASED INTERCEPTOR
TOTAL QUALITY MANAGEMENT
NEWSLETTER

"MR. OUTSIDE/MRS. INSIDE" STRATEGY USED IN SPO

Popular management book *"Swim with the Sharks"* by Harvey Mackay advocates the use of a "Mr. Outside/Mr. Inside" strategy for running an effective organization. He explains that companies that have had one top official who did major interfacing on the outside and another top official who managed the in-company operations have proven to be very successful.

The SBI program office is run in a manner similar to what Mr. Mackay says is necessary. Program Director Col James Simmons is "Mr. Outside", while "Mrs. Inside" is acting-Deputy Program Director Mrs. Winnie Fanelli, who recently replaced Lt Col Ray Fellows in the job. Lt Col Fellows' previous fine work as the SPO's "Mr. Inside" earned him a promotion to the CN Deputate office.

Mrs. Fanelli said, concerning her new position, "TQM has been my working philosophy before it was even called TQM. I believe in good communication and teamwork among members of the SPO, and I will do my best to help Col Simmons in continually improving the way we do business here."

The new "Mr. Outside/Mrs. Inside" team should help to keep our program office one of the best-run operations in Space Systems Division.

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TQM PRINCIPLES:

. Serve your Customer

. Strive for Quality

. Continuous Improvement

SBI LEADS IN USING TQM FOR S/W DEVELOPMENT
POTENTIAL $30M SAVINGS

Total Quality Management (TQM) principles such as tailoring, teaming, and using innovative methods for continuous improvement have been prodigiously applied by the Air Force Space Based Interceptor (SBI) program office and contractors Martin-Marietta and Rockwell International in the area of software development. This work on product improvement could save the SBI program an estimated $30 million in life-cycle costs.

The software requirements for operating a space based interceptor system are tremendous, and the development of that software can easily get out of hand. By employing TQM related principles, many problem areas have been reduced, resulting in the potentially large cost avoidances.

MANY INNOVATIVE IDEAS

Software engineers and managers working on the program have been innovative in seeking continuous improvement in SBI software development.

Air Force software quality expert, Ken Chiavone, who was recently recruited to the program from Warner-Robins AFB, is pushing for improvements in various areas of the SBI software development using TQM methodology. He is advocating well-defined user requirements for the development of a thorough B-5 specification, full participation of the user during all phases of the software acquisition, and the extensive use of global variables to make the software development more effective.

Software project engineer Dan Burley said that the use of highly modularized coding would also enhance the testing and supportability of the software, resulting in a more cost-effective, quality product.

Other Air Force SBI software engineers are also doing their job to reduce the software development costs.

(SOFTWARE SAVINGS - cont'd)

MARTIN SOFTWARE INNOVATIONS

Martin-Marietta SBI software development engineers are incorporating TQM principles, utilizing innovative approaches, to address the producibility aspects of the SBI operational software. They state that their entire team is dedicated to the TQM philosophy. This is necessary, given the size and complexity of the SBI software development effort.

One area that Martin is applying TQM is in tailoring the products to the needs of the Program. Tailoring MIL-STD 2167A is necessary due to Martin's iterative prototyping approach to software development. They also are tailoring the data item descriptions (DIDs) to accommodate an analysis/design methodology and accompanying products for effective conveyance of information.

"Tailoring for a balance of optimum quality and cost effectiveness requires a customer/contractor relationship," explained a Martin software manager. "That relationship nourishes new concepts, driven by the desire to achieve the same goals -- a cost-effective, quality product."

Martin is also using an automated library-type control system to allow software development at work stations to avoid having to use a costly mainframe, while still maintaining proper configuration management.

Also consistent with TQM is incorporating software reuse into the design philosophy. It assures that the amount of unique code to be developed is minimized and reduces the amount of testing necessary to verify the software. The result is higher code reliability at reduced cost.

RAPID PROTOTYPING SAVES MONEY

Both Martin-Marietta and Rockwell International are using rapid prototyping of the software to optimize the product while minimizing cost. Normally software is developed and tested before being given to the user/customer. With rapid prototyping, the customer makes inputs along the development path. Functionality is emphasized, while concern about details is delayed until the engineers are more sure the software works and satisfies the customer's needs.

The SBI software development team at Rockwell International is employing TQM in their software development approach by emphasizing early and concurrent development of software with hardware and other program elements. The concurrent approach that Rockwell is using emphasizes rapid prototyping.

Rapid prototyping was recently mentioned as a "technique for systems development that holds promise of more thoroughly developed products up front and greater customer satisfaction with the final results," in a *FEDERAL COMPUTER WEEK* article.

This approach identifies changes early in the program, when the changes are relatively inexpensive. Early prototyping also permits continual evaluation of the software development effort and allows for planned efforts such as logistics support required to support full scale software development and software maintenance.

OTHER ROCKWELL IDEAS

Rockwell software designs also implements a complete complement of instrumentation to provide rapid feedback on the design and code. This forward looking approach allows the software engineer to evaluate the software design for performance improvements and potential problems.

Additionally, scheduled internal reviews are performed on each software element at each life cycle step. All functional disciplines participate in these reviews to insure a continuity of approach to software development across the program, promoting early resolution of life cycle issues such as verification, integration, and operational support.

MOVING AHEAD

The work done by the SPO, Martin-Marietta, and Rockwell International in software development will continue to reduce the costs involved, while improving the quality of the product. It is another example of TQM methodology being applied to develop a more cost effective, quality product.

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SMOKING SOMETIMES ACCEPTABLE WHEN APPLYING TQM

Although Building 80 is designated as a non-smoking area, in some situations smoking is allowed and necessary for implementing TQM. Apparently 1Lt Joe Walker and Capt Ken Bruner were observed to be "smoking" in the building while putting together a briefing that Maj Arnie Alanis was to take to Washington.

With only an hour left before Maj Alanis was to leave for the airport, Capt Bruner was then overheard saying, "Not much time left, Joe. Let's use some TQM here. Let's START SMOKING!" ###

ALS TQM EXPLAINED IN TRAINING SESSION

Dr. Toru Iura, consultant to Aerospace, recently presented *"TQM and its Application to the Advanced Launch System (ALS) Program"* to members of the program office as a training session.

Many of the topics explained by Dr. Iura were seen to have direct application to the SBI program. A number of the participants of this training session showed insight on possible SBI applications in their specific work areas, as demonstrated by their questions and interest.

Dr. Iura defined quality, as used on the ALS program: "Quality is meeting the user's needs over the life of the product at the lowest cost to the taxpayer." He showed the evolution of quality management awareness, principles of modern management, and the cultural changes needed for TQM.

Key TQM techniques including simultaneous engineering, quality function deployment, parameter design, and statistical tools were explained.

Maj Robert Leal, Deputy Chief of the Systems Interfaces Division, said, "The session certainly gave me food for thought on how these TQM methods could be used to improve the work we do in our division. We will be looking into ways to directly implement improvements."

Producibility Engineer, Mehdi Kavary, felt the information was essential for the work in his area. "Aspects of TQM will direct effect process control efforts of the contractors."

Personnel interested in improving the quality of their work attended this voluntary briefing.

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SECRETARIES TO LEARN TQM METHODS

Secretaries in the SBI program office will be given an introduction to TQM in September in a short workshop designed to help them improve their effectiveness, as well as job satisfaction.

In *"TQM for Secretaries"*, they will learn about TQM, discuss problem areas, and suggest ideas for improvements. Secretaries from CNID and CNIS will also participate.

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CAUTIONS ON "DOING IT RIGHT FIRST TIME"

You've probably heard the phrase *"Do it right the first time!"* associated with TQM. Although it is an admirable goal, if it is used incorrectly the phrase has potentially negative connotations that could be contrary to the philosophies laid down for successfully implementing TQM.

It all depends on who is making the statement. If the individual worker wants to do his or her job correctly the first time, it is a good TQM attitude, but if management is mandating that policy, then it is contrary to TQM.

When *"Do it right the first time!"* is an expression management tells their workers, it can result in the same failures of other programs in the past.

About 20 years ago the Zero Defects program was pushed throughout the defense industry. People received Zero Defects pins to wear. Zero Defects posters were hung up all over. Supervisors and managers told their people, "I want to see zero defects in your work from now on!" But after a while, this program petered out.

The reason Zero Defects failed was because the onus was put on the workers. They were the ones that had to do good, and the boss blamed the workers if the job had defects.

Remember when President Ford handed out those WIN buttons? *"Whip Inflation Now!"* That program was a flop, because he put the burden for reducing inflation on the people. On the other hand, President Reagan showed the leadership to actually do something about inflation, such that it is no longer a problem.

Quality guru, Dr. Deming states that 80% of the problems in an organization is management's fault. If a worker doesn't perform well, it is a sign that his or her boss isn't showing the proper leadership skills.

President Truman had a sign on his desk, stating, *"The Buck Stops Here."* He was responsible for what went on in his organization.

"Doing it right the first time" is an admirable goal, but what happens if you fail? Do you get chewed out? If you succeed, do you become complacent?

TQM is about leadership responsibility for quality. It is about continually improving, giving feedback, getting feedback, and working as a team. That is what should be emphasized rather than another slogan by management to coerce workers into better performance. ###

WHAT IS OUR *PRODUCT?*
WHO IS OUR CUSTOMER?

We hear a lot of talk in TQM about delivering a quality, cost-effective **product** to the **customer**. But exactly what is our product here in the SBI program, and who is our customer? And what would determine if the product has quality and is cost-effective?

The ultimate product we are responsible for delivering is a Space Based Interceptor (SBI) sub-system that would integrate in and contribute to fulfilling the requirements of the Space Defense System. Our contractors are working on developing such a product.

Our customer is the Strategic Defense Initiative Organization (SDIO). Although we also respond to other organizations, we look to SDIO as our main customer. SDIO, in turn, responds to *its* customers within the Department of Defense.

DELIVERING INTERIM PRODUCTS

Since we are in the early stages of the defense acquisition process, we are presently responsible to deliver interim products, primarily consisting of information in the form of briefings and reports.

These briefings explain our concept, show what work has been done, give results of tests, and give estimated costs and schedules. The briefings are put together from data and results of work done and supplied by our contractors and technical support.

Our customer SDIO, and its customers, evaluate the information given in these briefings and decide on the course of action to take, including whether or not to continue the program and how much money we will get for further work.

FATE DEPENDS ON QUALITY AND COST

Much of the fate of the program depends on the perception of whether or not we are developing a quality, cost-effective final product. That is: a concept that is innovative, meets mission requirements, is durable against threats, and is well within the budget.

At the present time, the Air Force's MCV concept is facing stiff competition for SDIO dollars from Lawrence Livermore's Brilliant Pebbles concept. This points out the importance that our interim products - the briefings and reports - reflect a quality concept that exceeds the expectations of the customer, SDIO.

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BRAINSTORMING SESSIONS EFFECTIVE IN TQM

Brainstorming sessions are an effective tool in managing an organization. Besides stimulating ideas, a major advantage of brainstorming is the fact that everyone involved has "ownership" in the final result and in the decision-making. This follows TQM philosophies.

There have been some recent examples of brainstorming sessions within Space Systems Division (SSD) that show its effectiveness.

SSD MISSION STATEMENT MADE

Lt Gen Donald Cromer, SSD Commander, recently held a weekend off-sight at Vandenberg AFB with the Corporate Council in order to establish an SSD mission statement or corporate vision. Establishment of an organization's mission is an important element in implementing TQM.

The group brainstormed, with each person having an equal say, thus providing ownership in that mission statement to all involved. The mission statement was published in the 1 Sep issue of *ASTRO NEWS* as well as explained by Gen Cromer in a recent Commander's Call. It is recommended that all SPOs establish their own mission statements.

SPO RE-ORGANIZATION CONSIDERED

A self-evaluation of the SBI program office organization was done in a brainstorming session after a recent CNIW staff meeting. Ideas were presented by the participants on how to streamline the SPO organization and make the operations more efficient.

Considerations on re-organizing the SPO was initiated by the requirement that every organization in SSD streamline operations due to expected cutbacks in funding and manpower.

The brainstorming session proved successful in having participants provide inputs on a possible re-organization.

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If you have any questions, comments, or contributions, contact:

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