

Peace Shield — A Study in Motivation

Hughes Aircraft Uses a Strong Monetary Incentive to Achieve Extraordinary Program Success

B. A. "TONY" KAUSAL IV

Even before the sun rose, workers began to arrive. Lights were turned on and you could hear the hum of another workday starting. The Los Angeles commuter is noted for spending (wasting) hours going to and coming home from work. But one computer programmer, "Virgil," at the Hughes Aircraft Company's Command and Control Systems Division plant in Fullerton, California, was unwilling to waste valuable time commuting. He was motivated to deliver a product ahead of schedule even if it meant "camping out" at the plant during the workweek, which is exactly what he did! And the fruits of "Virgil's" labor? On June 20, 1995, Hughes Aircraft completed system-level testing in Saudi Arabia, signifying the completion of the system development process for the Peace Shield Weapon System.

Peace Shield Was Different

What was unusual about this program? A recent study by the Defense Systems Management College at Fort Belvoir, Virginia, indicated that the average cost overrun for Engineering and Manufacturing Development of a major system was 45 percent, and the schedule overrun was 63 percent. Yet, Peace Shield was delivered six months, 13 days ahead of schedule and below cost. How did the Air Force motivate a contractor to buck that trend? How did Hughes Aircraft motivate "Virgil" and the other employees of their company to deliver a product ahead of schedule to a customer?

It All Began With a Contractor Default

The story starts in July 1991 after the U.S. Air Force terminated for default another contractor for failure to deliver Peace Shield. Hughes Aircraft won the new competition to design and deliver the system. The estimated value of the contract was more than \$1 billion. Final delivery was scheduled for January 3, 1996.

The Peace Shield program, built for the Kingdom of Saudi Arabia, required delivery of a nationwide ground-air defense, and command, control, and communications system to the Royal Saudi Air Force. Key elements included 17 radars, a central command operations center, five sector command and operations centers, nationwide communications links, interfaces with all agencies having a role in national defense, and communications centers to contact and control civil and military aircraft. Because this system was critical to the defense of Saudi Arabia, timely delivery was mandatory.

The Workforce

The Peace Shield program was managed by the Air Force Electronic Systems Center, Hanscom Air Force Base, Massachusetts, as a Foreign Military Sale (FMS). "The schedule requirements of 54 months to deliver a Peace Shield system were thought by many people to be impossible," said Colonel Gary Smith, the Air Force Peace Shield program manager. "There were some estimates as high as 116 months. They actually met 47 months. An amazing feat!"



Hughes Takes the Strategic and Tactical Approach to Incentives

To motivate the contractor, the program office developed a cost and schedule incentive approach to deliver the system three months ahead of schedule and below targeted costs. The contract was a combination of Firm Fixed Price and Fixed Price Incentive Firm, with sharing ratios of

Kausal is the holder of the Air Force Chair, DSMC Executive Institute.

75/25 (below and above targets) and a ceiling of 125 percent. Furthermore, the contract contained a real carrot and stick – a \$50 million bonus to the company for a three-months-early delivery, and up to a \$50 million liquidated damages provision for late delivery. The government had provided the incentive. The company's problem was how to succeed on this difficult development task with significant software

workforce on what promised to be a very tough job. Peace Shield was a much larger program with many more personnel involved than the NATO effort. Successful delivery of the system to the Kingdom of Saudi Arabia in less than 51 months would require significant individual and corporate commitment.

Employee Incentive Pool

Using the NATO contract as a model, the company's Peace Shield program managers proposed an approach to Hughes corporate executives that designated 20 percent of the incentive award to an employee incentive pool. Because of the crucial nature of this program, Hughes corporate management doubled the incentive pool to 40 percent – a total of \$20 million. The award program was structured on a pro rata basis. If an individual worked the entire time, they would be entitled to the full amount of the award. If they worked 50 percent of the time, then they could earn 50 percent of the award. A minimum of 1,000 hours was required for any award. An additional 4.5 percent of yearly salary could be earned by meeting nine interim milestones. What

this meant to the average employee who worked full-time for the entire length of the program was a potential bonus of almost 75 percent of annual salary.

“You need both a strategic and tactical approach to incentives,” said Chuck Sutherland, president

of Hughes Command and Control Systems business unit. The Peace Shield program managers had laid the groundwork for the overall programs but they now needed short-term intermediate incentives. During the life of the program, additional software and hardware work was added by an engineering change. The company, determined to succeed, actually took profit



SEVERAL INDUSTRY EXECUTIVES AND ACQUISITION PROFESSIONALS FROM THROUGHOUT THE DEPARTMENT OF DEFENSE PROFESSIONAL ACQUISITION WORKFORCE CONTRIBUTED TO THE SUCCESS OF THE PEACE SHIELD WEAPON SYSTEM PROGRAM. FROM LEFT: DON NEUMAN, MITRE CORPORATION; TERRI SYNDER, HUGHES AIRCRAFT; BOB KRAMP, HUGHES AIRCRAFT; BRIG. GEN. BERWYN REITER, USAF, AF PEO/C³; CHUCK SUTHERLAND, HUGHES AIRCRAFT; DARLEEN DRUYUN, FORMER USAF SAE; JOHN WEAVER, HUGHES AIRCRAFT; MIKE ARMSTRONG, HUGHES AIRCRAFT; COL. GARY SMITH, USAF, PROGRAM DIRECTOR, ESC/IS; WAYNE SHELTON, HUGHES AIRCRAFT; MIKE SMITH, HUGHES AIRCRAFT, LOU KURKIAN, HUGHES AIRCRAFT; COL. CHARLES SCAPEROTTO, USAF, SAF/IAS.

and system integration risks. The real question: How to motivate the project team members?

The idea for a successful motivation program structure at Hughes actually began in 1989 when the company received an add-on for a small North Atlantic Treaty Organization (NATO) contract, which the Air Force sweetened by including a \$2 million incen-

ing additional shares. Upon completion, the employee could redeem the shares for a portion of the company's bonus. Company officials believe that the early delivery, under cost, was a direct result of the incentive.

Because of this success, Hughes decided a similar incentive approach might be an excellent way to motivate their

from an early contract change to form a supplemental incentive pool for employees. The profit was broken down in two \$600 thousand bonus efforts that represented three percent of an employee's annual salary. These were tangible, short-term benefits.

"Early, achievable incentives are important to motivate personnel since many believed that it was not possible to earn the money – it was too far out in the future," said David Pope, who headed the software engineering team. All interim milestones were met, and it became apparent to management that the employees were more highly motivated when the incentive was nearer term. To encourage teamwork, the company also developed a third, smaller bonus arrangement ranging from \$200 to \$1,000, with a formal presentation to those groups of employees who performed significant efforts in accomplishing contract work.

Inevitably, Some Problems Did Surface

What were some of the problems Hughes encountered? "It took one year to get through internal corporate processes. There were many doubters. Some executives felt that people already had salaries and did not need any further motivation," said Sutherland. There were also concerns about the impact of this effort on other programs. Would personnel want to leave current programs? Would personnel not want to leave the Peace Shield program? While all these were valid concerns, the company held fast to the belief that a strong, monetary incentive was the key to program success.

"Corporate commitment directly contributed to the success of this bonus program. This has been shown in word and deed," said Sutherland. For example, software development was on a critical path. In order to minimize schedule risk, Hughes front-loaded the program with 20 percent more manpower than a program of comparable size would have normally been staffed. "The company chose to rule in favor of

schedule over cost every time," said Sutherland.

Hughes also generated an extremely detailed plan to track progress on software development. Although these plans were costly to implement and maintain, their use was fundamental to the program's success in beating schedule. "Critical to success was the teaming environment," said Sutherland. Hughes relied heavily on the team concept, using it for both employee recognition and as a way to manage the project. Middle management positions were eliminated, and a less hierarchical approach was instituted. Now, previous middle managers were working as successful team leaders. They also formed Integrated Product Teams with the U.S. Air Force. "This teaming with the Air Force helped us to understand and resolve many of the difficulties during the development," said Pope.

Family life can suffer when an employee is spending a lot of time at work, particularly in "Virgil's" case since he was "camping out" at the plant during the week. "It was important that the family understand the importance of the work and the reason for the long hours," said Sutherland. In the middle of the project, Hughes Aircraft held an open house with displays, briefings, and refreshments for families in order to help the families understand the project and to make them feel as though they were a part of it. "Now the families could understand what dad or mom was doing," Pope added.

Still, virtually throughout the process there were "Doubting Thomas's." Several government "red teams" reviewed the program and concluded almost to the end of the program that Hughes was six months to two years behind schedule. But in the end, the results spoke for themselves – delivery six months and 13 days early.

Why Did This Program Succeed While Others Failed?

"We [Hughes and the Air Force] beat our target cost baselines, and met our

stretch program delivery goals," said Smith. "What makes it even more of a success is that as we added Engineering Change Proposals to the program, we were able to incorporate most of them without changing the schedule. This really makes it a remarkable success." He continued, "We were also lucky since this was an FMS program, we did not have the typical funding instabilities that many other programs have. Notwithstanding this, I believe the contract incentives contributed significantly to achieving program success."

How do you motivate contractors and their employees? This is a key question in government acquisition. This case study provides an example of successful motivation of a contractor and its employees. Too often "automatic incentives," such as incentive fees, are placed on contract with little or no results. Why did this succeed when other incentives failed? The answer is multifaceted: recognition by the company of the need to succeed, corporate and employee commitment, interim awards, team approach, and team and individual awards.

The difficulty in taking a case study and repeating its success is that the events and factors are not always the same. But using the lessons learned from this case and others, coupled with an understanding of the factors that motivate your program's contractor, plus a partnership with that company, can go a long way toward the successful implementation of contract incentives.

So how did Hughes do? In the words of Mrs. Darleen Druyun, Acting Assistant Secretary of the Air Force for Acquisition, "In my 26 years in acquisition, this is the most successful program I've ever been involved with, and the leadership of the U.S. Air Force agrees."

And how did "Virgil" do? For the months of extra effort, he received his bonus – perhaps even enough to buy a new camper!