

MANAGING FOR SUCCESS IN DEFENSE SYSTEMS ACQUISITION

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ABSTRACT

This study, an offshoot of a DOD cost growth study, was conducted to identify elements common to successful programs, programs that met most of their cost, schedule, and performance goals, and worked well when fielded. Key government and industry officials of twelve "successful" programs were interviewed to find out how success is measured and what impact various forces had on the success of these systems. The primary measure of success is that the system worked well when fielded. Main elements of a successful program are stability, realistic requirements, good people, good leadership and, particularly, confidence and teamwork between the program office and the contractor. The PM's tenure, pushing the state-of-the-art in technology, and meeting the requirements of regulations and directives have little impact on the success of a program. Outside influences are, on balance, helpful. The people we interviewed enjoyed their jobs and the challenges of program management. One program manager said it was the finest job he ever had--high risk, high rolling. A Navy PM said it was the closest thing ashore to the command of a ship.

INTRODUCTION

What have we been doing right in defense systems acquisition that we want to repeat? That's the thrust of a study we made recently on successful weapon systems acquisition management. We were well aware of various studies in and out of the Defense Department that took the opposite approach. We wanted to find out what makes for success.

We learned that success is not just avoiding pitfalls where other programs have been less-than-successful. It is something different--in practices, purposes, and in the eyes of the program managers (PM) themselves. One difference is that most PMs don't see cost, schedule and performance goals as being their main objective. Their primary yardstick is "does it work in the field?" "Battle effectiveness, not cost effectiveness, is what wins wars!" declared a PM.

Many commonly held beliefs are valid, such as stability, the need for good people, and wide-open communications between the defense program office and its industry counterpart. Other beliefs don't hold up, such as "stay within the state-of-the-art" and "the PM should remain at least three years on his program." One program manager said, "We pushed hell out of the state-of-the-art."

Continuity is essential, but not necessarily on the part of the program manager. His key staffers can provide the needed continuity.

What do successful PMs do differently? Sometimes it's a matter of what they do. In other cases it's more a matter of degree, such as their openness in communicating.

THE SUCCESS STUDY

Our first requirement was to determine what constitutes success: Success in both development and production? Success in one phase but perhaps not in another? Success on the current program only? Success in whose eyes?

We asked the Joint Logistics Commanders to nominate some successful programs, leaving the criteria for success up to them. They recommended a combined total of 52. We selected twelve, based on trying to obtain a mix in type of system, size and purpose, time frame and acquiring service. Most are reported on the Selected Acquisition Report (SAR). The selection of these programs as successes does not mean that they had no cost growth. A review of the SARs for seven of the successful programs shows growth, but the primary causes must be recognized: escalation, changes in quantities, and unrealistic initial estimates. Hellfire, CG-47, F-16 and the E-3A have substantial quantity increases; the FFG-7 quantity requirements have changed from 50 to 74 to 50 ships so far. The OSD escalation indices used for budgeting purposes were very low compared to the actual escalation experienced. On one program the initial, highly optimistic estimate given by the chief of the service to Congress is still used for then and now comparisons. The responsibility for the programs finally selected is ours. We are well aware that in this way we have eliminated others that are also successful.

The programs we selected are:

- FFG-7 Frigate
- CG-47 Aegis Cruiser
- Polaris
- F-16 Fighter Aircraft
- C-141 Cargo Aircraft
- BMEWS, the Ballistic Missile
- Early Warning System
- Atlas Ballistic Missile
- E-3A Airborne Warning and Control System (AWACS)
- Multiple Launch Rocket System (MLRS)
- Hellfire Missile
- CH-47 Helicopter Modernization
- Firefinder Radars

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We identified present and previous program managers and their industry counterparts, then set about interviewing 47 of them using a 22-point questionnaire for defense program managers and two 10-point subsets for their deputies and industry managers. We sought answers to the basic question posed above: what have we been doing right in DOD that we want to repeat? We believe the lessons learned will be valuable in the Defense Systems Management College curriculum and in the acquisition community at large.

One of the questions we asked was how PMs themselves measure success:

- works well when fielded
- meets cost objectives
- meets initial operational capability (IOC) date
- meets technical performance objectives
- meets logistics supportability objectives

Their answer came back loud and clear. Sixty-eight percent ranked "works well when fielded" as most important. The least important, ranked last by fifty-eight percent, is the IOC date, which is perceived as an artificial date whose main purpose is to aid in planning and scheduling for training and logistics support. Meeting technical objectives was second in importance, closely followed by cost objectives.

REASONS FOR SUCCESS

The factors that make or made for success differ, but there are recurring themes. Reasons for success cited most often are good people, good program managers on both sides, realistic and stable requirements, a good contractor, and factors related to stability-personnel stability, funding stability and product stability. Here are the main factors for success.

People. Good people are an absolute must. So how did they get good people? Industry gets these people primarily by growing their own: selection, attendance at company and other acquisition related courses, and development by giving them a chance to show what they can do. "But," one manager mentions, "it takes time to develop them." The service PMs try to request people by name after careful, deliberate evaluation of their capabilities and background. The FFG-7 hired young engineers-in-training at the beginning of the project and has been able to retain them throughout the life of the project by promoting them from within. Both service and industry PMs said they fire those who are not performing.

Stability. This is a theme that permeates the reasons for success. Product stability depends upon realistic requirements (realistic for the funds available) and keeping changes to an

absolute minimum. An Army PM notes, "Systems that have problems are those with lots of changes, especially with the user pushing for them." Stability in funding is also essential. VADM Levering Smith of the Polaris program is admired for his frankness in advising Congressional committees on what it would cost to achieve a particular level of performance. When he was pressed to lower this figure, he explained how this would buy less performance. Over the nearly 30 years of the program this straightforwardness has stood the test of time.

Interestingly, time pressures often are a factor in stability and success. The reason - a clear national need. As a result, outsiders who might be inclined to dabble in the management of a project are less likely to do so. Some multinational programs enjoy similar benefits of "hands off" treatment because of their management complexity. Since multinational programs often receive high level attention, intermediate levels tend to leave those programs alone.

Ability of the PM. This is a vital element reflecting operational background, leadership ability, and education for the position of program manager. Sub-items are ability to gain the confidence of higher levels (including not asking for additional dollars each year); ability to motivate a team; tenacity in driving toward program goals; and, usually, maintaining good relations with higher authority. A trait common to almost every PM is an ability to communicate well with all types of audiences.

In every case, it was clear who ran the show - the PM. Sometimes this was stated in some form of directive. More often though, the PM took the authority he thought he needed to do his job. This didn't always make him popular, of course. In one service the question arose whether dedication to program objectives may be a hindrance to career objectives.

Continuity. The continuity of key individuals is necessary, but not necessarily the continuity of the PM. One program has had five PMs in a little over seven years. On the other hand, Polaris had only three PMs during its first 21 years. RADM Meyer had been the first and only PM on the Aegis cruiser since 1970. The key factor again is stability, with continuity being one important aspect.

Acquisition Strategy. Contractors themselves give credit to acquisition strategy as a reason for program success. On the Hellfire program, the service PM established second sourcing as a principle of acquisition strategy. This tended to sharpen the competition and keep a discipline on costs, schedule and technical performance.

The MLRS program employed competition with source selection based on "ammunition cost effectiveness" which forced the contractors to optimize technical performance within a cost envelope. MLRS also used "design to unit production cost" as a primary criterion in evaluating proposed changes. The acquisition strategy for MLRS included the evaluation of the relative cost effectiveness of multiyear procurement versus second sourcing. The FFG-7 acquisition strategy employed ship system design support which provided for design support by prospective shipbuilders during the early stages of ship design; lead ship-follow ship concept, with a schedule interval of two years between their construction in order to implement lessons learned from the lead ship; government validation of drawings and other technical data; utilization of landbased test sites for integrating ship subsystems; and the use of grooming sites for repairing, testing, and delivering government furnished equipment.

Resources. It would be easy, and understandable, for observers to conclude these programs are successful because they had everything going for them, including high level backing, connection to a national need, choice of personnel, and funding.

In analyzing and discussing the question of success because of resources, or resources because of success, we came to two conclusions: 1. None of these successful programs would have "flown" if they had been unsuccessful in technical performance or had costs that soared above budget. 2. After a need has been established and a project is under way, there is a period of a year or so during which the PM has an opportunity to demonstrate that higher levels' confidence is justified. Then, the resources, attention, and other advantages seen in hindsight become available.

Of the programs we studied, all had to prove or demonstrate their probability of success, their ability to do what they were being developed to do. Polaris and Atlas, classics in systems management, emerged after indecision and delays that might have killed other programs. A high official said of early Navy efforts to establish a long-range missile capability, "The Navy was really in danger of being read out of its ballistic missile altogether. There just wasn't enough money in the defense budget."² Success looks easy in retrospect.

Multinational and coproduction programs usually receive adequate funding. At least three of the successful programs which were part of this research project have received Congressional support and funding partly because of their NATO and foreign military sales aspects.

State-of-the-Art. Seventy-eight percent of the managers contacted reported their programs pushed state-of-the-art technology and felt this had a positive, motivating effect on their programs' success. On the other hand, those whose programs did not push the state-of-the-art also felt this had a positive effect on the success of their programs. Polaris pushed the state-of-the-art in five or six different areas simultaneously. This in fact had a lot to do with acceptance of the program. An industry manager regarding the state-of-the-art, made this perceptive comment: "I don't believe this (advancing the degree of state-of-the-art) is critical to the program success, so long as you don't have incompatibilities between state-of-the-art, program goals and program commitments."

From this, we conclude that program success is not determined by the technological state-of-the-art, but by associated risks, and these risks must be adequately funded to avoid cost overruns. These results seem to refute the belief that successful programs depend on proven technology.

The Contractor. One of the questions asked of government managers was whether they had an integrating contractor. Ninety percent of the service PMs did have an integrating contractor, usually the prime. This contributed to the program's success. We also asked them about the technical expertise and management ability of their contractors. With few exceptions, all of the PMs responding to this question characterized their contractors as being very good or excellent.

A strong common theme, one that recurred often throughout the interviews, was openness and frankness on the part of both the PM and his industry counterpart. There is no substitute for the confidence and team spirit that develop from this straightforwardness.

It is interesting to note that two of the particularly successful contractors had been involved in other less-than-successful programs. The difference seems to be the working relationship between the program office and the contractor.

DOD and Outside Agencies. We asked the government program managers whether the success of their program was helped or hindered by outside government influences such as the user, supporting agencies, higher command headquarters, service headquarters, DoD, Congress and GAO. Slightly over half of the responses to this question said that overall outside influences were a help rather than a hindrance. One PM listed six separate outside influences that had hindered his program; but he then said that in the long run, the hindrances had helped. The problems and stumbling blocks encountered helped his office sharpen their skills, knowl-

edge and abilities.

In general, if the other levels agreed with a program's objectives, if the PM kept them informed and got them working together and gave them the feeling that the program was theirs also, the PMO was helped rather than hindered. VADM Raborn brought even the GAO and the Secretary of the Treasury onto his team of supporters.

The hindrance or adverse "outsider" effect mentioned most often concerned staff personnel at the service or DOD level. One PM stated "There are a lot of people in the Pentagon who can say No - and cause you a lot of delays and other problems - but do not have the authority to say Yes." Another common complaint from both government and industry managers involved the numerous time consuming audits performed by DOD and GAO inspectors. In most instances, new inspectors had to be taught the program before they could perform the audit.

Outsiders tend to leave a program alone if it is going well. PMs varied in their reactions of how to cope when there are problems. One PM said that when someone outside his office tried to force him to do something, he explained what the repercussions would be. If the person persisted, the PM said he would tie the person's name to the required change and its related cost and schedule changes so that everyone throughout the briefing cycle would know who was pushing for that change. Usually, the person backed off.

The PMs gave Congress credit for, on balance, being a help rather than a hindrance. One PM suggests, "Brief them. Talk to the staffers, the Representatives and the Senators. Answer them truthfully. Be credible. Don't try to con them. Explain the national defense need that the program is filling."

We also asked the program managers how they dealt with micromanagement. The approach generally followed was to be open, and to keep outside agencies informed on what was happening on the program. Some, however, said they didn't volunteer information, although they answered all questions without elaboration. "Being truthful is different from being candid, though," one PM stated.

DOD Directives and Regulations. We asked both government and industry program managers which regulations or directives caused problems and contributed to program costs. Their answers surprised us. Most of the responses indicated that regulations and directives didn't cause any significant problems. Two even said that specifications and standards are written for good reasons, are important and useful, and are not a waste of time.

No single regulation or directive was cited as a culprit. Most program offices tailor directives to what makes sense to them, or they ask for waivers. The PM himself generally doesn't get involved in the administration of directives and regulations.

We also asked for observations regarding DOD Instruction 7000.2 on cost performance measurement. The response, with a couple of qualifications, was generally favorable. One Army PM said that he looked into reducing the cost of various reports, including the cost performance report. The reports' total cost was \$4 million, but he found that his contractor would use the reports for his own management purposes anyway; the most the PM could save was ten percent.

The ease with which current PMs relate to levels of approval and administrative requirements is remarkable. The PM on one of the early programs said of the current environment, "We spend more, trying to avoid mistakes, than if we made mistakes. Time is money." On the various requirements, justifications and bureaucratic red tape the PM must live with, he said, "Now we have echelons on echelons...the Soviets couldn't have imposed a more restricting system!" Defense and Congressional staffs have grown tremendously over the past decade or two, and life for the PM has grown more complex. But the current PMs are well-equipped, by temperament, experience and education, for coping with their jobs. They like what they are doing.

INDUSTRY AND SERVICE OBSERVATIONS

As an illustration of how well industry and the services work together, no significant differences in practices, goals, methods or other factors surfaced during our study.

We asked managers in both industry and government to rank eight factors for successful program management. In slightly abbreviated form the factors are:

- Establish a teamwork relationship of mutual trust between government and contractor program management.
- Understand the program objectives.
- Have good, visible program plans.
- Get accurate and timely information on actual progress.
- Note deviations between planned and actuals.
- Take corrective actions.
- Make friends for the program.
- Establish total program definition at the start of the program.

The overwhelming majority rated teamwork and mutual trust as the most important. The next most important was ensuring that everyone really understand program objectives. The two

tasks rated lowest require some explanation. One of these is "make friends." The reason for this ranking is that if the item produced works as it should, making friends is incidental to the system's objectives. As expressed by one PM, "if a program is managed correctly, it is bound to make some enemies because some people will not get what they want individually."

Also ranked low is "establishing total program definition at the initiation of a program." Most PMs felt the initiation of a program is much too early to establish total program definition. Their rationale is clear when one recalls that most of these programs pushed the state-of-the-art in technology.

All individuals cited open communications as a basic practice. An industry spokesman refined this somewhat: "We had many informal channels, but we and the Navy require very careful control of the formal channels." Most of these programs involved high-risk technological advances and used cost-type contracts. Several industry executives said this contractual arrangement tended to promote communications. On lower risk programs, we see no reason why fixed-price contracts should inhibit communications.

Industry's view of what makes a successful PM is similar to DOD's: bright, flexible, intent on results, able to make right but timely decisions (right 75% of the time), good health and business acumen. On a high technology program, he should also have some type of technical background.

TIME PERSPECTIVE

One factor in selecting the dozen programs we looked at was to find whether there are significant differences in program management now from what it was earlier. Most of the programs are fairly recent. The C-141 and BMEWS programs go back to the 60s. Going back even further, there's Polaris, famous for both management and technical breakthroughs, and Atlas, an outstanding program and the forerunner of modern project management dating from 1954.

As might be expected, there are differences between program management as practiced earlier and as it is today. But an observer is struck more by the similarities than the differences, quite a compliment to the pioneers who blazed the trail.

Similarities, Then and Now. Although the degree of authority of the PM has changed - generally less now than formerly - one critical aspect has remained constant - the PM has used his authority. Successful program managers have taken authority where it is not specifically granted. One PM has said, "Any PM has as much authority as he is willing to step up and

take."

The need for strong leadership remains constant, regardless of a program's era - dedication and determination to get the job done well, ability to attract good people, ability to communicate well.

Other similarities pertain to requirements. Typically, a successful program's requirements have been established early, and are realistic for the resources available. Plans are defined early and requirements stay virtually intact throughout a particular phase of a program. The type of contract is appropriate to the risk and complexity of the particular phase.

Differences, Then and Now. There are far more directives, regulations and "help" now than during the early programs. But today's PMs do not view this as a major problem, perhaps because they have learned to survive in the present environment.

A more obvious difference relates to the climate of the times. In the time of Atlas, Polaris, C-141 and BMEWS the need for each system was clear and these programs received strong, high level support. There was greater urgency and team spirit then and the PMs strove diligently and successfully to develop this spirit.

The needs today are generally not as clear, the urgency is not so apparent, and perhaps the support is not so strong. One PM on an early program says, "(these higher levels) were 95% helpful. We made friends; they didn't try to manage for us."

The PM in earlier days was freer to make mistakes. This may have been part of pushing the state-of-the-art. VADM Levering Smith, the technical director and subsequently the PM on the Polaris, says, "When making new things, you have to expect surprises."

PMs' RECOMMENDATIONS to PMs

The final question in our discussion with PMs was "Do you have any other recommendations that might benefit program managers on other defense programs?" Some responses follow:

"Tell a new PM that it is important to baseline his program - not just cost, but technically also so he really understands what's there..."
"Have your program planned out in as much detail as possible, as early as possible, so that there is a comprehensive baseline from which to evaluate changes."

A senior PM said, "Be in charge - 100%. Keep people off your program, take charge, don't give your program away. Limit outside influences on your program to those which you

request." One program office has a sign that reads "Do not participate in our decision-making unless you share the consequences."

An area noted by several individuals was the importance of getting and developing the best people possible and then giving them authority and responsibility. One PM commented, "The biggest problem a PM faces is saturation. If the PM insists on making all the decisions he gets into overload. Let your people make the decisions they can make and save the big problems for the PM. Successful program management means you get the broadest participation throughout the organization. Real success is measured by how few decisions the PM has to make. Ultimate success means the PM makes no decisions, just sets the program objectives."

"Create a program office team atmosphere and everyone must aggressively manage - not just the PM. Delegate authority within the office and hold people accountable. Let people have latitude to make this happen and feel that they are responsible."

"Establish open communications with the contractor and maintain mutual respect for all decision making. Seldom are decisions popular to both sides. The contractor must understand why you are making the decision and respect it."

"Understand the contractor. It takes a team of the contractor and the PM to build a supportable system. They must agree it is the best they can do. Have a good interface with the contractor. There is no need for an adversarial relationship."

"Do not keep problems to yourself; surface them and work them. Determine who - government or contractor, by name - is responsible for solving the problem. You have plenty of good experience available within the program office - use it."

They also emphasized the need to be cost conscious. Regarding funding, the consensus was, "Know how to protect your money and don't let anyone take it away from you. Let those who try know what the repercussions will be if they succeed."

"Don't ask for permission to act in Washington. Don't be reluctant to act when you know what you are doing." "Make timely decisions; don't procrastinate; make them as naturally as possible. Don't agonize over decisions; make the best one you can, as soon as you can, and get on with it."

CONCLUSION

The basic question asked of PMs was the reasons for success on their programs. The reason most often given was good people, followed by good program management, good relationships between

the contractor and the PMO, good contractors, firm requirements and stability. The differences in what makes for success are minimal, regardless of service affiliation, size or type of program, and time period.

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