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# To the Next Generation of Program and Project Managers

by J.R. Thompson

The success — or failure — of the next generation of NASA program and project managers will depend on how well we do our jobs today. We will either pass along a tradition of achievement or leave a difficult path for those who follow us. I would like to pass on a stronger, more capable agency to the next generation of NASA employees.

Long after the majority of today's leadership is retired from NASA, many of the programs we advocated or worked on will still be operational, for better or worse. One day, I expect to turn my television on to a 24-hour special access channel to see what the Space Station Freedom crew is working on. I expect to marvel in the preparations for flight of the Lunar-Mars Mission, the grandest global enterprise of humanity to date, and wonder at the latest planetary discoveries. I hope to see the U.S. flag on the tail of the world's first aerospace plane. I hope that people in 2010 will be able to marvel at these feats with the same enthusiasm and respect that we have now for the accomplishments of our space programs of the 1960s and 1970s.

It is clear to me that our performance today will determine what kind of NASA we will have at the turn of the century. What we do today at our desks, in our laboratories, in our conference rooms and at our job sites matters a great deal if we are to succeed in the new century. Today is the first day of NASA's future, and I believe it is a very good one.

For example, we have achieved a good balance of science, manned spaceflight and technology, not just one at the expense of the others. We must maintain that balance, realizing that science depends on technology and that there is no substitute for human presence in space. By challenging the frontiers of science, we will advance the technology and make human presence in space more useful.

However, we can't afford to "fall in love" with a new program to the detriment of existing programs. Almost every day I hear of interesting new ideas coming to us from the laboratories and the universities. Some of these ideas have merit, but we may have to bypass many of them so we can do well with the opportunities we are already committed to.

This is not to say that NASA is unwilling to hear new ideas. We are always seeking better, more cost-efficient ways of managing the programs we now have. Innovative opportunities are already being identified in such areas as space station payloads and the Space Exploration Initiative, and we should incorporate other good ideas as the work progresses. But our primary job is to focus our efforts on making our existing program commitments a success. Most of NASA's budget is to manage and develop our ongoing programs and projects; only a small portion is earmarked for new initiatives. No matter how much we want to tackle new projects, we must first perform those that have been mandated by the President and endorsed by the Congress.

## ■ What We Can Do Better

NASA's senior scientists, engineers and managers have excellent opportunities now to define and manage NASA's current programs to ensure future successes. The outcomes of our decisions and accomplishments will be felt for years to come. Since NASA is a highly integrated institution, mistakes and missteps can affect us all.

One area that I have noticed as a major source of problems is in defining program requirements. It seems that just about everyone connected with a relatively simple project can add on any number of requirements, which may get included without being challenged. When all the requirements are finally compiled further up the line, we find that we simply do not have the resources to implement what we have said the project needs!

The cost growth needed to accommodate useless requirements can paralyze a program or project. One way we can save money and precious time and achieve better performance is to do a better job in Phase A and Phase B. We need to scope out the requirements up front and then challenge them internally.

We also need better ways of estimating and controlling costs. I could name project after project that was estimated to cost millions and ended up costing billions instead. It is good that we say we are willing to compromise cost but not content, but better checks and balances are needed all along the way. Upper management is part of this problem.

Our institutional reputation is built upon competence. In this time of tightening up,

NASA's competence in the area of budget and finance needs to be improved. I'd like to see a little more tension between project management and financial management. If we don't do a better job of estimating and controlling costs, I can guarantee that someone else will come in and do it for us.

## ■ Qualities of the New Manager

We must consider who will replace our current management teams and where the new leaders of NASA will come from. I've seen the age distribution figures on NASA personnel, which show that there is a big gap between Apollo-era managers and relatively new hires. Quite frankly, the numbers don't scare me all that much because young people don't scare me. I've found that whenever young people were thrust into leadership positions, nine out of ten times they did just fine. I'm not so sure that middle-age managers have much of a better record of success, but I am sure that chronological age is not the main factor in the success or failure of a program or project manager.

I think that there are three basic qualities an aspiring program or project manager should have. First, I'd look for leadership capability. Leadership can be interpreted in a lot of different ways, but we all know leaders when we see them. More often than not, such leaders possess personal integrity. They command, rather than demand, respect from subordinates. They eagerly take charge of a program or project, plan it out thoroughly and communicate clearly with those who are under them, above them and beside them. They are not too proud or reluctant to incorporate proven technologies, or to tap the expertise and talents of outside agencies or institutions.

You know what to expect from a good leader, there are no surprises. When things go right, these leaders praise the subordinates; when things go wrong, they take all the blame on themselves, then make sure the problem is corrected and put the project back on the right track.

Second, I'd look for common sense in managing people and contractors. The first step is to pick the right people to manage. Perhaps nothing is more important than finding the right person for the job. Common sense will tell you that incompetent or mismatched people will kill a project, but a good team will function well.

Once the best and brightest have been selected for the team, the manager must delegate responsibility and authority to the lowest level possible. Management is difficult and time consuming enough without having to do someone else's job or question the dependability of the people you pick. Contractors, too, deserve to be treated as full partners. Increasingly, NASA programs and projects have an international flavor. International partners must be treated with the respect they deserve.

Third, I'd ask: Does this potential project manager have technical moxie? To lead others, sometimes you have to guide them. Now technical moxie doesn't mean the technical knowledge to do everyone else's job, but rather the ability to learn all the technical matters that are the manager's responsibility. A new manager isn't expected to know the form, fit and function of every little piece of a project at the start, but sometime before test and verification the manager had better learn those things. I'd pick a manager who was a quick learner and had solid technical know-how, rath-

er than someone with a long list of varied technical accomplishments.

The fact of the matter is, in NASA today, few projects stand alone. As manager of the Main Shuttle Engine, for example, I had primary responsibility for that project, but other Shuttle projects depended upon our schedule and performance. They had to know what I was doing, and I had to know how they were putting all the pieces together to make the Shuttle fly. Technical collaboration across these projects was critical to our mutual success.

Technical moxie involves some innovation and creativity on the part of an aspiring manager. Take a look at the job in front of you now and look for ways to achieve better performance with lower cost, in less time. One way to do that is to use existing technologies, observe what others are doing in allied fields, and take an item off someone else's shelf instead of recreating it each time. It takes creativity to find the best solution for the problem at hand.

Looking at your present work and finding new ways of doing all tasks better is perhaps the best exercise one can do as an aspiring program or project manager. Be open to new ideas, and stimulate new ideas among your colleagues. Stimulation is at the heart of everything we do at NASA, and I hope I have stimulated a few ideas for you to do your job extraordinarily well. The future of NASA depends on you.

There is a connection between where NASA is today and what it takes to become a good program or project manager. The key to both is to maintain your balance. Just as NASA today strives to keep a good balance of science, technology and manned

systems, the aspiring manager needs to keep a good balance of leadership ability, common sense and technical knowledge.

### NASA's Future is Now

Although NASA is evolving, it has actually shrunk in terms of work force and real dollars since the days of Apollo. As NASA continues to change, projects will probably have to be performed by fewer people, which will force new solutions and bigger challenges. Strong leadership skills can go a long way in handling tough decisions and tradeoffs.

No matter what happens, I don't think that you should try to guess the future. Instead, you should be looking at the job in front of you, trying to do it better, more safely and more efficiently. The answer is not out there or coming later — it's right in front of you, right now.

In closing, I'd like to suggest that there are some other things we can and should be doing to leave NASA a better agency than we found it. One thing is to stimulate an interest in aerospace among children, the next generation of NASA program and project managers. Volunteer for a hitch on

NASA speaker's bureaus at Headquarters and each Center. Schools, social organizations, churches, and fraternal societies are hungry for news and views about the aerospace industry. The interest is there, but it needs to be cultivated.

Take advantage of the NASA Program and Project Management Initiative. Take the courses and read the literature or, if you're an experienced veteran, volunteer to teach or write so the corporate memory of NASA is not lost. Shared experiences and lessons learned are legacies we can leave behind for the next generation.

Finally, I would suggest to all, young and not so young, to be open to new ideas. I'm constantly on the lookout for ways I can do my job better, here and now, not in some vague, distant future. Since we came on board, NASA's new leadership has made a lot of changes. Change is a sign of growth, but what I want to leave with you is the notion that growth doesn't mean just size or numbers — it also means quality. In the final analysis, I'm not asking you to do more, but rather to do better. No doubt, the best way to succeed is to inspire our young people by doing the common tasks uncommonly well and building a better NASA.