

# **F.I.S.T.**

*Fast, Inexpensive, Simple, Tiny*

**A Five-Part Series**

**by**

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***Now, on with the show.***



**I contrived a private agenda to subvert the stupefying power of the corporate culture and provoke the emancipation of creative genius.**

**- Gordon MacKenzie**  
*Orbiting The Giant Hairball*



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## Introduction

The five articles in this little book first appeared in a military technology journal with the catchy name *Defense AT&L*. In case you're wondering, the "AT&L" part stands for Acquisition, Technology and Logistics, and the journal is published by the Defense Acquisition University.

The articles are reprinted here, not in order of publication, but in order of the acronym they comprise – namely, *FIST: Fast, Inexpensive, Simple and Tiny*. The original PDF's can be downloaded individually (for free!) at [www.dau.mil](http://www.dau.mil), but for ease of access we've consolidated them under a single cover. You can also pay six bucks (each!) for them over at Amazon.com, but we hope you don't.

This booklet is dedicated to all the patriotic military personnel, government civilians and contractors out there who are selflessly focused on defending the interests of the warfighters and the taxpayers. It is **not** dedicated to the people who instead direct their energies towards serving their own interests or the interests of their bosses. You know who you are.

We hope this collection helps military technologists (both in and out of uniform) and government leaders across the land to design, develop and deliver systems with rapid availability, inexpensive quality, simple interfaces, and smaller sizes.

It can be done!



## **FIST Comic**

The Editor at *Defense AT&L* like to call it a “graphic article” (as opposed to a graphic novel), but to us it’ll always be a comic. We spent a remarkable amount of time putting it together, creating the characters, nailing down the plot, laying out the story board... and then realized none of us could draw. Fortunately, we were able to connect with the amazing and talented Jim Elmore, and he did the actual artwork for us.

The original concept was 5 pages long and spent a fair amount of time on character development, but budgetary constraints limited us to two pages. No problem! This is the FIST team in action, boiling down the larger/more expensive concept to it’s essential components, saving money and time and delivering a completely unprecedented product. How’s that for an object lesson?

Sadly, the artwork doesn’t reproduce well in this book’s format. Happily, you can download it from [http://www.dau.mil/pubs/dam/03\\_04\\_2006/fist\\_ma06.pdf](http://www.dau.mil/pubs/dam/03_04_2006/fist_ma06.pdf).



## **It's About Time**

*Jan/Feb 06*

*Ward:* In many ways, this is the article we always wanted to write. It is full of very rigorous research and serious looking graphs and charts... all of which was provided by other people, so we didn't have to do the heavy lifting. It is one of the most pointed articles we've done so far, and really takes The Establishment to task for doing things badly. And in the actual journal (available online), it has a drawing of a guy in the embrace of an enormous monkey. It just doesn't get any better than that.

Who knew they'd let us get away with accusing the DoD of not really wanting to reduce development timelines despite decades of pronouncements to the contrary... or making reference to "slow dancing with the 800 lb status-quo gorilla..."?

## It's About Time

As James Gleick observed in his book *Faster*, the pace of just about everything is accelerating and has been for some time. But while the pace of activity throughout the world is increasing, the DoD technology development community is often locked in processes and systems that operate on a Cold War-based timeline. And according to the 1986 Packard Commission report, that timeline was too slow even for Cold War forces.

### A Brief History of Speed

Pardon us as we bust it out “old skool” style for a moment. You see, the idea that we need to decrease the technology development timelines actually predates the Revolutionary War, so we understand if some readers are a little tired of hearing this refrain. Sadly, despite the vast consensus on the need for speed, progress in this area has been pokey, to put it politely. But for any newcomers out there, here are a few comments on the topic of DoD development cycle times from the past 20 years (emphases added).

**1986:** “Many have come to accept the ten-to-fifteen year acquisition cycle as normal ... We believe that it is possible to *cut this cycle time in half*.”  
—Packard Commission Report

**1986:** “The most important way technology could enhance our military capability would be to *cut the acquisition cycle time in half*.” —Chairman of the Joint Chiefs of Staff

**1994:** “Deliver emerging technology to troops in *50% less time*.”  
—Federal Acquisition Streamlining Act (FASA)

**1996:** “*25% cycle time reduction* target for MDAPs [major defense acquisition programs] by 2000.” —DoD’s National Performance Goal

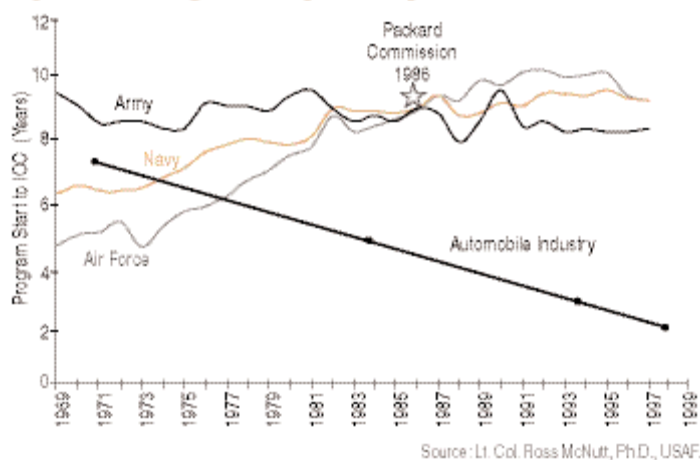
**1997:** “We need a *fast-paced acquisition system*.” —William Cohen, secretary of defense

**1999:** “*Reducing the time to develop* ... systems is essential.” —Gen. Lester Lyles, vice chairman of the Air Force

**2002:** “We still have *an acquisition system that takes years, and years, and years*, notwithstanding the fact that technology is changing in 18, 20, 24 months. We have a budgeting process that takes forever. We have any number of things that are *too slow, too sluggish, not agile enough, not fast enough.*” —Secretary of Defense Donald Rumsfeld

We could go on (and on and on), but we’re sure you get the picture. So given the amount of high-level focus on decreasing timelines for the past two decades, one might wonder how much progress we’ve actually made. Figure 1—a 30-year snapshot of average development cycle times—answers that question.

**Figure 1. Average Development Cycle Times**



We are having a hard time finding a 50 percent decrease ... or a 25 percent decrease ... or a noticeable reduction in time for any of the Services. We’d even settle for signs of the “fast-paced acquisition system” that Cohen asked for, but we just don’t see it. All three Services seem to be rising to a common level of slowness, while the U.S. automobile industry cuts its time by almost 75 percent. Of course, it’s not exactly an apples-to-apples comparison, but the point isn’t to beat or even match Detroit. The point is to demonstrate some sort of decrease.

As you’ll notice, the graph ends in 1998, which was eight years ago. Maybe things have greatly improved and nobody knows it, in which case we didn’t need to write this article. Sadly, our research indicates that not to be the case—the timeline trend has not improved. More significantly, nobody seems to be tracking, analyzing, and publishing these metrics any more. That just might be the most disturbing thing.

### Maybe There Was A Typo?

So we started thinking. Could it be someone accidentally added an extra “s” somewhere along the line and everyone started trying to reduce our *timeliness* instead of *timelines*? We’re pretty sure that’s not what happened, but the data do

seem to support that hypothesis. All joking aside, this is a really interesting—and by “interesting,” we mean “disturbing—set of trends.

Dr. Marvin Sambur, former assistant secretary of the Air Force for acquisition, used Figure 1 in a briefing, with this commentary: “As depicted by the solid black line, the auto industry was faced with a crisis in the early seventies. ... Japanese competition and consumer demand for new products drove down the [American] product cycle time.”

So, if competition decreased the auto industry’s cycle time, then perhaps the DoD doesn’t have enough competition. Or more pointedly, perhaps we don’t have sufficient competition in the right dimension.

When we develop an airplane, for example, we judge its airspeed but not its development speed. In a competitive acquisition, the DoD tends to put all competitors on the same timeline and does not usually give points for early delivery. Over 90 percent of DoD contracts contain no schedule incentives, according to the Schedule Incentives Reinvention Team report. That means if a proposal hits the milestone—super. If they plan to deliver early—no big deal.

So we suspect development cycle times have not gone down in large part because there is no competitive pressure to drive them down. Surely there are exceptions to this, but the Schedule Incentives Reinvention Team briefing indicates that “80% of projects specify an expected schedule to the contractors—and contractors who bid different schedules are seen as non-responsive.”

Now there’s a brilliant idea: discount any contractor who claims the government’s expected timeline could be shortened. Is it possible these so-called “non-responsive” contractors are actually willing and able to deliver technology faster than the government expects? We’ll never know unless we let them try.

By the way, the May 2003 update to the DoDD 5000.1 guidance states that “advanced technology shall be integrated into producible systems and deployed in the shortest time practicable.” This is a step in the right direction, and we contend that dictating a schedule (as the DoD apparently does 80 percent of the time) violates this directive. That’s a practice that simply has to stop.

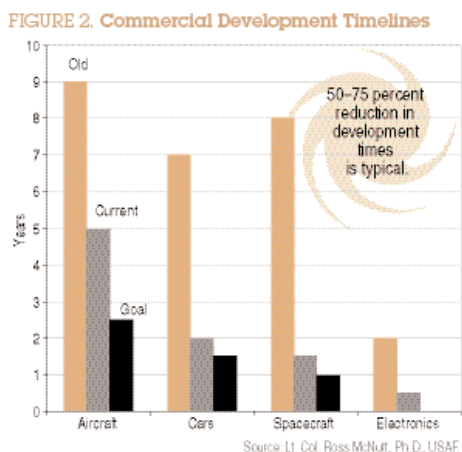
## Can It Be Done?

Okay, we hope everyone is convinced by now that development cycle times are w-a-y too long. It's painfully clear we need to move faster. The question is, are we asking too much? Can the work *really* be done any faster than it already is? Maybe this stuff has to take as long as it does.

Well, a few years back, there was a Lean Aerospace Initiative research project, sponsored by some school called MIT (never heard of it). Air Force Lt. Col. Ross McNutt, Ph.D., examined 320 defense projects (the results are to be found in his Massachusetts Institute of Technology doctoral dissertation “Reducing DoD Product Development Time: The Role of the Schedule Development Process”). The various project managers and program element monitors interviewed estimated the average project could be completed in 50 to 65 percent of the scheduled time—factors that were consistent across all size programs, all levels of technological advance, and all different types of systems

Still not convinced? Recall Parkinson's Law, which states that work expands to fill the time allotted. It's the old “if you've got all day to do a project, it'll probably take all day” idea. The thing is, Parkinson's Law cuts both ways. It means work is also compressible, at least to a point. If you've only got an hour to finish that same project, you can probably pull it off, can't you? Or is that just us?

But why limit the discussion to defense programs and automobiles? Let's see what a few segments of the private sector are up to lately. Figure 2 shows what some industries have accomplished.



We didn't collect these particular data; they came from that MIT project we mentioned. And we feel compelled to point out that we can't quantify how long it took to get from “Old” to “Current.” Of course, given the 30-year DoD trend we saw previously, it really doesn't matter how long it took the commercial

world to do this. This trend is clearly not even *starting* in the DoD acquisition environment.

So let's check out a few specific data points that went into that chart. The Boeing Company stated they cannot afford a new aircraft unless they can develop it in two-and-a-half years. Modifications of their commercial aircraft have to take less than 18 months. Hughes Aircraft Company recently designed and launched an entirely new spacecraft bus and payload in less than 26 months. Really? Yes, really. Moving on ...

### **Secret Speed Sauce**

What's the secret? How did the aircraft, automobile, spacecraft, and electronics industries do it? What do they know that we don't know? This may sound obvious and redundant, but apparently "companies that have focused on reducing their development times have dramatically reduced their development times." Does that surprise anyone? The MIT crew thought it was worth pointing out.

It gets better. Along with reducing development/acquisition time, these companies have also increased product quality, decreased development cost, and increased the number of products produced. Which brings us back to the Packard Commission's observation that an unreasonably long timeline is the central problem from which other problems stem. Maybe that Packard group was really on to something. It's too bad we didn't listen.

### **The Irrelevance Of Ease**

Some of us might be tempted to believe that if it was easy for the DoD to cut cycle times, we would have done it already. That would be incorrect. If it was *valued* we would have done it already. If people thought it was important, and if we really wanted to cut cycle time, we would have done it already. The truth is, we're not even tracking cycle time metrics.

We are not suggesting it would be easy to cut cycle times in half. We simply contend that ease or difficulty is entirely irrelevant. The DoD does difficult things all the time (and cutting development time is apparently not all that tough).

In reality, the DoD has not cut development time because we don't really want to, despite the earlier statements from various officials. How do we justify that assertion? Quite easily—just look at the data again. All the data. Specifically, take the part about "companies that focused on reducing timelines reduced their

timelines” and put it next to that other bit about how “contractors who bid different schedules are deemed non-responsive,” and “90% of contracts offer no schedule incentives.” Then add in the fact that we stopped collecting cycle-time data in 1998. Looks like a lack of desire, focus, will, and values to us.

### **Fast & Slow**

*“Hurry! Hurry! Go, go, go!”*

*“Where to, sir?”*

*“It doesn’t matter—they need me everywhere!”*

Okay, time for a short note about what speed really means. The May 2003 *Harvard Business Review* tells a fable about a farmer pushing a cart full of apples. The farmer asks a passer-by how far away the market is. The reply: “The market is an hour away if you go slow. If you go fast, it’ll take all day.”

That strange answer makes sense because the road was bumpy and the cart was full. If the farmer tried to rush to market, he’d spend all day picking up the apples that would inevitably bounce out of his cart. Does that sound like a familiar condition for a DoD program manager—very bumpy roads and very full carts?

Clearly, the objective in the fable (and in the real world) is to get to the market soon, and sometimes the fastest way forward is to take your time. Remember the tortoise who beat the hare in that famous race? So, while speed is indeed a virtue, being fast is not simply about quick movement. Deliberate and efficient forward movement, even if it seems slow in the short term, might be the fastest way to the finish line. The point is, there’s a world of difference between being fast and being hasty. And now that we’ve cleared that up, back to the show.

### **Time To Get Our Game On!**

So far, we’ve seen that technology development needs to be done faster, probably on the order of half the time it currently takes. We’ve also seen it can be done faster, according to a significant number of smart people who know what’s going on. Then we talked about what speed is and is not. The only remaining question, then, is “How?” What can be done to bring about this increased speed? Submitted for your consideration are three concrete actions.

Fail to proceed at your own risk.

**The Goal:** Set an aggressive goal (50 percent reduction sounds good to us) and mean it this time, doggone it! Yes, that’s what we all thought the Packard Commission did in ’86, and FASA did in ’96, and everything else—but maybe

we could try it again, just one more time. Action on the individual PM's level would be a nice first step.

Or how about a DoD-wide initiative to reduce development time across the board? Yes, it's been tried before, but what if we launch a little psyops mission and tell the Air Force that the Navy is going much faster all of a sudden ... then tell the Army the Air Force is slashing schedules left and right ... and then tell the Navy the Army is kicking butt. It's amazing what inter-Service rivalry can do.

**The Practice:** Start generating, collecting, tracking, analyzing, and publishing cycle-time metrics. Then discontinue/ disallow the practice of dictating schedules. At the very least, make it a rare exception to the soon-to-be newly established standard practice of seeking fast-moving, rapid-delivery contractors who set aggressive delivery timetables. Introduce schedule incentives for some portion of the 90 percent of contracts that currently don't have any. Then make sure late deliveries and schedule slips are not tolerated, or at the very least, not ignored or rewarded.

**The People:** Remove, relocate, retrain, re-educate, or otherwise replace the people who are content with the status quo. That's an essential element of any significant organizational change, and it just might be the missing piece of the various timeline-reduction efforts of the past few decades. The DoD needs to stop tolerating people who assert the amount of time it currently takes to develop and deploy new systems is just fine or can't be shortened.

Those who believe solving the timeline problem will introduce new problems are undoubtedly correct, but that doesn't mean we shouldn't solve the timeline problem anyway and then start fixing the new problems. It's time to find people who believe in speed and put them in charge. We've got a list of names, if anyone is interested.

Seriously cutting the DoD's technology development cycle times may or may not be easy, but it is certainly possible. We can do it. We *need* to do it, even if it's hard. It will solve a whole host of problems. The alternative is to keep slow-dancing with the 800-pound status quo gorilla. And that's just not pretty.

## **Doing Less With More**

*Nov/Dec 04*

*Ward:* This is definitely in my list of the top three most important articles I've written. Like the previous article (*It's About Time*), this one has a lot more research behind it than our articles usually do, and the implications and assertions are extremely far-reaching. It's also one of the longest pieces we've ever done.

Basically, this article proposes a whole new way of doing the technology development business within the DoD, and I sincerely believe these changes are feasible, if someone had the will to give them a try. I'll go even further – they're not just feasible, they're downright necessary.

As usual, I tried to keep a light touch while still maintaining a sense of the seriousness of the subject. I think I pushed the envelope about as far as I could, and in a lot of ways this is the standard against which I judge my other articles, in terms of innovative thought and status-quo defying ideas. But then I have moments where I think I didn't push the envelope far enough.

## Doing Less With More

### *The Perils Of Overfunding*

#### **AUTHOR'S WARNING**

*This article may offend the professional opinions and sensibilities of certain individuals. Discontinue reading if any of the following occur: itching, aching, dizziness, ringing in ears, vomiting, giddiness, auditory or visual hallucinations, loss of balance, slurred speech, blindness, drowsiness, insomnia, profuse sweating, shivering, or heart palpitations. May be too intense for some readers and not intense enough for others. No program managers were harmed during the production of this article. Some restrictions apply.*

Let me get right to it: the Department of Defense acquisition community today has too much money. There, I've said it, and it feels good. It may be a career-limiting opinion, but after 10 years in this business, I can confidently (albeit naïvely) conclude we have too much money. More importantly, I contend this overfunding is limiting our ability to innovate, which has negative consequences for America's warfighting capabilities.

Now that I have your attention, let me explain how I reached this conclusion.

In a word, research. As I looked for common threads within innovative development projects, I quickly discovered something many readers probably knew already: I am not the first to contend DoD overfunding is a problem.

#### **It's Been Said Before**

Air Force Col. John Boyd and his collection of military reformers sounded a similar call in the early 1980s. In fact, Pierre Sprey, one of Boyd's acolytes, wrote *A Case for Better and Cheaper Weapons*, published in 1984. He compared "cheap winners" like the highly lethal AIM-9D/G Sidewinder (\$14,000 each) to "expensive losers" such as the less effective AIM-7D/E Sparrow (\$44,000 each). He argued that increased spending will yield less capability, particularly if we continue to buy complex, vulnerable weapons that are costly to operate. My research didn't stop there.

Navy commanders James Fitzsimonds and Jan van Tol observed in the Spring 1994 issue of *Joint Force Quarterly* that "revolutionary changes [in technology and concept of operations (CONOPS)] do not generally occur during war. ... Militaries are driven to innovate during peacetime by the need to make more efficient use of shrinking resources."

The article concludes: “Innovation is not necessarily or even primarily a function of budget. Many of the interwar innovations came at a time of *low* budgets and *small* forces” (emphasis added).

On the other side of the ledger we have the Cold War tactic of large defense spending, which was apparently an effective weapon against the now-defunct U.S.S.R. However, high rates of military research and development spending in that time period did not exactly produce the anticipated technological innovations—Strategic Defense Initiative, anyone? Instead, we find things like the Comanche helicopter’s expenditure of 21 years and \$8 billion with zero actual helicopters to show for it. And there’s also the recently cancelled \$11 billion Crusader, the on-again-off-again-on-again B-1, the on-again-off-again-on-again V-22, and so on.

While the newspapers in the 1980s never did get those \$900 hammer stories quite right, it’s not clear that large Cold War R&D budgets delivered what was promised. Fortunately, the Soviets were able to accomplish even less—perhaps in part because they outspent the United States by \$300 billion between 1970 and 1980.

### **A Tale Of Two Weapons**

Wilber D. Jones’ outstanding book *Arming The Eagle* lends further support to the overfunding thesis. First published in 1999, this book rigorously documents the history of U.S. weapons development and acquisition since 1775. It is full of fascinating snapshots and stories about successes and failures in military technology development.

Let’s take a look at the very different stories it tells about two infantry weapons: the Bazooka and the M16. Early in World War II, the Bazooka went from drawing board to battlefield in 30 days—surely some kind of record. A contemporary article in *Liberty* magazine breathlessly opined the \$19 rocket rifle “can almost duplicate the devastation wrought by a 155-mm howitzer that costs \$25,000!” While the assessment of this weapon’s effectiveness is undoubtedly overstated, the Bazooka’s impact on the battlefield was undeniable, and the cost was ridiculously low.

In contrast, the M16 took 20 years to go from concept to capability, at a pricetag many orders of magnitude beyond the 30-day wonder. It turns out both weapons had similar operational limitations upon deployment: neither performed as advertised. The important thing to note is the Bazooka’s problems came to light quickly and were addressed quickly (the first major Bazooka upgrade was

accomplished in six months). The M16's bugs took longer to find, longer to fix, and cost considerably more.

This doesn't establish a causal relationship between large budgets and low capability/low innovation—but hang on, we'll get there. It does show the M16's decades-long, disciplined, neat, orderly, and well-funded development effort didn't guarantee the system's operational effectiveness. Neither did the Bazooka's month-long, quick-and-dirty, low-cost approach. The key to field success in both situations was (drumroll please) actual field experience and direct user feedback. The inexpensive, rapid developmental approach of the Bazooka got the users involved much sooner, which may very well be the key to this whole thing.

### **War and Peace, Fact and Fantasy**

Let's return to the assertion of Fitzsimonds and van Tol that most innovation happens during times of peace and small budgets. Specifically, let's focus on the peacetime dimension. Why would wartime not be a cauldron of innovation? What leads to peaceful innovation? And what's the connection to small budgets?

During wartime, new military technology development is left largely to technologists and engineers like me. We tend to know a lot about technology and its limitations and relatively little about combat environments and their requirements. Only when the shooting stops do adequate numbers of combat-experienced individuals have the opportunity to spend their intellectual capital on new system requirements and developments. Of course, in the case of the Bazooka, its absurdly short development timeline gave soldiers an opportunity to provide real-time combat truth to the developers, who could then address the weapon's shortfalls. But this is clearly an exception to the peacetime-innovation trend.

The principle behind the parable is this: technology developers tend to have facts about technology and fantasies about the operational (i.e., combat) environment. In contrast, users tend to have facts about the operational environment, and fantasies about what technology can do. Innovation seems to require the latter combination, which accepts the limitations of the foxhole and puts innovative pressure on technology, not the other way around. It leads to creative technologies and approaches that are well-suited for the environs in which they will be used.

The alternative (and unfortunately, traditional) approach—technology facts and operational environment fantasies—tends to be neither as creative nor as

effective and it often makes absurd assumptions or demands on combatants as they try to integrate new, rigid technologies.

### **Back To the Bazooka**

What would have happened if the Bazooka budget had been larger? For starters, its development would have taken longer if only because it takes time to spend money. Larger budgets get more oversight, which takes more time, which—in a cruel irony—increases the overall cost. (More people overseeing more dollars requires more people and more dollars—a financial snowball effect). Also, the risk of analysis paralysis increases in direct proportion to the size of the R&D budget.

What does this have to do with low budgets? Just about everything. When something is expensive, there is a natural and understandable tendency to keep it away from the kids. Exquisite artifacts are treated with great care and shielded from those with grubby hands who might damage or break them. But a \$19 piece of steel pipe with a few doodads welded to it (a Bazooka) can be sent into a rigorous combat environment without fear of breakage, in part because it is simple and robust, and in part because it is inexpensive enough that its builders don't mind if it breaks.

The conclusion is unavoidable: increased development costs tend to have an isolating effect, even for supposedly rugged military technology, because users are kept at arm's length and development times stretch into decades. This unfortunate attempt to disinvolve users may be rooted in good intentions, but ultimately it limits the systems' effectiveness by keeping ground truth out of the equation. Early user involvement is a prime driver for innovation and effectiveness, and rapid, cheap systems tend to bring users on board sooner. Large wallets just get in the way, blocking one of the key elements of successful technology development.

### **Reforming Rewards and Recognition**

For the sake of argument let's say I've convinced someone that overfunding is a problem. The logical next question is "What do you propose we do about it?" I'm glad you asked!

Most readers have probably noticed the DoD acquisition profession tends to use dollar figures to quantify job progression, equating increased program costs with professional maturity. If you managed a program worth \$1 million last year, your chances for promotion are better if you manage a program worth \$10 million this year. That's a problem. We need a different set of values and metrics where dollar figures and professional maturity are not automatically

equivalent, where an up-and-coming program manager hears instead, “Well, Capt. Smith, you did good things with \$10 million last year. Now let’s see what you can do with \$1 million.”

The idea is not simply to slash budgets on existing programs, although that is often a good idea too. The point is to avoid turning our noses up at a program just because it’s inexpensive, or overvaluing a program just because it costs a lot of money.

## Redefining MDAPs

The situation is more pronounced at the higher levels. For example, take major defense acquisition programs (MDAPs). In order to be an MDAP, an acquisition program must either be designated by the under secretary of defense (acquisition, technology and logistics) as an MDAP or be estimated to require an eventual total expenditure for research, development, test, and evaluation of more than \$365 million in fiscal 2000 constant dollars or more than \$2.190 billion in procurement in fiscal 2000 constant dollars. That essentially means a system becomes an MDAP when it reaches a particular dollar value (Figure 1).

FIGURE 1. MDAP Defined

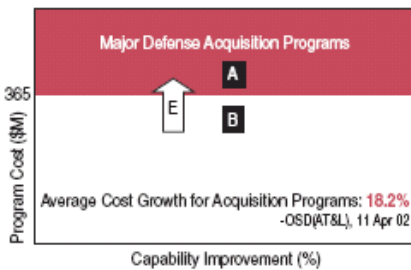
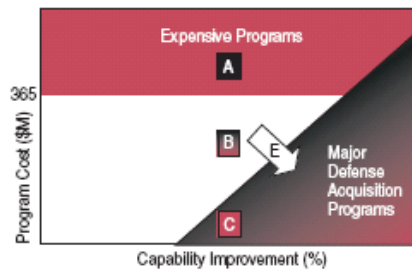


FIGURE 2. MDAP Redefined



Shouldn’t capability come into the equation somewhere? At the moment, it does not, and that is kind of embarrassing. Would it not make sense to designate a system as “major” based on the degree to which it contributes to national security, provides a new/necessary functionality, or otherwise makes our forces more effective? Currently, all it takes to be “major” is a big price tag, no matter how much or how little the system improves the users’ capabilities.

The figures illustrate this point. In Figure 1, which system, A or B, is more prestigious and better for your career? The more expensive one ( System A) of course, even though it provides the same increase in capability as the less expensive one (System B). In fact, a cost overrun for System B could push it over the line and turn it into a

“major” program. This causes subtle (and not-so-subtle) environmental pressure (E) in the direction of increased cost, as depicted by the arrow. This may not be the only reason for the 18 percent average cost growth, but it is certainly a contributing factor.

There is a better way. You see it in Figure 2. In this approach, all the statutory requirements for reporting, testing, oversight, and so forth of programs costing more than \$365 million would still apply, but we would now call those programs what they are—“expensive.” Not good or bad, not major or minor. Simply expensive defense acquisition programs. EDAPs. Even if they are worth every penny or are a bargain at twice the price, they cost a lot of money and everyone knows it. What a refreshing change it would be to acknowledge that reality.

This wouldn't fix all our problems, nor would it guarantee innovation all the time, but it would be a step in the right direction. For example, in this proposed paradigm, which program (A, B, or C) is more prestigious and better for one's career? The MDAP (C) of course, which delivers a significant improvement in capability at a low cost. Who would want to be the manager of System A (the EDAP)? One implication of this approach is that cost overruns could result in the loss of MDAP status, unless there is a corresponding improvement in capability. Environmental pressure in this scenario is down and to the right, in the direction of lower costs and improved capabilities, as it should be.

In an interview with NASA's *ASK* magazine, Terry Little, (acquisition advisor of the Missile Defense Agency) addressed a common misconception that “if you emphasize something like speed or cost, everything else goes in the toilet.” Contrary to that often-held belief, Little's experience indicates that “people working the problem won't let that happen. ... What you give up [by focusing on speed or cost] is very modest in comparison to what you gain.” All I can say is, “Amen, Mr. Little. Amen.”

### **Time To Act**

The history of military innovation clearly points to the value of small budgets and the dangers of large ones. I think the M16 and the Bazooka are interesting examples, but the 21st century is already full of similar situations we could have discussed, particularly in the areas of information technology and unmanned aerial vehicles.

High technology is not terribly expensive these days, and maybe it never was. But this whole thing is really not about high or low tech. Our mission is to deliver innovative, effective capabilities to our users, and it's amazing what you can do with \$19 worth of steel pipe and assorted parts. I don't expect ever to see a \$19 aircraft carrier;

there will always be a need for expensive systems. I simply contend the DoD's current value system tends to drive costs upward, while reducing innovation. And it is high time we did something about it.

My own, admittedly limited, experience with both expensive and inexpensive development efforts resonates with the academic research. My teams and I typically did more with less and the most when we had the least. That is to say, our innovation and our impact on operations were most significant when our resources were the most limited. It is hard to avoid concluding that small teams + thin budgets + short timelines tends to = significant innovation and combat effectiveness. If the DoD as a whole is aiming to maximize bang for the buck, it helps to recognize that bang and buck are often inversely proportional.

This is not a call for fiscal discipline in a political sense, and it's not about the government's spending less money for thrift's sake, although that's not a bad idea. It is about spending less money for technology's sake and for the warfighter's sake. Counterintuitive though it may be, if we want to provide America's soldiers, sailors, airmen, and Marines with innovative capabilities, we need to spend less money developing systems.

Reducing R&D budgets is not a cheap fix, but nor is increasing spending. Frankly, there is no sure-fire way to produce innovative technologies, and spending lots of money is perhaps the least effective approach imaginable. Getting actual feedback from combat-experienced users tends to be highly productive, and large budgets usually get in the way of that communication.

How much should we cut from the budget? More than we will. The longstanding cultural standards within the DoD acquisition community place such high value on large budgets that any effort to decrease them will be met with fierce opposition. One way to begin influencing the culture is by redefining MDAPs as outlined here. One might reasonably ask how we would recognize and reward our people for doing good work if dollar figures are no longer used to measure professional competence. Look again at Figure 2. The top performers should be moving down and to the right (or at the very least, to the right) as their careers progress.

What should we do with the money we save? Frankly, I don't care, as long as nobody tries to give it to me.

## **The Simplicity Cycle**

*Nov/Dec 05*

*Ward:* I got sort of fed up with all the serious and highly-accomplished scientists and engineers I met who seemed to equate complexity with value. That is, they acted as if a system's goodness and utility were directly proportional to how complicated the system is... and looked down their noses at anything that was simple.

Well, I set out to disabuse them of that notion, and The Simplicity Cycle is what I came up with. It graphically explores the relationship between simplicity, complexity, goodness and time, all in a neat little package.

My original version of this article used a whole series of diagrams, which walked through the Cycle a piece at a time, then a final complete diagram at the end. That was too complicated, so we went with a single, hopefully elegant diagram to represent the whole thing.

A modified version of this article was published at [www.ChangeThis.com](http://www.ChangeThis.com) with some great diagrams, and I even created [www.TheSimplicityCycle.com](http://www.TheSimplicityCycle.com) (with the grooviest illustration yet!) to spread the idea further.

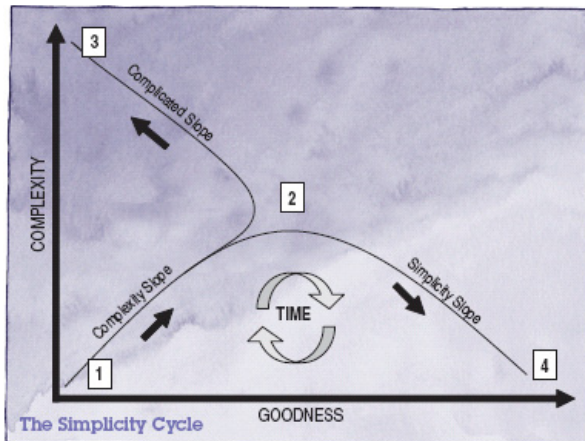
## The Simplicity Cycle

### *Simplicity And Complexity In Design*

Albert Einstein and Henry David Thoreau were kindred spirits in many ways.

They were both towering geniuses, each with the unique and intriguing eccentricities that tend to accompany people with such extreme mental gifts. They were both tremendously curious about the world around them; they both worked as teachers; and both left indelible marks on the world. And despite the vast scale and scope of their chosen fields of study, they both had a profound appreciation—and need—for simplicity in their lives as well as their work.

Thoreau is famous for challenging his readers to “simplify, simplify, simplify.” With slightly more nuance, Einstein opined that “everything should be made as simple as possible, but not simpler.” However, to simply say simplicity is important is rather... simplistic. There’s a lot more to it than that, so we’re going to take a tour of something I call “the simplicity cycle.”



### Simplicity 101

*From naive simplicity we arrive at more profound simplicity.*

Albert Schweitzer

The simplicity cycle is a teaching tool I developed to illustrate the typical progress of a system design, academic discipline, or technology development program as it progresses from conception to maturity. The simplicity cycle highlights a typical path for any number of activities and illuminates a few key design myths and pitfalls on the way. We will examine it one piece at a time, then put the pieces together.

We begin with a blank x-y chart where *complexity* increases along the vertical y-axis and *goodness* along the horizontal x-axis. Goodness is a general term that

means slightly different things depending on the application and context. If we are talking about a technology or a system, goodness represents operational functionality or utility; for an academic discipline, it represents increased understanding; and for system design, it reflects design maturity.

## **Region 1: The Region of the Simplistic**

*One, two, buckle my shoe.* Traditional nursery rhyme

The journey begins in the lower left quadrant of our x-y chart above: the *Region of the Simplistic*. Here, complexity and goodness are both low. In mathematics, this is where we discover numbers and encounter things like

$1+1=2$ . In aircraft design, it's where we make paper airplanes. In other words, this region is where a foundation is laid for all the progress and work that follows. From the simplistic vantage point, it is sometimes difficult to tell the difference between subsequent regions because our understanding of the road ahead is too simplistic. Not to worry, we usually don't usually stay here for very long.

## **The Complexity Slope**

*I have yet to see any problem, however complicated, which, when you looked at it in the right way, did not become still more complicated.* Poul Anderson

As you learn and develop, new elements are introduced, and complexity increases. Fortunately, these new elements add utility, functionality, or maturity, so goodness also increases. This corresponds to movement from the bottom left quadrant towards the middle of the chart.

Progress along this slope—the *complexity slope*—can be described as learning and creating. In a word, the slope is about genesis. For mathematicians, our use of numbers and simple addition grows to include things like multiplication, division, and algebra. Now, rather than  $1+1=2$ , we are working with  $Y=mX+b$ , which requires (among other things) the introduction of elements beyond numbers. The complexity of our output has increased.

And so has the goodness because we can do things with algebra that we can't easily do with arithmetic.

For system designers, travel along this path involves adding new pieces, parts, and functions. Aircraft designers leave paper airplanes behind and move on to scale models, wind tunnels, and operational prototypes. The transition from paper airplane to operational prototype results in the ability to do more, whether that be to fly longer and higher, to carry more weight, or simply to land without

crumpling. It is reasonable to conclude the increased goodness / utility / maturity is largely the result of the increased complexity.

That brings us to one of the primary myths of complexity—a common but erroneous belief that complexity and goodness are always proportional, and an increase in one dimension equates to an increase in the other. More pointedly, there is a misperception that increased complexity actually *causes* increased goodness. As we have already seen, this is partially and initially true—but only to a point. Eventually we arrive at the second region, and our trajectory must change.

## **Region 2: The Region of the Complex**

*A complex system that works is invariably found to have evolved from a simple system that works.* John Gaule

In the second region (located in the center of the graph), complexity and goodness have achieved a critical mass. This is the *Region of the Complex*. In practical terms, the number of elements involved have substantially increased beyond the original simplistic situation, and a meaningful degree of functionality and maturity (a.k.a. goodness) has been demonstrated.

To continue building on the aircraft example, the Wright Flyer fits in this category quite nicely. It was a rather complex machine and required a fair amount of effort and maintenance to keep it aloft. Its creation was primarily the product of genesis and learning as new information was produced and new functions and elements were added to earlier designs. It also demonstrated a wholly new ability: manned flight in a heavier-than-air vehicle. Thus, it can be said to have a moderate degree of both complexity and goodness. For that matter, the current fleet of NASA's space shuttles probably resides in this region or perhaps slightly up and to the left of center.

Operations in Region 2 typically involve a nontrivial amount of effort and strain. Significant resources, either mental or physical, are usually required. If you are working hard to create a design, solve a mathematical problem, or perform a similar task, chances are you're here.

As we enter this region, we have reached a crucial point where complexity and goodness are no longer proportional. Any substantial *increase* in goodness actually requires a *decrease* in complexity. That is, improved utility or increased understanding requires some amount of *simplification*—represented by downward movement along the y-axis. There are actually two paths out of this

region, and neither follows the earlier trajectory of increases to both complexity and goodness.

From this point on, the two axes have become inversely proportional, so an increase in one drives a decrease in the other. One pitfall that designers, engineers, and academicians may fall prey to in this region is the belief that continuing to increase complexity automatically leads to increases in goodness. That view leads us to the upper left quadrant of the chart.

### **Region 3: The Region of the Complicated**

*Something of true value does not become more valuable because it becomes complicated.* Donald Curtis

“Complex” and “complicated” may sound similar, but they are in fact two very different beasts. Complexity is often essential. Certain topics, issues, and missions are inherently complex—and there’s nothing wrong with that. But complicatedness involves *unnecessary* complexity. It’s caused by the addition of non-value added parts, of gears that turn without reason or grind against other gears. Generating new-and-necessary elements moved us to Region 2. Generating too many parts leads to Region 3: the *Region of the Complicated*.

Increasing complexity beyond that required to reach Region 2 actually represents a decrease in understanding, design maturity, and functional utility. It’s a step backwards along the x-axis, though some people may take misguided comfort in the positive movement along the y-axis. Think of it as achieving “the complexity on the other side of understanding,” often caused by overthinking a problem.

My wife describes this region as “the smarter you are, the dumber you get.” That absolutely nails it because it highlights the illusion that complexity and goodness are always directly proportional. Moving in this direction (toward the upper-left quadrant of our chart) is not a question of getting smarter—it is a question of simply producing a more complicated output. Here we find the learned academician who everyone assumes is brilliant because nobody can understand a word he says. In fact, his academics may simply be complicated and have very limited goodness.

I suspect many of the problems faced by beleaguered aircraft like the B-1 and V-22 were at least partly caused by the fact that their complexity exceeded their goodness, so they floundered around in the Region of the Complicated. That is precisely why this cycle matters to program managers and technology

developers. An inadequate appreciation for simplicity can result in an overvalued perspective of complexity, which can cause programmatic disaster.

Incidentally, the B-1's operational goodness improved substantially once it moved towards increased simplicity, and the V-22 appears to be moving in that direction as well, according to an article in a recent issue of *WIRED* magazine. Movement toward the lower right quadrant is precisely the path one should take when leaving the Region of the Complex.

It should be noted that the upper right quadrant of the xy chart is unreachable. An extremely high level of complexity and an optimized degree of goodness are simply not compatible. A system, process, design, or discipline that appears to be in this fairy-tale region actually resides in the Region of the Complex (center of the chart), and has the potential to increase its goodness only by decreasing its complexity.

### **The Other Side of the Mountain: The Simplicity Slope**

*Making the simple complicated is commonplace; making the complicated simple, awesomely simple, that's creativity.* Charles Mingus

The ideal path out of the Region of the Complex is down and to the right, in the direction of increased goodness and decreased complexity. However, to begin moving in this direction requires us to learn some new tools ... and forget some old ones. In place of learning and genesis, which served us well on the trip between Simplisticness and Complexity, we must now master a toolset that includes things like *unlearning* and *synthesis*.

At this point in the journey, the necessary tasks do not involve creation of new elements, but rather the integration of existing elements or even the removal of some elements. The process requires the abandonment of certain behaviors, principles, and activities that brought the current level of goodness because to continue using them has become counterproductive.

The idea is to prune and pare down the design, reducing it to the essential components, each of which is able to freely operate with minimal friction and maximum contribution. As software guru Eric Raymond explains in *The Cathedral And The Bazaar*, "Perfection [in design] is achieved not when there is nothing more to add, but rather when there is nothing more to take away."

One of the laws identified in Genrich Altshuller's *Theory of Inventive Problem Solving* (a.k.a. TRIZ) is the Law of Ideality. This law states that as systems

mature, they tend to become more reliable, simpler, and more effective—more ideal. Further, the amount of complexity in a system is a measure of how far away it is from its ideal state. In fact, upon reaching perfect ideality, the mechanism itself no longer exists. Only the *function* remains. This path to maturity describes movement towards Region 4.

#### **Region 4: The Region of the Simple**

*Out of intense complexities, intense simplicities emerge.* Winston Churchill

Elegant, graceful, streamlined solutions are to be found in the bottom right quadrant of our graph, the *Region of the Simple*. Einstein's famous  $E=mc^2$  equation is an example of life in the fourth region. There is tremendous complexity behind it, but the equation itself is at once profound and breathtakingly simple. There is something profoundly Zen-like about the goings-on in this region, and the individuals who abide here tend to have many attributes of Jedi masters.

In terms of aircraft, the streamlined, high-performance F-16 really takes the cake (notwithstanding the inevitable attempts, throughout the years, at gold-plating the initially minimalist design). In the world of consumer electronics, the ubiquitous Apple iPod combines extremely low complexity with an equally high goodness quotient, placing it squarely in this area.

This is the region most good system designers aspire to enter. However, the simplicity in this region is built upon an essential foundation of earlier complexity. One cannot often jump directly from simplistic to simple, skipping the complex entirely. The initial increase in complexity established a foundation and is as crucial to maximizing goodness as the later decrease in complexity.

#### **What Comes Around, Goes Around**

*Complexity is another word for simplicity unfolding in time.* Cliff Crego

There is an old Zen koan that poses the following question: "How do you proceed from the top of a 100-foot pole?" That is the question we must ask upon reaching Region 4. The optimal path out of this region involves yet another trajectory change, and we find ourselves traveling along a slope that runs parallel to the earlier complexity slope. This means increasing complexity once more as a means of establishing a corresponding increase in goodness. However, we must avoid the orthogonal *complicatedness* slope, which would take us up and to the left.

This means increasing complexity—once again using the opposite of the activities that moved us along the previous slope. The trick is to avoid complexity for complexity’s sake and to accept only those additional elements that provide a corresponding bump in goodness. We might picture a sinewave leaving the region of the simple and extending out to the right. Where does it stop? I’m not sure it ever does.

### **Elementary, My Dear Watson!**

*Seek simplicity, and distrust it.* Alfred North Whitehead

Mere simplicity, defined as a state of low complexity, is seldom adequate for the academic, systemic, operational, and organizational activities we pursue each day. And yet simplicity in speech, in design, in understanding, and in operations is essential to optimal performance. This is no paradox, once we are able to see the distinctions between simplisticness and simplicity and the ways both relate to complexity and complicatedness.

The journey of design, like any journey of discovery, involves both genesis and synthesis, learning and unlearning. True mastery comes from discovering “the simplicity on the other side of complexity” and then understanding that forward progress requires complexity to increase once again.

It’s just that simple.

## **FIST Part 5, Putting It All Together**

*May/June 06*

*Ward:* The framework of this final article was established years before it actually saw the light of day as a completed piece. It ended up on the back burner for a number of reasons, but once we had the first four articles finished and published, we knew we'd have to go back and do this one.

It ended up being a pretty nice capstone for this whole FIST project, and gave us a chance to tie up a few lose ends.

## **FIST Part 5**

### *Putting The Pieces Together*

This is the fifth-and-final article in a long-planned but previously unannounced series titled “FIST--Fast, Inexpensive, Simple, and Tiny.” Our initial FIST research started to take shape in March 2003, and the actual series began in the November-December 2004 issue of *Defense AT&L*, with an article entitled “Doing Less With More.”

That first article illustrated the I (Inexpensive) portion of the FIST model and argued that smaller budgets foster innovation. The second installment was published a year later, when “The Simplicity Cycle” (November-December 2005) explained the relationships between simplicity, complexity, goodness, and time. Installment three, “It’s About Time,” appeared in the January-February 2006 issue and explored the history and future of technology development timelines. The fourth installment was a two-FISTed comic (our editor prefers “graphic article) in the last issue. It literally illustrated the application and interaction of the four FIST values.

### **The Word Of The Day Is ...**

That brings us to the key word in this series: values. The components of FIST are, first and foremost, statements of professional values. They are characteristics, attributes, or entities that are judged to be of greater worth than the alternatives. They describe principles, standards, and qualities that are deemed worthwhile and desirable.

Specifically, the FIST values contend that for military program management and technology development, speed is good, lower costs are good, simplicity is good, and smallness is good. These are professional judgments, based on extensive research and experience, not merely opinions or theoretical conjecture. However, they are “theory” in the scientific sense of the word. They make predictions that can be tested and proved ... or disproved. In the previous four articles, we offered some results of our tests, and we invite our readers to do their own experiments and investigations as well.

Like any set of values, FIST can be understood as a collection of philosophical assertions, designed to drive actions and inform decision making. It may be indelicate to point this out, but the truth is, we often pay public lip service to the values embodied in FIST, while disparaging and denouncing them behind the scenes. For example, “Yes, of course we want to avoid wasteful spending—but by the way, make sure your expenditure rates are not too low, otherwise we’ll lose our money and we won’t get as much next year ... and you won’t get

promoted.” Thus, these values are not universally accepted as principles within the DoD program management community, much less are they put into practice on a regular and widespread basis. That’s a shame. We hope these articles can help fix that.

### **The Final Piece**

Alert readers may have noticed the series has so far only addressed the F, I, and S of FIST. This final article explores the concept of Tiny (as expressed in the statement “small is beautiful”) and then ties all the pieces together. We almost didn’t write this one because it is, in some sense, redundant. Tiny is basically the inescapable outcome of the three previous values. If your project is Inexpensive, it has a Tiny budget. If it is Fast, it has a Tiny schedule. A Simple project has a Tiny degree of complexity. Further, a Fast, Inexpensive, and Simple project necessitates a Tiny program office. You get the picture.

Could there possibly be a project, program, or team that’s Fast, Inexpensive, Simple, and Huge? No, FISH makes little sense because the first three values are generally inconsistent with Hugeness. If your project is already F-I-S, it will logically tend towards T as well. Even so, we believe Tiny is a sufficiently significant concept to merit a focused exploration of it as a distinct value.

Tiny may be an outcome that springs naturally from the previous three values, but an in-depth understanding of and appreciation for the value itself can contribute greatly to a program’s success. Any readers who wish to explore the value of Tiny in more detail than this brief article can afford might want to check out Bo Burlingham’s recent book *Small Giants*, which examines 14 companies “that choose to be great instead of big.”

### **Dr. Dolittle and the Elephant**

At a meeting long ago, in a place far away, Dr. Dolittle stated that Project Pachyderm is small. Maj. Myopia quickly concurred, observing, “It’s not a lot of money.” We were rather surprised by their assertion. We had previously heard the burn rate for Project Pachyderm was approximately \$700,000 per day, but we didn’t want to sidetrack the discussion since the meeting was already hours longer than originally planned. By the way, names and figures have been changed to protect the guilty.

Back in our office, we did some digging and found out that Project Pachyderm’s two-year contract was valued at \$600 million. Assuming work is performed every day of the year, we calculated a burn rate over \$800,000 per day (\$600 million divided by 730 days equals \$822,000 per day). Surprisingly, the rumored \$700,000 per day was actually on the low side!

Interestingly, we also had intimate knowledge of Project Cheetah, a lean and rapid prototype-to-operations development effort with a budget under \$400,000 (that's right, thousand, not million), a four-month schedule, and a team of two government people plus two contractors, all working the project part time. They were chartered to address what turned out to be a significant portion of Pachyderm's requirements. In a matter of months, this tiny project delivered a powerful capability using less money than Pachyderm spends by lunchtime every day of the year for two years straight. The larger effort? It failed to deliver anything at all. Now tell me again who's big and who's small?

### **Everything Is Relative?**

We gladly admit size is relative, and Pachyderm's budget is certainly a small effort compared to some, but it is also rather large compared to Project Cheetah's. How then should we distinguish between large and small? On what basis can we say a particular project is "not a lot of money"? Perhaps the thing being purchased should be taken into consideration. For example, \$100 is a lot to pay for a candy bar, but not a lot to pay for Pablo Picasso's *Garçon à la Pipe*.

In the Pachyderm-vs-Cheetah example, we are definitely talking apples-to-apples. In fact, the Elephant ended up basically doing a cut-and-paste job of the speedy Cat's software (then happily collected a fat award fee for the "effort"). The warfighters got what they needed, so it worked out—but the point is, there was nothing small about the Pachyderm, despite assertions to the contrary.

### **Perspective Matters**

Of course, perspective counts too. When you're very young, \$100 is a lot to pay for anything (although my four year-old daughter favors "thirty-two hundred thousand hundred" when discussing large numbers). And in a world where programs worth multiple hundreds of millions are commonplace, it's understandable that one's perspective about size might be different from that of the average joe.

Why does this matter? Because as long as we've got high-ranking government people looking at \$700,000-per-day burn rates as "small" and "not a lot of money," we're going to continue having enormous expenditures and low expectations for delivery ('cause hey, we didn't really give

them very much money, so we can't really expect them to deliver very much, right?). So let's try to remember that in real life, even one million dollars is a lot of money.

## **The Tiny Fighter**

But size isn't all about money, of course. Tiny can (and should) be applied across the board. We hope our Army, Navy, and Marine Corps readers will excuse this Air Force-centric example, but it's just too good to pass up.

As Air Force Col. James Burton explained in his amazing book *Pentagon Wars*, the guys involved with the development of the F-16 understood and embraced the value of Tiny in a big way. This aircraft was half the price and half the size of its predecessors and was developed in half the time. The statement of work was a mere 25 pages, and contractor proposals were limited to 50 pages.

The result was a remarkably agile, maneuverable, and successful fighter, despite the eventual goldplating and increases in complexity injected into the system as the program matured. Over 4,000 of these fighters have been produced, and they are in service in 24 different countries. The point is, being Tiny can really pay off.

Of course, Tiny doesn't just apply to schedules, budgets, and paperwork. It's also about people. In terms of timeliness and accuracy, smaller teams are better able to communicate with internal and external team members. Further, you've got to be careful not to have such a small team that you don't have adequate resources to do the job, but at some point, adding more people becomes counterproductive—as the Simplicity Cycle article illustrated.

It's worth repeating that this is fundamentally a problem of values. Why does the DoD technology development community sometimes fail to be FIST? Because it is hard to do? No, we do hard things on a daily basis. Because our hands are tied? No, we are intelligent and creative enough to find innovative solutions, if we set our minds to it, to just about anything.

It is because on the whole, we often don't value speed, inexpensiveness, simplicity, and tiny-ness. Our research indicates that all too frequently, we don't function this way because we are not looking for improvement in these dimensions. Let's fix that.

## **A Brief Aside**

Some people are fond of saying “better, faster, cheaper: pick two.” Picking two may be conventional wisdom, but it's short-sighted and both intellectually and experientially unjustifiable. This is a family show, so we won't use the colorful idiom with which we would like to respond—let's just say someone is blowing smoke.

The truth is, when considering better, faster, and cheaper, we refuse to pick two. We pick all three on a regular basis. So did the team who developed the F-16 and dubbed themselves the Fighter Mafia. And you can do it too—we believe in you!

## **Rewards and Change**

If we truly want to accept the value of Tiny, practical-minded readers are surely wondering how such a value could be integrated into the current framework. How can we reward smallness when the most prestigious programs a program manager can lead are those with enormous budgets, endless schedules, extreme complexity, and massive teams? How can we reward smallness when a PM's career path is supposed to be one of increasing responsibility, defined as dollars and people managed?

If we were lawyers and this article was a television show, this is the part where we would jump up, slap the table, and shout “Objection! We reject the premise of these questions! Opposing counsel is basically asking how we can change without changing. Your Honor, we have already asserted that the FIST value of Tiny is not part of the current framework, so to expect anyone to integrate it without significant change to the underlying structure is ludicrous.” And then we'd cut to commercial, for cliffhanger effect.

But we aren't lawyers and this isn't a TV show, so that's not really an option. Fortunately, in addition to being objectionable, those questions are easily answerable. We could reward smallness the same way we reward any other positive behavior or desirable attribute. Train for it. Use it as the basis for promotion and recognition. Give people awards for doing it. Integrate it into the culture. All it would really require is to stand the current value structure on its head and entirely change the cultural expectations and mindset. (Hey, we said it was a simple question to answer, not an easy solution to implement.)

Widespread acceptance of the FIST values requires an abandonment of the business-as-usual mindset. FIST can't simply be grafted into the status quo establishment; the old ways have to be torn down and replaced. Fortunately, that's not as difficult as it sounds because the FIST values are already firmly established, if you know where to look.

We contend the FIST values are not alien at all. They are the values inherent in our own homes and lives. They are sometimes suppressed and supplanted once we get to work by an environment that rewards **Slow**, **Unwieldy**, **Complex**, and **Kostly**, but they linger in our daily nonwork activities. When we are the

consumer, the customer, the user, we always prefer something fast, inexpensive, simple, and tiny. Look at cell phones, computers, ATMs, fast food (okay, so we love our super-size fries, but we're loving them a lot less these days). We complain when things are slow, expensive, complicated, or overly large. Look at our response to automated customer "support" systems ("press 1 for this, press 2 for that"). We hate that sort of thing because it goes against our values.

Bringing the FIST values to work simply involves approaching system development and acquisitions the way we approach other things in life: with a preference for rapid availability, inexpensive quality, simple interfaces, and smaller sizes. There's nothing new here.

### **The Revolution is Within You**

So what are we really recommending with this FIST approach? Some of our ideas involve sweeping changes, like coming up with a new definition for MDAPs (major defense acquisition programs). Others are more modest, like not dictating development schedules anymore. Some are subjective, like "smaller is better." Others are measurable and objective, like "decrease development time by 50 percent." But they are all based on values that 99 percent of us already accept in our daily lives. And that is why a FIST revolution is possible.

Generally speaking, the values expressed in the FIST series are those principles that reformers, revolutionaries, and mavericks have fought for—and often been kicked in the teeth for—throughout the past several decades. These values are certainly not new, but as far as we know, they have never been put together in a unified form quite like this. Until now.

We hope that by codifying, quantifying, and connecting these four values, they will be easier to grasp, adopt, and implement. Our aim is to provide a common vocabulary for PMs to use as they discuss and explore these issues.

We encourage PMs to seriously examine what sort of values they are expressing in the way they run their programs. We suspect most programs and environments will find some pieces of FIST easier to adopt than others. Undoubtedly it will take a fair amount of time and effort to bring the whole thing on board, particularly for programs with a history of being slow, expensive, complex and large. Nonetheless, it is important to try.



## **ABOUT THE AUTHORS**

**Dan Ward** is a developmental engineering officer in the US Air Force, with a Level III certification in Systems Planning, Research, Development and Engineering (SPRDE) and a bunch of other certifications. He holds degrees in electrical engineering and engineering management, and also has a Rogue Master certification from Rogue University, where he is the Dean of Curriculum Development.

In addition to the articles in this volume, Ward is the author of a self-help book titled *The Radical Elements of Radical Success* and a children's novel titled *Meet The Boomer Sisters*. He is also the founder and Editor-In-Chief of a crazy little webzine called [RogueProjectLeader.com](http://RogueProjectLeader.com) and would play lead harmonica in the punk band Major Punks, if such a band actually existed.

In his increasingly diminishing spare time, he is a juggler, magician, fire-eater and frustrated sketch artist, but mostly he watches tv and plays with his kids. His five favorite words are: love, laugh, and, also, & again.

**Chris Quaid** is an Air Force Officer with over 10,000 hours of space operations Command & Control. In addition, Chris Quaid earned his Master's in Business and is a Program Manager... and a certified Level 2 Contracting Officer's Technical Representative... and has a Rogue Master Certification from Rogue University, which he invented.

Without concern for his own safety, Quaid has developed into a unique global macrobrand, along the way earning such honorific titles as Disturber of the Peace, Epicenter of Chaos and "that semi-literate pirate over yonder." He wears these titles proudly. Quaid is the co-creator , co-founder and co-CEO of Rogue Venture Industries (patent pending, all rights reserved).

Along with other illustrious labels like Air Force officer, space operator and program manager, Chris Quaid is the proud father of his 3 children. He is the Rogue Man About Town for [RogueProjectLeader.com](http://RogueProjectLeader.com) and would play stand-up bass in the punk band *Major Punks*, if such a band actually existed.



