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Future Directions for Defense Communications
John T. Myers

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Future Directions for Defense Communications

John T. Myers

Since 1987, Lieutenant General Myers has been Director of the Defense Communications Agency, which is charged with development and maintenance of the Defense Communications System and the Defense Message System. He was commissioned into the Army in 1957, and has spent his entire career in the Signal Corps, serving twice in Vietnam and twice in Europe. His previous assignments include Director of Training, U.S. Army Signal Center and Fort Gordon, Georgia; Commander, 1st Signal Training Brigade, Fort Gordon; Deputy Commander, U.S. Army Communications Command; and Commander, 7th Signal Command and Fort Ritchie, Maryland. General Myers holds a B.S. degree from John Carroll University and an M.S. degree from the University of Arizona; he is also a graduate of the U.S. Army Command and General Staff College and the Naval War College. Among his awards and decorations are the Distinguished Service Medal, the Legion of Merit, the Army Commendation Medal, four awards of the Bronze Star Medal, and the Air Medal.

Oettinger: It is a great delight to introduce our guest this week, Lieutenant General John Myers. He's multiple hatted at the Defense Communications Agency (DCA) and the National Communications System and I guess WHCA, the White House Communication Agency, is also one of his responsibilities. Given that, it will not surprise you that I asked him for his views on the communications component of C^3I. That, of course, would be welcome as would his views on any other aspect of the context. His biography is in your hands, so I won't waste his time reciting it. He has agreed to take questions as he goes along, so feel free to ask him as he does. Sir, it's all yours. Welcome, it's a great pleasure to have you here.

Myers: Thank you, Tony. It's nice to be back on the Harvard campus in a nonhostile and nonthreatening environment. As I mentioned at lunchtime, the last time I was here I was stoned, as in having rocks thrown at one! I didn't expect to find that today; and I'm sure I won't. You can throw all the rocks you want in this room, as long as they're verbal.

I've chosen to talk on two subjects; one probably belongs in the School of Management and then the other is more hardware- and systems-oriented. I'm trying to give you a flavor for a couple of things which I think are extraordinarily important and also a flavor for some things that are percolating well in the Pentagon.

But let me, because of the diverse group, paint a quick overview of basically what the Defense Communications Agency is and perhaps what it does. It's about 4,500 people, half military and half civilian. The Air Force and the Army are about equally split, with a minority of sailors and a couple of duty Marines. Most of my military are either in the White House Communications Agency or overseas; most of my civilians happen to be in the States. We've got a $550 million and change appropriated budget, and I run a $1.4 billion sales organization, which acquires communications services for the services and other components of the federal government. The independent operating companies of the corporation tend to fit into categories. Putting aside the normal corporate overhead, we have a very large procurement arm (that's the one I referred to); we have a

studies, software, and computer operations house which predominantly supports the Joint Staff and OSD (the Office of the Secretary of Defense); we have a major communications utility, the Defense Communications System, so I have a large element of the organization that runs that utility on a worldwide basis; I have a joint interoperability and testing and standards organization; and I have a futures study organization. Those tend to be the principal components of the conglomerate. In simplistic terms, our business is ensuring that the President can talk to the forces and the forces can talk to the President whenever he has to do that.

So, what I want to talk about and share with you today to start with is something that deals with our vision of the 21st century and how well we will be able to exploit technology — both management technology, because I think that's a fair expression, and hard technology as it evolves over the next 10 to 20 years. So let me take a few moments to explain what I think our vision is and the process associated with it.

We call it Vision 21, and we expect to achieve it with the help of a process we call "Total Quality Management" in the model of W. Edwards Deming, if that is in any of your vocabularies. That is something we could discuss as an aside later or any time you like.

Oettinger: Just a quick note on that. Deming is a statistician who developed the initial methods of quality control, who was copied by the Japanese in the development of quality circles, etc., etc., that then became such a hallmark of the Japanese manufacturing process. He happened to be a good buddy of my father-in-law.

Myers: Oh, is that right? DCA's Vision 21 is actually step one of a corporate long-range strategic planning initiative that provides direction and establishes the ultimate goal, referred to as the "vision," which we in DCA will pursue and achieve by the beginning of the 21st century. In government in particular, but I'm sure in academia also, if you talk about why we are focusing on the 21st century, that answer very simply stated is that things we're buying today are going to be around until 2025. So in many respects the things that we are doing today, in management, acquisition, policy, etc., are 21st century issues already. It's not as though we're just getting ready to get there.

The DCA Vision 21 concept consists of the DCA Vision Statement, a statement of purpose and mission, and the description of five over-arching major focus areas which serve to guide us in everything we do. Now, the vision statement, as shown on this slide (figure 1), has become our credo for the agency; it is the driver in every action that we take and in every decision that we make. If what we're doing in the agency fails to measure up to the Vision 21 litmus test, then, from a corporate perspective, we're doing the wrong thing.

Vision Statement

*DCA is the leader in providing **affordable, integrated, interoperable** information systems to support Command, Control, and Communications that allow the NCA, the JCS, the CINCs and other customers to employ and sustain forces consistent with national policy.*

Figure 1. Vision 21

Deming's first point in his 14 points of management is constancy of vision or constancy of purpose. One of the shortcomings, both in industry and government, we think, having adopted this management model, is the focus on the first quarter report and short-term return on investment. If you don't have some constancy of purpose in your organization at any level, then you're going to be sacrificing short-term gains for long-term potential and serious long-term losses.

The vision statement stresses several important points. First, it says we must get ourselves into a position of leadership in the C^3 community, and we must be recognized as the leader, not by ourselves, but by our customers. You can't preordain yourself to be a leader; your followers, in this business sense "our customers," must agree that we are a leader. We must be recognized as the leader when we have to be proactive and not reactive, and we need to be working on the leading edge of technology without becoming a risk industry ourselves.

Among the many properties that the future C^3 system must have, we have chosen the three shown on this slide (figure 1) for special attention. The first, which I don't think I would have to explain to anybody, is that the systems must be affordable. They can have the very best ideas in the world, but if the taxpayers' dollars are not available and they cannot be procured, then they have little relevance. So any system that we're talking about has to be affordable.

It has to be integrated and interoperable. The reason that it has to be integrated ...

Oettinger: At the risk of playing the idiot who would question "affordable": in a slightly different content in the civilian hassles over telecommunications policy that is a code word for one continues to cross-subsidize from one place to the other. I'm wondering whether you're using it in that sense or you're using it literally.

Myers: I'm using it quite literally; in other words, we could have one aircraft carrier or we could have 15. Now you could have one that had all of the amenities and all of the gold-plating and all of the everything else; but one carrier probably would have no useful purpose as a combat platform. So I was using it very literally. We must be able to strike a balance between requirements and the technology so that the system one wishes to acquire is truly affordable.

The integrated portion is because we're always going to have old systems, so you are faced with the very practical problem of ensuring that you can integrate the new hardware into your total infrastructure along with the old hardware, and in a joint or combined environment you must have interoperability. It's something that we have preached for years in a forum with either the military or the private sector. I always say that everybody's for interoperability until it affects you or your product line or until it affects the program that the service PM (project manager) is managing, but everybody's for it. It is, however, a fatal flaw if you do not agree in a joint manner how to overcome it.

Finally, we acknowledge the business we will be in, which is the information systems business, which is not the business that DCA has been in in the past, which was strictly a communications utility. So, we've had a major change.

Student: Sir, if you're going to be in the information systems business, in the wake of the recent West German hackers ...

Myers: Or the Princeton hackers ...

Student: Or the Internet virus, or worm, and numerous other things that cropped up, how come security isn't one of the highlighted words up there?

Myers: It's not not there; it wasn't disincluded. I guess I would have to go back to the process. This was an interesting collegial process in which all of the corporate board members were brought together for three days in an off-site, sitting around in this type of an environment, and that was how we arrived at that. Now, security is an extraordinarily important requirement. So, all I can say is that it is not disincluded, because we have systems which do not have a secure compartmented requirement; we have systems that have extraordinarily secure compartmented requirements for protection. In the total domain, you run from nothing to everything.

As an aside to your question, the problem of idle or not-so-idle hackers is not a trivial problem and it brings at odds the desire to have reasonable access in a friendly, useful manner to a system and then the counterpoint is absolute security so that it's so difficult to get into that you can't use it. In between is every possible solution. There are readily available protections in policy, procedure, and minimal software investment that do, in fact, protect you from the idle hacker. The dedicated inside person, however, there's very little protection against; that's the person who already is cleared and has access, and so on. So you've got a very tough domain.

We'll be in the business of information systems, and we're in it for a purpose. The purpose is to support and sustain the C^3 systems for our customers, and our primary customers, of course, are the warfighting, peace-keeping commanders in chief. Those are what I view as my principal customers: the

President, the Chairman of the Joint Chiefs, and the commanders in chief.

Following corporate approval of this vision statement, each DCA Directorate head (I refer to them, as I've already said, as my vice presidents) develops the Vision 21 support plan to cascade on down within his or her organization. Personnel in the directorates all the way up and down the management chain were empowered to become involved in the Vision 21 process (that is not your normal military or governmental corporate environment), thereby helping to formulate the direction and methods to achieve the Vision 21 within their sphere of influence. Thus, the fundamental concept of Vision 21 is for each and every employee to be able to link the way the work of that individual employee (soldier, sailor, airman, civilian) supports his/her own organization's support plan and then how that supports the corporate plan.

Total quality management (TQM — figure 2) is a vital and necessary quality and productivity tool that will ensure that we are completely successful in achieving Vision 21. Total quality management is something that we, the DCA staff, do together with our suppliers and our customers; it's not a unique program to the Defense Communications Agency. It's a major program within the Defense Department, and there are many vendors today who have major quality programs and major success stories already ongoing. It's not more checkers; it's not a zero defects approach; it is a very structured way of doing business which applies statistical quality control methods in a concept in which you must have the knowledge to do your job right and, therefore, you do your job right the first time.

Management has to give you the resources and tools to allow you to do that right the first time. For example, one printed page in a government environment costs about $7 to produce. If you, as a manager, give bad guidance, if the professor gives his secretary short shrift and scribbles out notes that take her four drafts to translate and then he is also a heavy red-pencil adjuster and he red lines that four or five times, then each iteration is $7 down the drain. If the manager gives better guidance, so that the person who has to do the work can do it correctly the first time, then you have a productivity gain and you have not added one extra resource to your unit, to your corporation, to your organization. It didn't cost you anything to do that. Many people will say they need another 800 people and $8 million if they are going to institute a quality program. That, we believe, is a very grave fallacy.

Now, as a part of this, the employees examine and approve a step-by-step process in order to improve their work: what do they do, why do they do it, why does somebody else come in and check it, and is the whole process necessary? The Air Force Logistics Command gave an example in a TQM seminar recently in which it was taking them an excess of 60 days to pay bills to their vendors. So they took two months to painfully analyze every single step of the process. The first thing they found out was that what they thought was the process wasn't what was happening. The second thing they found out was about 80 percent of the people involved were typically bureaucratic people who could say no, but they had no value added to the process in the first place. They ended up saving eight people who could be put to work doing other things. All the auditors were put to work processing bills, and they ended up paying their vendors in 28 days, all because of just some good common-sense analysis of that process; but that is absolutely essential to the total quality management approach.

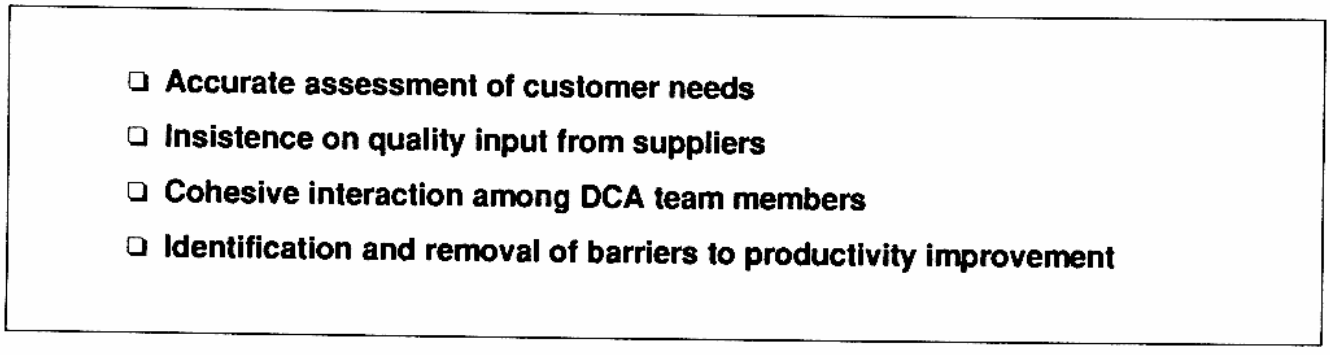

Figure 2. Total Quality Management

Shedding ourselves of poor-quality input and accepting only that input which meets high standards of quality are the other TQM concepts germane to the success of Vision 21. It's not just an out-of-house problem either; in a sense, the paper that you give to the professor is an input; is that a quality input? That's the example I used with the secretary before. Are the mission orders that Rocke gave to his soldiers a quality input, so they could effectively receive it and process it? If it was not a quality input, then the process of that order was going to be faulted, because you'd have to go through four do-loops in order to get back to a satisfactory output. You can view the process in-house or out-of-house; whether it's a government supplier, a federal contractor, or whether it's a worker (soldier, sailor, airman, Marine) in the unit.

Of equal importance is the need for DCA employees to know their customers and to conduct continuous formal and informal assessments of their needs. In the uniformed services, it's no different than knowing your troops. In the business area, you should know your customers by name, personally, you should know their business, you should know what their requirements are, and you should be able to do business with them that way. Very often in government, I think, we try to sell something which the user doesn't want. In the case of the services and the service hardware people, although the requirements system is very structured, one of the problems we have is delivering an item which is not the item the user or the customer really wanted. A combination of accurate assessment of customers' needs, the insistence on quality input from our suppliers, and a cohesive interaction amongst our team — our suppliers and our customers — is absolutely essential. This combination is the process for total quality management which will empower us to achieve the DCA vision for the 21st century.

Now if you think about it, failure to transition our best technology into new systems is a quality problem unto itself, because bad systems are not quality systems; but inserting the technology gives you a quality system. It's a different side of the same coin.

Oettinger: Before you move on, "suppliers" went by so blandly, and it's 1989 and it's five years since 1984 when some of you may remember American Telephone and Telegraph Corporation got dismantled, and before that, in a sense, there was not *a* supplier, but one giant and lots of dwarves, and I'm wondering whether you might make a comment on your experience and that of your predecessors with regard to that change from singular to plural.

Myers: In the good bad old days or the bad good old days, if you go back to the Cuban missile crisis, we were in a very wonderful environment from a certain perspective. You picked up the phone at DCA headquarters (which was really born two years after that, but if you'll allow me that for the history purists), you called up AT&T and said I want 64 circuits in Miami, I want them there tomorrow morning, and I want them to have these characteristics, and they were there. We went through a national security emergency preparedness exercise in which a surrogate President participated two years ago, and one telephone company said, "I'm sorry; you can't have the circuit at Fort X because you didn't ask us soon enough." That's two aspects of the difference in the world we're in today.

Now, a beneficial side of that, however, from a cost perspective, is that on the average we're acquiring leased services at 50 cents on the dollar predivestiture, which is not badmouthing AT&T or anything else, but reflects the competitive environment in general, and it's especially true for wideband services. On the other hand, when you've just said, "I want three of these and four of those," prior to divestiture, you didn't have to do the engineering, planning, thinking, or anything else. So now, in our case, we may have 100 engineers fully employed doing all of the necessary technical work in order to put a proposal on the street to half-a-dozen vendors for a competitive procurement to supply you the service that you got very simply prior to divestiture. So, in an economic sense, we're probably saving money; in a national security sense, we have an opportunity, if we do our engineering work thoroughly, also to ensure that we have redundancy and duplication of both path and services so that you have less likelihood of losing that capability from a single-path failure. I guess that's it, unless I missed something that you were probing for.

It's like that glass of water again; it's either half full or half empty depending on which horse you're riding. We're still learning to be as competitive in the marketplace in acquisition as some other people knew how to do before divestiture. We're still learning how to do business with that. You have to remember that my communications acquisition people tend to be over 40, not that we don't have some young folks, but the experts are over 40 and they grew up picking up the phone and calling AT&T. So we have a major retraining program ongoing in order to get the people into the competitive strategy environment for acquisition of systems and services.

Now to institutionalize the strategic planning concept and to carry on the further steps that will be required, a new corporate planning office has been established within DCA. This office reports to the Associate Director for Engineering and Technology. One of my senior vice presidents has that title and his focus again is on bringing technology into the information systems and services that we require and pursuing those in a smaller R&D arena if we want to pursue any specific or unique applications.

I cannot overemphasize the importance of strategic planning in our business and in the achievement of our Vision 21 goal. There's nothing magic about Vision 21 except that there was no strategic plan in place. There was no long-term set of goals; there was no long-term policy for the corporation; and from my view, that was a critical and major shortfall. We weren't doing long-term planning; we were just putting out the fire in front of us each step of the way down the road. There are some exceptions. Milstar is an exception; the DSCS (Defense Satellite Communications System) is an exception; but in general there was not a global view that would allow us to get there in an incremental sense, and I'll use a specific technical example in a moment.

Oettinger: We had one of the earlier presentations from a budgeteer, and in terms of no strategic plans, were you referring to no adherence to some of the conventional DOD PPBS (planning, programming, and budgeting system) procedures or are you talking about in-house, the term of office of the director?

Myers: I was speaking beyond the domain of the normal five-year planning cycle. In other words, and I'll give an example towards the end, if we have what is our ability to envision in 2010 and the technology in general that might be available in a broad sense, we could then migrate to a totally paperless environment. If we chose to do that, if that was worth pursuing as a general objective, then starting with all the trees that we eat every day today, how do you migrate the infrastructure that you have in place from that which prints everything to that which prints nothing? So it's a global strategy, which doesn't have a defined architecture; it doesn't have clearly identified boxes; but it has concepts. It has strategic concepts in place in which you say, "That's really where we want to head." My favorite way of saying it in the corporate boardroom is, "Hey, guys, you gotta remember in everything you do that we're headed generally north; so that no matter what you do, it's okay if you go a little north by northeast, or a little north by northwest, but, for cripes' sake, please don't start going south." It's not consistent with what we've decided we want to do; and that begins to go back to the fact it doesn't fit the litmus test of the Vision 21 perspective.

So you've got to be in the domain of the five-year budget cycle but by the time you're there you first of all have had your strategic plan in place, you have a requirements review from your users, you've gone through the normal Joint Staff requirements definition process, and you're down to the point where now you can begin to say, "I need money, beginning..." But then you're in almost the box identification level as opposed to, again, that global strategy. I feel very strongly that that's what senior leadership in government is paid to do. That's certainly what it gets criticized for not doing in the *Boston Globe* or the *Washington Post*, and I think the poor old State Department has been on the hook. When they've not been talking about Senator Tower, then they've been castigating the State Department for not getting a firm global international policy out very quickly.

I mentioned that we have five major focus areas (MFAs) shown in figure 3, which are individual areas that allow us to support the Vision 21 process. A senior member of the staff, in fact, a vice president, has become the "goalkeeper" or chairperson for each of the five major focus areas. The goalkeeper's job is to chair a committee composed of members from all the directorates whose purpose is to ensure that the workforce, down to the lowliest member, is coordinated in its efforts to achieve that particular goal. It's a total orchestration process up and down the organization, so that you get the maximum efficiency from the engine, the output is coordinated, and you're operating towards a goal. If you have ever been into an organizational effectiveness or organizational development type of a model, the basic model for getting to this point is an OE or an OD model. But it also is participatory management, which is usually not really popular with uniformed members — tech sergeants, gunnery sergeants, or infantry captains. It's a participatory management process which I feel very strongly is absolutely essential if you're going to be successful at both the higher level in government and at the level where you also have a much greater participation of the civilian workforce.

To illustrate the process, let's examine just one of the MFAs: MFA #5 — the Defense Information System Program. Tony is on our Scientific Advisory Group (SAG), and we talked briefly about this particular area at our meeting. I want to talk about this particular major functional area to this audience, because it's the one which contains the real technical

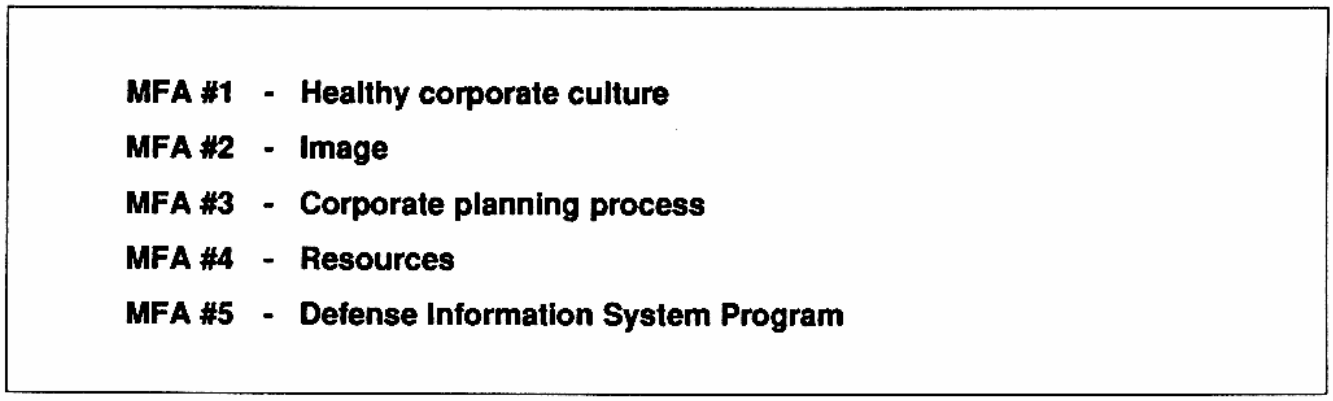

Figure 3. Major Functional Areas

content of Vision 21. To understand MFA #5, we first need to state some definitions.

The first definition is the Defense Information System (figure 4). It's the total domain; it's the global domain; and it's intended to be global, deliberately so. It includes everything remotely involved with information in the Defense Department — all the boxes, all the people, all the hardware, all the software, all the policies, all the procedures. It's the total domain.

Now to limit DCA's involvement in this domain, we need a couple of other definitions (figure 5). The next one is a change in terminology compared to previous plans. We have tried to adopt the terminology of the future in keeping with the time frame which is the target of the vision, the 21st century. We've tried to stretch our thinking a little bit beyond our present charter, to imagine the kind of charter that the agency might have if it were rewritten circa 2001. For example, the information transfer utility is basically a synonym for today's defense communication system. It's the pipeline; it's the connectivity; in some cases it's our bread and butter, in terms of major programs.

The new terminology captures the concept that communications ought to be thought of in the context of a total information system. This is certainly not something that DCA ever dealt with before. It only dealt with the utility concept before, and not with that vocabulary. We are a utility manager, which is a fairly comfortable and well understood term in most fora. Included here for instance is the utility rate-paying notion — should the user pay for what he gets out of an information system? It has historically not been the norm in the Defense Department. Communications systems and services had been a free good; therefore, like air, you used infinite amounts of it and there was no constraint therefore on the C^3 budget other than when somebody at the Defense level or Congress said enough is enough. But there was no analysis at the beginning of what really was needed, what the contribution was to war fighting, what the return on the investment was, why you needed a class A line versus a class C line, or why you needed wideband versus narrowband. The answer was, it just sounded better. Whatever ad you saw on television that night is what you said you needed. So whatever vendor got to you, that's what you said you needed, regardless of whether it was affordable. By taking advantage of economy of scale in the acquisition of commercial telecommunications services, we think we can make an impressive contribution in affordability toward the vision statement.

You asked about divestiture. By competing requirements, and because we can bundle all of Defense requirements into selected procurements, in 1989 we will save over $100 million in either direct savings or cost avoidance through smart acquisitions for the services, the FAA (Federal Aviation Administration) and some other Defense customers. That wouldn't have been done before and cannot be done on a go-it-alone basis by any one of the departments, services, or agencies.

Oettinger: By whose muscle are they kept in your orbit, or is this persuasion and budgeteering that says I'll do it cheaper for you in the long run?

Myers: The three services do not have the resources to go out and do their own acquisitions.

Defense information systems are:

- The aggregation of sensors and or/data entry devices, communications networks and computer resources;
- Organized to provide collection, production, storage, display and dissemination of information products;
- Supporting missions and functions for DOD elements such as the NCA, the JCS, the CINCs, the services and the agencies;
- Consisting of hardware, software, personnel and procedures.

Figure 4. Definition: Defense Information Systems

- **The information transfer utility is that portion of defense information systems used to transfer information;**
- **Services are simply functional capabilities delivered to customers.**

Figure 5. Definitions

They would have to make an investment from their own organization if they were to do that, so the pressure on the services is it would cost them more to do it. Also, the three services are in full agreement that it is smarter business; in other words, it's good to come to us because they know they save money. The FAA comes to us for the same reason. They're our largest single customer in terms of individual contracts, but not the largest customers for dollars. The other Defense agencies and some other elements of government do not use us for a myriad reasons ranging from institutional bias — they don't trust us, or they've never tried us, or we haven't marketed them because we had enough business, just a myriad of reasons why they do not use DECCO, which is the contracting organization. One of my business goals in our five-year business plan is to expand that. It is in Defense's best interest to expand that because

there are secondary and tertiary benefits that are gained if we have a larger customer base, because what that really does is reduce the cost of defense.

The future Defense Communications System may be thought of as a generalization of the DCS, which is what I said a moment ago. With these definitions in mind, the goal statement for MFA-5 is shown in plain language on figure 6 and please note the emphasis on "technical programs." I might point out that in that second-to-last bullet, generally speaking I am not in the O&M (operations and maintenance) business. That is the service O&M commands' responsibility. For a number of reasons, there are certain O&M functions, largely the running of major data centers in support of OSD, that were transferred to DCA because it was convenient, but that could just as well be done by the Air Force or the Army, in their existing data centers. It isn't. But in general, we are not in the O&M business.

So you see our role in the 21st century varies depending on whether you're talking about a broadly defined defense information system in which case our role is strictly as an adviser to the policy makers in the Pentagon, or some subset such as the information transfer utility, in which case we are the actual manager and operate the utility company with the service O&M commands doing the actual work of running the engines. Now if we can figure out how to be successful in transferring that superb technology we see on the horizon into operational use, then we will have achieved the necessary conditions for the success of that vision. If we can't manage the transition, then we can't achieve the vision and we're going to fail in providing the necessary utility or information system services that OSD and the federal government need. In order to make its contribution to national defense in the future, DCA means to take full advantage of the technology and cultural changes that this nation will face in the new information age.

Now let me go to the other point. I've talked so far about the broad management and strategic planning ideas of the agency. This is an appropriate forum to talk about things such as that, but we've got two problems associated with the issue I was talking about, and Tony highlighted one. He asked in a different question "Do you mean doing it on your tour?" In federal service, uniformed or other, you either are a part of an administration, or you have an assignment that has a fixed length of time. Most corporate CEOs are not faced with that kind of a problem. They get hired to stay with no fixed tenure, generally, unless they get fired.

Goal:

DCA technical programs are providing defense information systems consistent with Vision 21.

Supporting Conditions:

- DCA is the across-the-board planner and systems interoperability engineer for command, control and communications systems, and for the information transfer utility;
- DCA establishes policy and is the top-level manager for the development, implementation, operation and maintenance of the information transfer utility;
- DCA is a provider of information services, including the operation and maintenance of computers and databases, to OSD, JCS and the CINCs;
- DCA is the designated adviser to DOD on the evolution of defense information systems.

Figure 6. Defense Information Systems Program

One of the problems that I have is cultural change, because what the whole Vision 21 process is doing is changing the very way the agency does business: the way every Senior Executive Service official and the lowliest GS-2 or PFC think about their job and the way they address their job. Major cultural change in any organization larger than a marriage is, at best, difficult. We've been in the process two years, we've had four off-sites at the corporate level, and we're making progress. But it is not a trivial task, and as I said before, Deming's point number one is constancy of purpose. There is no quick return on investment. You've got to have the tenacity to stick with it, and you have to have the time to get it done. So my goal is to have the process institutionalized in one more year or two, depending on how long I stay in the agency. So that has to be a goal. Then once the process is institutionalized, it will carry on because the culture of the people will have been changed. They are no longer Republicans, they're Democrats or whatever, but they think differently and that will perpetuate itself.

Now, let's talk about a couple of technical changes that are coming down the road and are significant to government and to the Defense Department and especially to the agency. The General Services Administration recently awarded a contract called Federal Telephone System 2000 (FTS 2000); the two winning vendors were AT&T and US Sprint. The contract basically provides full-spectrum information services to the entire federal government. Mandated by Congress, DOD must acquire services from that particular contract.

The contract unto itself is neither good nor bad. It provides much, much more than plain vanilla long distance telephone service. You can get video teleconferencing, you can get packet switching, you can get narrowband or broadband video, you can get any number of services, to include wideband point-to-point circuitry, off that contract. What the contract does not provide for is any security or command and control requirements. So on balance, one of the major issues that we are working on very closely with GSA and the working group is: what of that contract is of value to DOD? How can we take advantage of that service both practically and economically, yet what must we retain for critical command and control purposes, because none of the military-unique requirements are included in the contract? It is a non-trivial problem, made a little more difficult because the contract has been congressionally mandated in the sense that State, Defense, and everybody must acquire services that way.

I think it's a great opportunity at the moment, in the context that we think the contract is so structured that we will be able to acquire equal service at less cost for the services. In today's environment less cost is the most important thing to the Army, Navy, Air Force, and Marine Corps because the number of O&M dollars for C^3 is decreasing every year, yet the demand for C^3 is going up exponentially. If you take anything out of here back to your services or your agencies, it's to begin to be able to articulate, in a meaningful manner, the value of C^3 to the State Department, to Interior, to wherever, to your Defense participant, and articulate it in a manner which he can understand.

The biggest single weakness that we have in the C^3 business is that we do not have any such things as firepower scores, exchange ratios, or any other killer mentality values, as I always refer to them, that allow you to go to an assistant secretary, a general, an admiral and say, "Sir, for $39 million, I can shoot down such-and-such; invested in C^3 it will give you x sortie rates, it will give you so many more killed tanks, or shot down airplanes." We do a lot of hand waving. The commanders usually roll their eyes and say "I don't understand." Then after they buy the other things they invest in those C^3 issues, and it's not their fault. It's the community's fault. Maybe you could write a text on exchange ratios versus investment for communications, command, and control. It's a tough issue. We've got a number of our scientists working on that.

Oettinger: Jerry Tuttle* keeps asking for some measure like that.

Myers: We're all asking. Gordon Smith, the ASD C^3I, says "Please," and he goes in and he gets beaten up whether it's over at Congress, or up at Bob Costello's**, or at the Deputy Secretary level, because you can't walk in with a little formula that says, "Here's the return on investment on the value of the investment. It's much more complicated. And we don't buy carrier task forces; we buy a couple of thousand SINCGARS (Single-Channel Ground and Air Radio Systems) radios, and 10,000 of this, and it doesn't equate. It doesn't help the corporate level decision maker make good decisions. That was an aside.

Oettinger: In rough terms is your budget something appropriated to your agency, or is it cobbled together from your clients?

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*Vice Admiral Jerry O. Tuttle, Director, C^3, Joint Staff.
**Dr. Robert Costello, Under Secretary of Defense (Acquisition).

Myers: No, the budget of $550 point x million is directly appropriated to my agency for running the agency, or buying a service from MITRE, or whomever. The $1.4 billion in sales is the other services' appropriated dollars in which they come to us and say buy me this, that, or the other thing.

McLaughlin: Do they have a choice of coming to you or not?

Myers: They do not have a choice for the practical reason that they do not have the resources; over time they have lost the resources to do individual acquisition for that type of service, and there is no value to them to avoid us. There is greater value to them by coming to us. The Defense agencies, on the other hand, have never attrited that capability over time, so somewhat euphemistically I say that the Defense Communications Agency is the Defense Communications Agency for everybody but the Defense agencies. 'Tis true. But that's for another set of reasons.

OK, let's talk a little bit about the hardware system: the Defense Message System (DMS). The multiservice agency Defense Message System working group formed last fall. Why did we form it? We have a very good system operating around the world today called AUTODIN (Automatic Digital Network) which is the worldwide record traffic teletype system that sends messages reliably, securely, to ships and to soldiers, sailors, and airmen all over the world. It's been around however, since its original state, from about 1970. It has been improved, as recently as last year, but it's basically the same conceptual system in terms of policy, procedures, and service, as the messaging system of World War I. It just automated an old torn tape concept, and as the computers got faster and the tape drives got better and the DASD (direct access storage device) got bigger we could do some other things. Essentially, it is a store and forward automated torn tape system. Nothing wizzy about it, but it's a very good one.

There was a very valid requirement in 1978 to come up with a replacement for the AUTODIN system. However, if you think about 1978, and where technology was in 1978, it was certainly more than 10 years ago in terms of technology change. The knowledge base of the requirer in 1978 was primitive compared to the knowledge base of a requirer today if he were to sit down today and write a requirement.

The Air Force was tasked, and picked up the task circa 1983, to come up with the interservice AMPE (automated message processing equipment) program, which would have been the replacement for both the service automated message exchange, AMIS (the Air Force management information system), and the worldwide AUTODIN system. They were, however, given the 1978 requirement, and they were also given a task to field an A-1 level certified multi-level secure system. They were given an impossible task. They worked heroically at doing it, and finally it was recognized that within the budget line available and the technology available, you could not, in fact, deliver a multi-level secure system as the requirement stated. So that went belly-up last year and we had to come up with a way to address an evolutionary strategy — to evolve into the Defense Message System that I referred to earlier.

As an initial working group task, a request for information from industry was formulated. So if you want to say that we are following our own total quality management views, yes, we are because this time we didn't go in a room, lock the door, refuse to talk to anybody, blindly write a requirement, throw it out the door, and say "OK, you dirty guys, meet the requirement," and then they went in the room in the dark, and they didn't talk to anyone, and they kept throwing it back and forth across the transom. We hope in some cases we're learning. So we said, "Here's what we think, what do you think?" We went out to industry with a request for information.

We had an extraordinarily good response. They came back with some excellent dialogue, and we reviewed it and had some good dialogue, and then sat down to look at some architectural plans, and some objectives, to move in that direction. We also found out that, as always in government or large organizations, there were some other things happening that would have direct application that you wouldn't have to reinvent.

Another major criticism in the information systems business is that the Air Force would never accept a system from the Army, they would go out and invent their own. The Navy of course would never accept one from either; they would go out and invent their own. We're very, very parochial and hidebound, and we like to use the word "unique." Everybody has a unique requirement. The Rangers are different from the infantry; the F-14 drivers are different than the F-4 drivers; everybody has a unique requirement. Uniqueness is extraordinarily expensive, and it does not contribute to either integration or interoperability.

So what we found here, and we do have a pretty good collegial and joint group, is that there were a lot of things ongoing. NSA, for instance, has their Commercial COMSEC Endorsement Program (CCEP) going. That has some applications to the

issue at hand. They also have a secure data network system progressing nicely. There are Protocol standardization initiatives, such as the GOSIP (Government Open Systems Interconnect Profile). OSD mandated that we would migrate away from Defense-unique standards and migrate into an International Systems Organization, Open Systems Interconnect, and GOSIP standard which basically says when you get away from CCITT (Comité Consultatif International Télégraphique et Téléphonique — the International Radio Consultative Committee) and all the other acronyms, we're going to use commercial standards, wherever and whenever it can possibly be done.

Oettinger: The exceptions are all the unique cases.

Myers: Fortunately, that looks to be more and more like almost all the time. Lo and behold, we find that you can take off-the-shelf computers and put them on a destroyer and they don't self-destruct, or you can put them other places where we traditionally have spent a lot of money buying uniquely designed and always obsolete hardware because we thought it had to be painted green, it had to fly, it had to sink, it had to swim, it had to be subjected to 80° below the zero temperatures and 400° above zero temperatures, and of course the user never could withstand any of that so one wonders why the radio or whatever piece of hardware had to do it. So there's really a very strong push in this area, and in lots of other ones as well, to go to off-the-shelf hardware, off-the-shelf software, and international standards.

Implementation must be truly evolutionary in the DMS, as opposed to trying to design from scratch a total system that some vendor would be expected to deliver and then replicate 5, 8, or 100 times in terms of comm centers and major processing nodes, on a worldwide basis. We're going to have an evolutionary process. As we phase in newer technology and migrate to international standard protocols, then that integration problem crops up again. You have to have backward compatibility, because you cannot eliminate the entire worldwide infrastructure in one fell swoop. It's just not possible to do that. Even if the technology were there, you couldn't afford the dollars to do it.

However, to combat our historical tendency of never phasing out anything, an aggressive phase-out of obsolete components, procedures, protocols, and formats is also essential. We think the key in that area is selling the services and the services' customers the fact that it costs them more to keep what they've got than to replace it. If we can demonstrate that clearly, then there will be a strong motivation for the service budget guys to say, "By investing $5 I can save $100," and that would seem to be rational; therefore they will do that. And that's the approach we're taking in that particular area.

Oettinger: I have a question about an earlier incarnation of this problem. I remember hearing arguments that one of the greatest mistakes we made was to replace the worldwide VHF radio connectivity because it was obsolete and not cost effective and so on, and yet, on the other hand, it was a good alternative and the Soviets never did that, and so what a stupid accountant's way of looking at the world. The view you expressed now sort of stands that on its head, and so I'm wondering whether anything has changed that is substantive, or is it just swing of moods, or what?

Myers: If I understand the question, then I would say that there are several things that have changed that begin to help that. One is an ever-increasing absolute dependence on information systems. From the battlefield commander to the Comptroller of the Defense Department, there is almost nothing that they can do without information systems and services. They're finally realizing that. Also, at the lower end of the spectrum, the battlefield commander is recognizing the leverage, the value added, that that capability has. Associated with those two is the realization that everything we do doesn't have to be unique so that you can, in fact, field electronic systems sooner and at less cost than you could traditionally.

Oettinger: No, I meant, why the phasing out?

Myers: Why phase out AUTODIN?

Oettinger: Yes, why phase out the old?

Myers: Well, for one thing, its going to die, so you either have to replace it with a like capability following the traditional process, but with new things, or at least a prudent-thinking man would say, "Do I want to do that, and then if I do, fine; if I don't, what other alternatives do I have?" Driving the problem for AUTODIN, and I may end up summarizing the rest of the talk, is the fact that the messaging world that we find ourselves in today consists of the record traffic system of AUTODIN and a five-headed unofficial system that we have today starting with the WWMCCS (the Worldwide Military Command and Control System) intercomputer network, which today, thanks to Admiral Tuttle, also now passes record traffic. So the Chairman could in fact now tell somebody to go to war from a WWMCCS terminal as opposed to having to write a message, carry it to the comm center, and interject it into the AUTODIN

system. The capability has always been there; the procedure prohibited it.

So you have WWMCCS, now you have SCINET (Sensitive Compartmented Information Network), which is a compartmented level DDN (Defense Digital Network) packet switched network; you have DISNET, which is the Secret-level DDN worldwide network; you've got MILNET; and then of course AUTODIN is the fifth one. None of those talk to each other. They are not interoperable, and so you must have a carousel in your room if you are going to have all of those capabilities. Now, from an investment strategy or an operational O&O concept perspective, what rational company would ever field such a capability? I don't think anybody would. So we have this global view of the Defense Messaging System which is a totally integrated worldwide network of text-available human intelligence transfer.

How we get there is what the Defense Message System is all about. It deals with starting with those five separate systems. I want to get to the day when John Myers can turn around at his desk and send Mike Cardarelli a message. If I want to ask him a question, fine; if I want to tell him to launch his airplanes, fine; but I can do it from my desk. That implies a whole lot of things. Does he in fact know that it's from me? Am I in fact the one who is originating the message or is it someone using my terminal? That's an easy one; the terminal, as in STU-3 (secure telephone unit) today, will tell you that it's terminal, Top Secret; but unless you have voice recognition you don't know it's John Myers you're talking to, so Mike doesn't necessarily know that I in fact signed the message that told him to take his airplanes off. What if I am in the Top Secret mode and he is only in the Secret mode? So the multi-level secure issue is a problem.

The services have a problem with what we'll call official traffic and unofficial traffic, which basically is, "Hey, Mike, John's calling, tell me what you think about something." That's unofficial traffic. Official traffic is, "The CNO (Chief of Naval Operations) says ..." How do you manage those across the networks? But the objective architecture says we're going to get to the point, post 2000, where the networks will be fully integrated with appropriate gateways. The art of the possible says in the near term, if you put the TS and the SCI together, that's a doable do, and if you take Secret and everything else and put that together in a pile that's a doable do. That's an evolutionary approach to getting to the point where you can really begin to write software that NSA will approve, that will allow you to have true universal multi-level secure capability.

That's the objective. Now, what are some of the services doing, because it isn't all pie in the sky and it isn't just Washington bureaucracy. All good military plans have to be broken into three phases; everything has three phases, academia must have three phases, too. The first phase of the plan is targeted for completion by 1993. That will emphasize automation of the existing comm center functions and movement of the messaging interface closer to the user. Remember, the real objective is to kill comm centers, COMSTAs (communications stations). They're dinosaurs; they're manpower intensive; they interestingly enough are the source of most security violations; and they are also where you have the highest numbers of people with clearances who really don't need them if you structured the problem a little bit differently. This will begin the reduction of cost at the base level, which is not an insignificant issue to the services.

Also planned for the phase are acquisition and deployment of the AUTODIN-to-DDN interfaces because we want to begin, at least at the unclassified level, to exchange information across those two networks, and to improve directory services and the initial X.400 e-mail via DDN, because we're not using X.400 now in DDN. You can now go into a Navy COMSTA which will have a World War II teletype machine in it; to another COMSTA, an Air Force or an Army comm center, which might have the latest state-of-the-art microprocessor in it, and you have everything in between.

In addition to resolving severe obsolescence problems, this phase will lay the foundation, in a very practical sense, for this march toward that objective architecture. By the end of this phase the AUTODIN and DDN e-mail will still exist as separate systems, but they'll be interoperable. You'll be able to exchange across gateways.

The second phase is targeted for completion around the turn of the century, circa 2000, and it will produce the most obvious improvements that the user will begin to see. It will have an integrated Defense Message System based upon X.400 messaging, vice the distinct AUTODIN and distinct e-mail, and they will begin to merge. The protocols, procedures, and formats will change. Fully integrated and centrally maintained X.500 directory service, which is the emerging international standard, will become available. As the TCC (telecommunications center) functions and responsibilities are shifted in that time

frame to the user's desk and to the user's workstation, telecommunications centers and comm centers will begin to phase out. We'll be able to start closing comm centers. The AUTODIN switching centers will evolve to regional X.400, X.500 components. We'll be able to replicate them, but not in the same limited number as the AUTODIN switches today; hence the survivability and reliability will go up because you won't have these nice great big targets in the system.

The third and final phase, targeted circa 2008, will be the achievement of the total DMS target architecture, and that's the totally integrated architecture. You'll have a totally transparent packet-switched interoperable integrated network, as opposed to five independent networks, and that's what we're shooting for. It's not a technology problem, except the multi-level secure issue. There are some breakthroughs coming there and I think I'll highlight a couple of those in a minute.

Now, I would call Phase 3 of DMS Phase 1 if you go back to that global defense information system; Phase 3 of DMS is Phase 1 of the DIS. I say that because to be compatible with our own corporate vision, it must be an evolutionary springboard to a user friendly, technologically transparent, broadband system, capable of meeting a wide range of my customers' requirements, from the foxhole — the tactical end, all the way back to the White House — the strategic end. It's got to be done with no user pain, and it's got to be affordable, as we said before. The menu should ultimately contain all information systems technologies: narrative, voice, video, and anything else that somebody's going to dream up.

So what's next? For starters, all the services have named their initial DMS beta testbeds. We have absolute 100 percent cooperation from the services. The beta testbeds are scheduled for activation early this summer. The Army has selected Fort Huachuca, Arizona, and Fort Ritchie, Maryland; the Navy has selected Cheltenham, Maryland; and the Air Force has chosen Mather AFB at Sacramento. In addition, DCA will have a major testbed at Fort Detrick. The benefit of Detrick and Ritchie is they're close to Washington so they have some additional spinoff value because other people can get up there.

Most encouraging is that the services and agencies are moving out on specific projects and components, almost on their own, with very little encouragement from us. The thing that we bring to the table is the coordination. The Army has identified 60 sites worldwide where consolidation of comm centers and ADP facilities will be accomplished. What does that do for them? It saves them people, dollars, and resources. That's the big advantage of that consolidation. In fact the Army has already consolidated four: Jefferson Proving Ground, Fort Ritchie, Pine Bluff, and Fort Irwin. They've got another six that they will have done this year.

The Army has also implemented an AUTODIN interface that is capable of splitting security levels and thereby contributing to the extension of automation to the user. It's not a crypto device, so it's nothing more than a traffic cop that will allow you to route unclassified traffic directly to a user desk at the post, camp, and station level, if you want to do that. In many posts, camps, and stations, that represents about 98 percent of the traffic that goes in and out of the base. Yet if you look at it from an investment perspective, what you built previously was a Secure Compartmented Information Facility in which everybody had clearances at the compartmented level to protect for one compartmented message and one TS message every year, but your investment strategy was designed around that one message. That just doesn't seem to make a lot of sense. It probably did in 1959, but it certainly doesn't in today's technology environment.

What's the Navy doing? The Navy's one area of actually superior expertise is in the automated addressing arena, because the nature of the Navy is to chase ships around the world and ensure that messages get delivered to them, whereas airbases and Army divisions don't generally steam around. So their expertise is in changing their directory very frequently. They are going to be the leader in the DMS directory.

Oettinger: If I might break in, I want to make sure, because we have a number of non-technical people in the class, that everybody grasps why what General Myers is describing with the beta is a problem. It seems to me that most of you are used to picking up a phone and calling anywhere you damn please, and sort of may be wondering why what he's describing is a problem. No, I guess it's clear to everybody.

Myers: The Navy is also active, through the DMS Joint Projects Working Group, in base-level initiatives such as the personal computer message terminal, which is a PC-like device for internal message distribution. Again, that is very key; you can't close the comm center until you can solve the internal message distribution problem.

The Air Force is assuming an increasing role as really our acquisition agent for large information requirements contracts. As many of you may know,

the Air Force owned the Zenith contract against which any of the services could buy PCs. Their follow-on contract was the Desktop 3, and they just recently awarded the Standard Multi-user Mini-Computer requirements contract which AT&T won. The Air Force is just completing acceptance testing against that contract which will allow any of the services then to buy any of the parts necessary to build a PC-like either local area network-type service or an individual PC-like terminal. We were very fortunate that they had really had the foresight to do it.

Another program is the red switch or secure switch program in which the Air Force also went out with the requirements contract so that all the services can acquire the red or secure switches from the Air Force contract. These contracts are excellent vehicles, but they also demonstrate that in terms of the hardware components of the Defense Message System you can see we're talking about off-the-shelf non-developmental equipment, to include software again wherever possible. But there will be a couple of areas where there'll be some software requirements.

In the R&D area, the Air Force's Rome Air Development Center is becoming very active in DMS and its near-term efforts are aimed at development of a regional AUTODIN-to-DDN interface prototype, and we think that we'll see that this year.

DLA (the Defense Logistics Agency), one of the Defense agencies outside of NSA and DIA, which are the two normal security elements or components of the problem, is taking the lead in Phase 1 of migrating data pattern message traffic from AUTODIN to DDN through the acquisition of a specialized AUTODIN-to-DDN interface that converts the AUTODIN messages to DDN file transfer and vice versa so that you can begin to move traffic in that other network.

I think if there's a message based on that one program that I would want to leave with you, because of what I will say is often the negative publicity in the acquisition of major systems, this is not business as usual. We think that we have taken a look at what the private sector has to offer. The rate of change of technology is a major problem in our business. It's wonderful, but you go out and buy an Apple II today and next week they come out with an Apple III. For almost anything in the information business today, its half life is about a year. So if it takes 8 years to run a major procurement and if it takes a total of 15 or 20 years to field a system, then look at what we're doing to ourselves in the information systems business. You are absolutely buying boat anchors if you stick to the way we have traditionally developed and acquired C^3-type systems. So as much as possible, and I think that "as possible" is getting to be most of the requirement, we're going to off-the-shelf technology, non-developmental, and then improving that as we go along.

We're also evolving systems, as I used as an example with the Defense Message System as opposed to trying to go with an IS/AMPE (Integrated Services/ Automated Message Processing Exchange) program and buy the whole enchilada up front and then try to make it affordable in the fielding. So business is not business as usual in the information area. Dr. Costello has allowed us to become a part of the Pilot Contracting Improvement Program, as I think it's called, under the Assistant Secretary for Acquisition, which allows us to tear up rules or get exceptions to rules and exceptions to policy in the acquisition business for C^3 systems. We're one of a dozen or so organizations or entities that have been incorporated into that program, which allows you to do business not against the law but against the normal bureaucratic way that one would have had to do it otherwise. So if there's a message there, we are trying to think smart, if you like, to buy smart, and to be responsive to battlefield commanders in the information systems area.

End of report. I'll be happy to answer any questions you have.

Student: You mentioned that you have $1.4 billion in acquisition moneys for a year and when you're talking satellites, I imagine that's not too many. Obviously we were hurt by the *Challenger* disaster in our abilities but now we've got the Delta back on line for a launch platform. I have a couple of questions. First, does the user pay for the launcher, or are you involved in that as well? Basically, I am interested in the funding.

Myers: The satellite business and DSCS are not industrially funded. But I'll give you an example of a satellite service that is industrially funded. First of all, the DSCS program is centrally managed by the Air Force. The terminal program is centrally managed by the Army. The Air Force microwave, the radio system in the Mediterranean, is a circa 1960s system. It's dying on the vine, it's not economically maintainable, and we need to replace it. We have a two-phase program (it was a three-phase program, we broke the rule) to replace it with leased private sector satellite services. We have signed the contract with the Turkish PTT (Postal, Telephone, and Telegraph service). The American vendor is going to be Comsat. We have signed to acquire satellite and ter-

restrial fiber services to the U.S. customers in Turkey, with at least one gateway station in Italy. Phase 2 will cover Spain and Italy. So we will then have replaced the old Air Force Mediterranean littoral system with a leased commercial system and that is industrially funded. So if you want a T1 span or if you want a plain old telephone circuit, then it'll cost you 39 cents a pound or $199 a pound or whatever, depending on what service you want to buy off that contract.

Student: You might add that the Navy sort of led the way with the LEASAT satellite back when they had the contract in 1978. Hughes Communications Services won the contract and assumed the risk should the satellite not work.

Myers: You don't get any of the war fighting capabilities in that satellite service that you would get from a DSCS; it's not a hardened system. But on the other hand, you still have other C^2 capabilities, and do you need to invest in a hardened system? If you're into an affordability arena, there's always give and take and trade-off; you would like to have this, you can afford this, therefore as long as you have a good strong C^2 backup, then you are willing to take the risk for your administrative support. That was your first question. You said you had two.

Student: No, you covered it.

McLaughlin: You had mentioned before the desirability of closing down the stations and comm rooms and saving the dollars and bodies and also reducing the number of security clearances. Is it your impression, or have you seen much yet, or are the Services taking seriously the incipient labor disaster of the next decade? They're just not going to be able to get nearly as many people as they've been getting or nearly as well qualified.

Myers: I think that may have not have been a motivator — cost was certainly a motivator — but the spinoff benefit of trying to reduce the number of manpower-intensive comm centers is a recognition of that. The Army's acquisition of the mobile subscriber equipment (MSE), which is their 21st century tactical level radio telephone system, is certainly indicative of that because the division signal battalion was manned at about 750 people; the new signal battalion with that equipment will be manned in the range of 450 people. So there's a significant reduction in direct labor by the insertion of that technology.

We've also found both an interesting cultural issue and a very practical issue. By the battlefield commanders taking MSE with them to Fort Irwin, which is where we have force-on-force exercises, they have already been able to do things both in support and operationally that they have never been able to do before with the direct impact on the battle. The interesting cultural problem is that leaders in the Army have always grown up listening to the radio, so the division commander could tune in to the brigade commander's radio and listen to him or those sorts of things. With MSE, where you have a secure radio telephone instrument, there is no chatter on the air and all of a sudden the intermediate staffs and commanders don't know what's going on, which has been found to be very unnerving.

Oettinger: Expand on that a little bit, because you talked a couple of times today about foxhole-to-White House and back and so on and when you think about any hierarchy, getting back to the comments you just made, folks tend to want to talk to the people under them but they're not all that happy when the people above them want to keep an eye on them. It's almost independent of where you are in the hierarchy. It used to be that you didn't have much choice one way or another but to the extent that you do have a foxhole-to-White House and back you have a great deal of choice about how much of that you do. Then, depending on the details of the technology, you either have people listening in on those conversations or not listening in on those conversations, which is your last example. I wonder if you could elaborate a bit more, with examples or whatever, on the effects of this, whether it's good or bad or indifferent in your judgment.

Myers: My sailor friends always say they don't want some other turkey, or words a little stronger than that, giving them rudder orders. They want to steer their own ship. In a very practical sense, although some in uniform don't like it, particularly in a low intensity conflict environment, the high political sensitivity environment, the days of sailing off into the sunset and operating independently of higher authority for lengthy periods of time and doing what you thought best are gone for a whole myriad of reasons. But the world is much too small; you know, anybody's a nanosecond apart nowadays.

I would choose to give what I think is an excellent example of high-order involvement at a time when de-escalating a conflict was pre-eminently more important than allowing it to flow to its logical military conclusion. Because again, as a command and control person, what you want to provide your senior authority and your battlefield commander is an instant exchange of information so that in fact national policy can be executed appropriately. And in a very

compressed world, that isn't sending it back on the next packet ship that will bring the mail.

So let's talk about the Indian Ocean and the Persian Gulf. General Crist was CINCCENT, and he felt he needed to communicate with the flag officer afloat on the command ship, which was the *LaSalle*, initially, in the Indian Ocean. The normal satellite capability, FleetSat, was inadequate because of the abnormal equipment package aboard that ship. Anyhow, the normal complement aboard that ship was inadequate to General Crist's needs, for a couple of reasons: one was the path, and two was the hardware equipment. What we ended up installing on the *LaSalle* was a WWMCCS terminal, which allowed General Crist to sit at his desk and literally chit-chat with the fleet commander, so he could ask questions and then he'd go to bed, and the fleet commander would get up and he'd read the question, he'd transmit back the answer, and they could have a dialogue. Now that isn't instant, but it could have been, and it facilitated a dialogue between the CINC and his Navy component commander afloat in the Indian Ocean. We also put a secure voice capability aboard the ship which gave the fleet commander and General Crist a wideband secure voice capability which was not there before. We also allowed that capability to be remotely keyed. We gave them two paths off the ship, one into the Pacific, and we brought both the WWMCCS and the keying line back into Landstuhl, Germany, so that General Crist could sit in Tampa, and key the system, using the remote keying line, which solved some remote keying technical problems we had, and have a secure telephone conversation of toll quality with the commander afloat.

During one conflict situation when the carrier aircraft were executing strikes against a couple of targets, one of which included an old destroyer, they had dropped I think it was one bomb and the ship was basically dead in the water, and the other aircraft was ready to sink the thing. There was a dialogue between the White House and the ship and then the conflict was de-escalated before the second strike aircraft came in and dropped the other bomb down the stack which would have sunk the destroyer.

You could have differing views of that, but in a very politically sensitive, high-level orchestrated environment, one could presume there was a relatively high-level instant decision (I have no direct knowledge of that part of it) which said it's in the U.S. best interest not to put that ship on the bottom of the Indian Ocean, therefore don't. "Admiral, tell that airplane not to drop the next bomb." That required an instant communication linkage from the bridge to the aircraft and back to Washington, and it worked very well.

Again, from a communicator's perspective, to me that is an absolutely perfect application of the technology to allow national strategy to be executed consistently with national policy and to de-escalate instantly. You will probably be able to find some equally bad examples, over the next 20 years, wherein one could argue that someone was tinkering and giving rudder orders that do not fit that type of a context. But there are military commanders and civilian leaders and politicians who are tinkerers and there are those who are not tinkerers. I have always felt that the worst commanders I've ever known are ones that carry what I always call very short screwdrivers. They are lousy commanders, but there are people like that. So if you happen to work for one you have to learn how to protect yourself against very short screwdrivers.

McLaughlin: That's an interesting language difference. The normal complaint is the 3,000 mile screwdriver.

Myers: In talking about giving rudder orders from long range, I wasn't really comparing the short screwdriver versus the long screwdriver. Local commanders have short screwdrivers; long distance commanders have very long screwdrivers. Any commander who carries a screwdriver is dangerous.

Student: When I first came into the Navy, in 1962, I remember that two levels of message precedence were being dropped at the time: emergency and deferred. I just wondered if there is today any issue surrounding the business of message precedence.

Myers: That's one of the policies and procedures. I have some strong views on that. In the digital automated world, I say there are only two precedences, actually there's only one: flash and other. So I guess there are two. In the old days where you had torn tape and sailors running around with tapes around their neck and baskets and pigeons and all, there was probably some merit for all those varying degrees of precedence but, again, it's my view that there are only two today: flash and other. If it isn't flash, it's going to get there whether its immediate, or routine or deferred.

Student: So those distinctions are not significant below flash precedence.

Myers: I don't believe so, in the emerging world that we are moving toward. Each time you design another level of precedence, another level of classification, another sublevel of classification, you have

another 10,000 lines of code that somebody has to write and you build in more cost and more chance of failure and of human error in the manual processing that to a degree you will never totally eliminate because somebody's going to have the thing someplace, sooner or later, anyhow.

Ernst: It's been a long time since I looked at that problem but when I did, it didn't make any difference because the moment you had an emergency only the highest precedence messages ever got through. They drove everything else out of existence.

Myers: Right. My technical experience in Germany was always that when there was an exercise there was flash and maybe immediate; everything else went in the sack on a helicopter.

Ernst: That's correct, then. That meant anybody had to make themselves flash to get a message through. So there was never a play of controlling the precedence.

Student: General, earlier in your talk you referred to the need to ensure accurate assessment of customer needs. A little bit later on you talked about this problem, which is not unique to the military, of course: evaluation of information resources for C^3I or whatever. The military needs to have a hard figure they can play down in the Tank. That second discussion seems to imply that you take on a greater role in determining what the customer's needs are than might otherwise be understood. My question is, how do you balance that between relying on what the customer tells you and what you tell the customer you think is needed?

Myers: I would say it this way. I see myself, my staff, as technical consultants. That means that a less informed customer first of all has to be brought up to a technology level of understanding which means you must professionally assist him in articulating his requirement in a manner that then somebody can address. So that's the consultative role. Then, I see myself as a retail salesperson. I can either ask you how much you want to spend on a new car, or I can say we have a range of cars starting with this Cadillac Eldorado at $40,000, and this Hyundai at $5,950. Now, what is it; if you want basic transportation, you've got this; if you want luxury transportation, if you want hardening against high-altitude electromagnetic pulse, if you want security, if you want it to fly, then here is the spectrum of costs. Then my staff will also say, "Our understanding of your requirement and the threat says we think this is enough." That's how I see our role.

Student: How many non-communications type of people do you have rotating in and out of a given J-3 or M-3 type operation?

Myers: I would say 90 percent of my sailors are combat commander types, either surface, sub-surface, or brownshoe — pilots; 98 percent of my Army guys are communicators; my few Marines are killers; and the Air Force is a mix of command and control guys and Air Force Component Commander guys.

Student: Why the dramatic difference between the Army and the Navy?

Myers: In the sense that the largest portion of our business has to do with the delivery of C^3 services, I don't have what I consider to be a lot of room for employment for infantrymen. In the case of the Air Force command and control guy, he may have come up through the sensor system side or the missile side in command and control and has a very sound understanding of the C^2 issue. That doesn't follow in the green suits — and I'm a green suiter. Some of my finest friends are soldiers, but their knowledge of C^3I is rudimentary. I don't have many places to employ majors or lieutenant colonels in the business unless they have come up from a C^3 background, have an engineering degree, or something else that makes them special, but a straight degree from Fort Benning, Georgia, doesn't make them very employable, unless you want them to be office managers, adjutants or executive officers or something.

Oettinger: Why is that not true of the Navy, then?

Myers: I always have to be criticizing and analyzing the other Services' career development, but the Navy, like the Marine Corps to a degree, says if you're going to be a surface, or sub-surface, or pilot commander, then communications is an absolutely integral part of your mission capability. The fact that there is a communications officer afloat is only incidental because you can blame him if something goes wrong; but the ship's commander is responsible for his C^3I in a much tighter sense, because as we said at lunch, once you get into the hull, you don't go anyplace, and you don't generally leave the airbase. The Army operates in a totally different environment. So the C^3 function is much more closely tied to the command mission in the Navy.

Oettinger: Let me try to phrase it another way and see if it's accurate: that a passage, whether in your shop or elsewhere, through some kind of communications or otherwise technically related something or other, is a normal thing for a naval officer, a line officer kind of thing, whereas in the other services,

especially the Army, that's not normal. It's a specialty rather than a stage you go through along with 16 others in career development.

Myers: I think I would agree with that. The Air Force is, again, a little bit different because you can be very closely tied to the strategic side in the command and control function, and sensor side, and the space segment side, and never be in Air Force Communications Command. General Herres to me is one of the glowing examples because he's done it all, to include commanding the Air Force Communications Command, but he's a very unusual guy in many ways. But the Air Force brigadier who runs my defense communications office is primarily a command and control and space segment guy, not an Air Force Communications Command guy. That's how he came up, but he has extraordinary technical knowledge of the C^3 business.

Oettinger: Other aspects than the communications?

Myers: Of pure communications, right. But he understands connectivity, he understands electrical engineering, he understands the chain of command, he understands both the defense utility function and the services function. It has to do with the culture of the services.

Student: I have a different question, going back to the Defense Message System. It seems that until 2008 you are integrating all these five networks that exist right now. I suppose that the networks came up separately or were brought into this system. How do you plan to prevent new networks being born, apart from your integrated system? How can your system adapt or be able to respond to all the needs of the future?

Myers: I guess there are two answers to your question. First of all, I cannot prevent any service or agency from going out on its own. I can, however, report that to either the JCS or the Assistant Secretary of Defense (C^3I). The Assistant Secretary of Defense controls the dollars. Therefore, in the case of policing the system, that's about the level where it has to be policed.

In a more practical sense, and I don't think I'm being too naive, I don't see any agency or departmental commander, director, leader, manager, whatever, willingly going out and wasting millions of dollars. So if I can demonstrate that the Defense system meets their requirement, it is at least unlikely that they will go out and waste several million dollars to invent one of their own. So that's the way I would answer that. Our business strategy is to do what I just said: provide a capability that is competitive with the private sector, and makes it bad business to go out and invent your own system.

Student: How flexible is your system after all these years, to adapt to all the new developments in your requirements?

Myers: If this is a fair example of flexibility, the Defense Data Network was budgeted and originally conceived to have 400 major computer hosts operating it. There are 1,500 hosts connected to the unclassified DDN MILNET today, with less money than was originally projected. This last year alone, we connected 89 new hosts. The total network, topologically and architecturally, has totally changed each year over the last 6 years without perturbing the service to any of the customers. The reliability and the availability of the network have consistently increased. It's no different from your local telephone company. They have to plan ahead for the next generation of telephone users, and we have to do the same thing.

We haven't always done that. And that's another change that I think is beginning to permeate Defense. By law we were precluded from buying computers with excess capacity until three years ago. If you wanted a computer to do 12 megaflops you had to go out and buy a 12 megaflop computer and you could not buy a 15 megaflop computer, which is not very good business, but that was the American law at the time.

Oettinger: That goes deep. I cannot resist injecting a personal anecdote, because my mentor, Howard Aiken, developed one of the first large-scale computers back in the 1940s. In the late 1930s, he had gone to see Thomas J. Watson, who at that time was the founder and still the guru of IBM. When I was a student I worked in an IBM lab and my boss's boss was a fellow named John McPherson who was Watson's son-in-law, and who had been present at that meeting between Howard Aiken and Thomas J. Watson when Watson gave Aiken the money with which this computer was built. McPherson told me that he had advised his father-in-law against giving the money, and I said "John, why did you do that?" He said "Because my engineer's soul was rubbed raw by the idea that anybody would be nuts enough to want to make a machine 95 percent of which would be idle 95 percent of the time." That mentality continues to rise.

It seems to me that one of the major changes in the technologies underlying command, control, and communications is that they are beginning to be so cheap that one should not think about that

McPherson-type story, or the 90 percent utilization that you're describing, any more than we think about the number of idle pads of paper that are around this room and that are not being used right now. The number of telephones in your rooms that are idling unused when you're not there, the number of PCs that are sitting idle because you're not using them, is by that account of yours absolutely staggering and immoral, but we don't give it a second thought because that convenience is so great, and it is so cheap, that it is a hell of a lot better to apply the resources and get on with the serious business of worrying about whether you're de-escalating or escalating a piece of conflict, than to worry about the total utilization of a piece of paper.

Myers: It's true.

McLaughlin: Was that particular statutory limit our friend Mr. Brooks?

Myers: It was a derivative of the Brooks bill.

Ernst: And probably a derivative of IBM's efforts always to sell excess capacity on the correct assumption that pretty soon you'd need it.

Myers: It just doesn't make good business planning. If you ran your own business, you would never buy exactly the same processing capacity that you needed that day.

Oettinger: We are going to have to adjourn because there will be somebody coming in here. I want to thank you so much for coming.