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**C3: A View from Inside the Joint Staff
Joseph S. Toma**

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C³: A View From Inside the Joint Staff

Joseph S. Toma

Mr. Toma is the Chief of the J-6 Special Actions Division in the Command, Control, and Communications (C³) Systems Directorate of the Joint Staff. He is responsible for assisting the Director with plans, programs, and policies for C³ systems to meet national needs and to support the worldwide operations of military forces. He has been a civilian analyst in the Joint Staff since 1973. The first six years were with the Operations Directorate, where he evaluated the performance of C³ systems and procedures from the national level to operational units. He helped establish the C³ Systems Directorate in 1979 and continues to contribute to the assessment of performance and to the development of joint command and control capabilities. Mr. Toma has had a role in operations, contingencies, and planning activities of the Joint Staff over a 17 year period, from the withdrawal of U.S. forces from Vietnam to the Persian Gulf operations. He helped plan the reorganization of the Joint Staff following enactment of the 1986 Department of Defense Reorganization Act. Previously, he served as a research and development engineer with the Air Force, nuclear weapons development and test officer with the Air Force and National laboratories, and as a strategic bomber and reconnaissance pilot.

Oettinger: I won't trouble you with Mr. Toma's full biography which you've had in hand for some time, but I do want to express my delight at his being here. His title may baffle some of you. But Joe Toma is one of those people who make institutions run. If you look at the people who are at the top of institutions — Deans, Presidents, or Commanding Generals, you wonder how the world runs. Then you find that in every institution that really works there are people who provide a certain measure of competence and continuity, who are the real source of the strengths of those institutions. Joe is one of those people in the command and control area, and I'm delighted he could be with us. I asked him to describe that world from his point of view. I hope he will provide us with some historical background leading to contemporary events so that we can see things and share the rather unique perspective he has on all of this. So saying, I just turn it over to you, Joe.

Toma: Thank you Tony; I appreciate that. I am happy to be here. It's a joy coming out to places like this occasionally. It gives you a little balance so that you can maintain some perspective in the world other than just sitting in the Pentagon all the time where Colonel Potter and I spend most of our time these days.

When Professor Oettinger wrote and said something about my unique span of experience, I guess he's implying that I've been there a long time, which I have. A couple of days ago I was talking to a historian in the Joint Staff and he's put out a little book recently on the Chairmen of the Joint Chiefs of Staff, and I was looking through it. There have been 12 of them and — I guess this is really going to make me sound pretty ancient — I've been there during the tenure of about 6 of those 12. That sounds like an awful long time to me; I don't know whether it does to you or not. It's going to be from the perspective of having been around the place for a

long time that I'll make my comments. It's hard for me to tell you or to judge how representative they might be.

I titled my talk, "A View from Inside the Joint Staff." Take it as a personal view of mine. A person coming into the Joint Staff for two or three years, and leaving on another assignment, would probably view differently than I would some of the same events and changes that I might comment on. As Tony indicated, I'm sure some of the bosses that have been in there, and come and gone, would also have different views of some of these events. I suppose I might be a little bit more optimistic and charitable than most because I can look back at things that didn't work too well many years ago that seem to work a lot better now. A person looking at a shorter time frame might say, "Gee, we haven't done enough and why aren't we doing better?" So you have all kinds of perspectives that you can view our business from, and my business is command, control, and communications systems. I did spend part of my time in what you might call the J-3, or the operations community. So, I'm really one of these people who has done a variety of things. I don't think I'm your typical communicator nor am I a typical operations-type person. Having said all that, I just want to tell you that my frame of reference might be a little different than a lot of other people within a staff like that; so, don't accept it until you make your own judgments.

In listening to what I have to say, if you hear some new insights or see something different than you've heard before, then I think the time has been worthwhile. If you think that you've heard everything I say before, from other sources, I guess I would also say don't be disappointed because there may also be a learning outcome there too, and that is that maybe there isn't much more to be learned than what you hear from other sources.

Oettinger: Do you want us to shut up until you're through or are you interruptible with questions?

Toma: I'd be perfectly happy to have you interrupt as I go along. Let me say that what I plan to do is talk a little bit about the evolution of command and control business in the joint community and then describe some of our system relationships. I don't think you can really understand this business unless you try to stand back and look at what the C³ systems are all about, the technological aspects of them. Then I'll talk about Desert Storm. I suppose the other comment that I'd like to make at the outset is — in this area, as we were discussing here earlier

before we got started — you can run into security limitations very readily in the joint operations area and in the national policy area. But I think we can discuss enough of the events that have taken place, and what goes on with the staff, to make the trends that I want to talk about meaningful, without getting into those areas. But ask me whatever questions you like and we'll just have to see whether or not we can pursue them.

First, I'll relate some key events that have contributed to command and control as it operates today in the joint community, without going too far back in history (we were talking World War II here a little while ago). In the 1950s, there was the nuclear force buildup and, of course, we had a policy of deterrence which included the so-called MAD, mutual, assured, destruction concepts. The concern about warning and control and being able to execute forces, in order to convince people that they shouldn't attack you to begin with, led to the development of the national military command system, and also to command centers, alternate command centers, and all sorts of facilities to make it possible to respond rapidly to an attack and to respond under a wide variety of conditions, like, having absorbed an initial attack from the Soviets, still being able to execute our forces.

Around 1962, there was, on paper in a better defined form than ever before, a concept for this national military command system. Up until that time, communications systems had been developed, work had been done on ballistic missile early warning systems and other things along that line, which occurred as a reaction to needs at that time. This was all put together, and there was a national military command center established in the Pentagon. Then when the Kennedy and Johnson administrations came along they moved away from this spasm nuclear-type attack that had been planned in the past, and we had to have more options, and so the notion of flexible response came along. Now that contributed to increasing the requirements for command and control systems because you no longer wanted just to be able to send out a message telling everybody, "Go attack the bad guys." You needed to be able to understand what was happening better, and provide options for more controlled response.

Oettinger: Let's put this in context, because the folks here may not remember; we're talking about a period in which the technology to do these things was just being born. You're looking at it from 30 years later when there's all sorts of stuff around.

Vacuum tubes are just beginning to disappear and these possibilities that Joe is talking about were at the very edge of technological possibility.

McLaughlin: I keep telling people that, in the age of massive retaliation, fail-safe meant that the launch message would get through. The real worry was that forces wouldn't be launched.

Toma: There was more concern about being able to execute the forces. It was some time later that we started becoming more concerned about being able to control them, or having them go accidentally.

McLaughlin: That's the point I'm trying to make.

Toma: A little later on, in the 1960s (and Frank Snyder brought these events up earlier today; they are significant to me as milestones) there were three events — maybe most of you are familiar with them — they're old history probably for most of the people in the room here. The Liberty, Pueblo, and EC-121 were all intelligence, or ferret vehicles — the first two were ships and the other one an airplane — and we were always out around the periphery of the Soviets learning what we could about their electronic systems and other capabilities. These three were all involved in tragedies of one type or another from our perspective. The Pueblo, of course, was captured, the Liberty was badly damaged during the Arab-Israeli war of that period, and the EC-121 was shot down and the crew lost. There was a lot of criticism at that time (after any event like this there's a lot of witch-hunting and self-questioning). Why weren't we able to prevent these, or foresee them, or react better to them? There was also criticism of the communication systems. In at least two of the cases, messages were mis-sent or delayed, and so people look for a lot of different reasons as to why these events occurred. No matter what the facts are, and some of them are still interpretable today in different ways, there was significant concern over the command, control, and communication systems. Congressional hearings were held, and special studies were undertaken, and questions were raised about the capability of our national leadership to react to crisis or critical situations, and if the military structure was able to transmit orders or messages to people promptly. This led to a significant study, too, called the 1970 Blue Ribbon Defense Panel, which David Packard, I believe, headed up at that time. That soul searching revealed the need for better management at the top of the defense structure. A lot of the outcomes of the studies indicated that there wasn't a unitary control at the top and that the command and control system

itself had faults in it, whether or not the particular failures that I referred to earlier were directly attributable to either hardware, software, or the people involved.

Well, by the 1971 time period, through many people's efforts, there were a number of agreements made and these were documented in a DOD Directive, which is where we end up writing most of these things, like laws for other people to follow. DOD Directive 5100.30 redefined who the national command authorities are, and I'm using this term in a specific sense here; these are the people who can make decisions as to the employment of forces, and in the case of nuclear weapons, the President himself giving the authority to release them. But this document said that the national command authorities would be the President and the Secretary of Defense only and that they would transmit commands or orders to nuclear forces through the Chairman of the Joint Chiefs of Staff. The document also defined the Worldwide Military Command and Control System (WWMCCS), and I'm going to talk a little bit further about that, but at this time the document said what this system would consist of. Also, the directive said that for all-time sensitive situations the Chairman was empowered to implement the decisions of the President and Secretary of Defense, on his own if necessary, if he didn't have time to consult with the Chiefs. People often overlook the fact, and I say this I guess for the benefit of the old-timers here, that authority existed from 1971 — even though in the late 1970s and 1980s there were many arguments about whether the Chairman had sufficient authority or whether he was just an advisor. A number of issues like that have been discussed. In fact, he had been given authority to act in time-critical situations when directed by the President.

Oettinger: The authority of the Chairman under more benign conditions essentially, sort of nonexistent, which was the other side of the argument before the Goldwater-Nichols act.

Toma: That's true. However, I think that's sometimes overstated. I went to work in the Joint Staff in 1973. Let me assure you that procedures existed from at least the 1973 period for actions to be taken in the manner that I stated a few moments ago. Authority is always a function of the individual who has that authority too, the personality. One individual might choose to exercise it in a fashion which is stronger than what another individual might and I think sometimes you have to think about that, too. People aren't automatons who work the same way.

There were many people who felt strongly on one end of this argument. At any rate, it led in 1986 to the Defense Reorganization Act, which did state clearly, not just as a defense directive but as the law of the land, that the Chairman was the principal military advisor. It was quite specific that orders for the commands would go through the Chairman. In my view, even more significant than that, was the authority given to the commanders of the unified and specified commands. Prior to this time period, there really were questions of interpretation, what the authority of CINCSAC (Commander in Chief, Strategic Air Command) or CINCPAC (Commander in Chief, Pacific Command), or CINCEUR (Commander in Chief, Europe) was versus the service chiefs, both in their role as a service chief and in their role as a member of the Joint Chiefs of Staff. The Goldwater-Nichols act gave the commanders in chiefs, the CINCs, authority over who was assigned to them — for example, what generals would be given to them to work with. It gave them authority over logistics, training, personnel, and planning actions. One of their component commanders might go to his own service asking for certain equipments, or forces, or changes, and the CINC himself may have had very little to say about whether that's what he wanted or not, or what training his people had received. Now, to the extent that the CINC exercises that authority, he has authority over all of these areas that I just mentioned.

Also, the act developed joint doctrine, and that sounds like a little thing but it says that now instead of the Air Force, and the Army, and the Navy all saying how they're going to do business or how they're going to fight wars, there's going to be a body of fundamental principles that's called joint doctrine that's going to say how everybody does it together. And this is going to be built into a structure, which will say how air forces operate in the same airspace, how land forces and air forces will operate together, and, even more significantly, how fleet forces and land-based forces will operate together also. Well, this is still going on. It was started shortly after the act, and it is continuing today. Those are some of the events that have been important in the development of both joint doctrine and procedures, how we go about doing business today, and this development is still ongoing.

I'd like to talk about systems and then I'm going to try to pull these subjects together. I used the name Worldwide Military Command and Control System a little while ago — called WWMCCS. When the 1971 directive was written, it said WWMCCS

would be the system to support the national command authorities in carrying out the function of directing forces. The directive had what we sometimes called an accordion definition: it could be as small or as large as a person wants to make it because if the President needs to talk to a ship at sea then the National Military Command System, which is a part of WWMCCS, might need to have a way to extend all the way to that skipper of a ship or an Air Force Wing Commander somewhere. But, in fact, over the years, WWMCCS has become better defined and there are some systems which are uniquely WWMCCS systems, dedicated for this purpose.

I've felt over the years that there's a lack of understanding of the commonality between a variety of systems that we talk about and refer to that is important to understanding how we operate different forces and functions within a geographical region, or functionally. Let me just describe these for a few moments and if you understand this concept generally we'll just go on. If you don't really understand it, ask me about it.

WWMCCS has a national military command system as a part of it, and the national military command system consists of facilities and communications such as the National Military Command Center (NMCC), and the National Emergency Airborne Command Post (NEACP), and there are other alternates of that type. But, in addition to that, the WWMCCS consists of a number of other elements. There are warning systems and surveillance systems in it, there are computer systems, there are sets of procedures and tools called decision aids and executive aids, and there are communication systems. All of these are called systems, generally, and that's unfortunate; it's like the word "things" because the systems can be many, many different things. The systems are sometimes subsystems of other systems, and sometimes the systems are thought of as being a separate physical or electrical entity from another and they're not — they may overlap, and be a part from another system.

The reason I say that is there's another whole world of intelligence systems. Intelligence systems have communication systems and computers and other devices in them. There is a critical communication (CRITICOM) network, special intelligence communication (SPINTCOM), a defense dissemination system (DDS) — it's a system to transmit high-speed imagery, and there are large computer systems. The communications that the intelligence

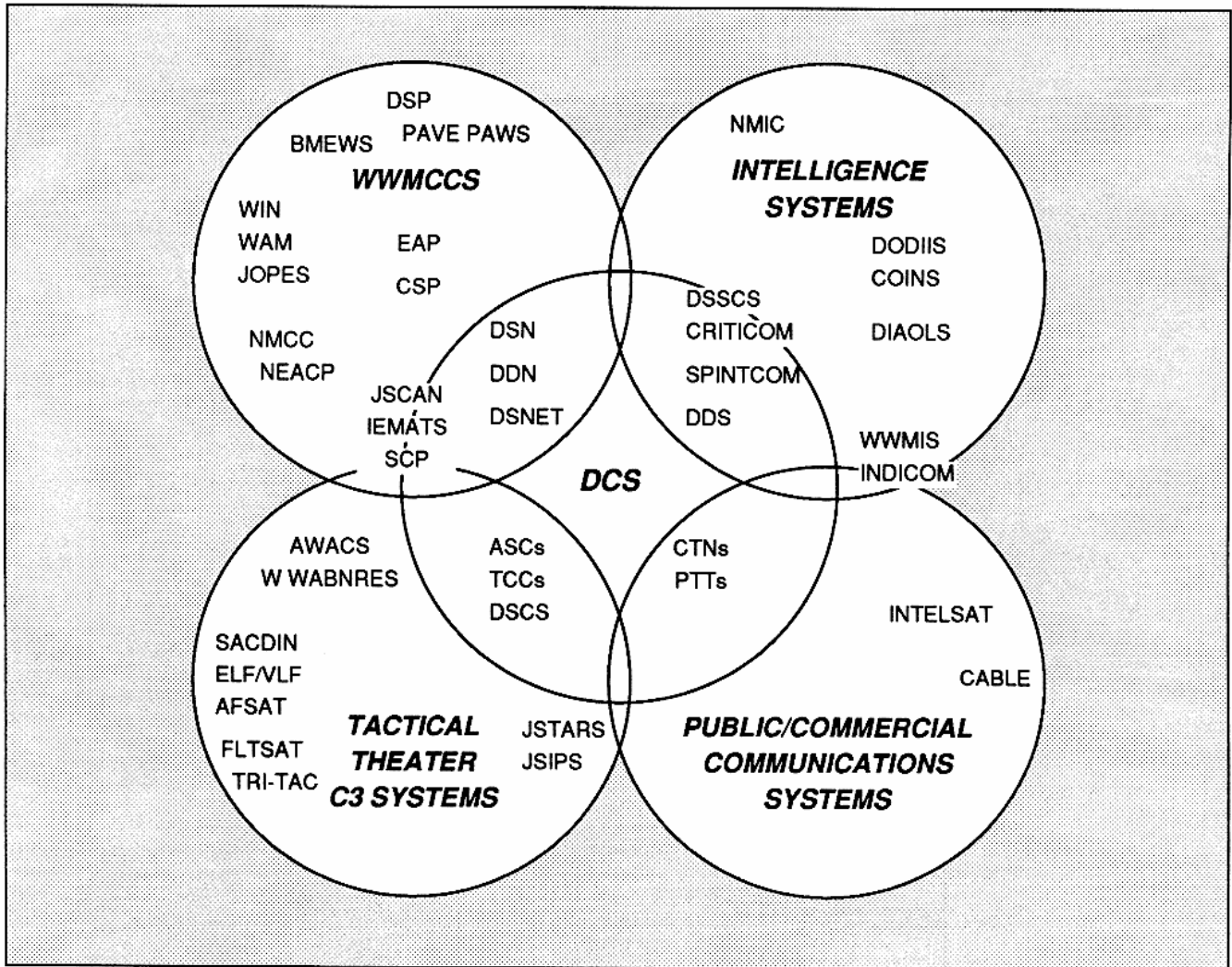


Figure 1
Definitions

community uses is largely the defense communication system, and that's the same system that the operations community uses for communicating between geographically distant places.

But then you ask yourself what is the Defense Communications System (DCS)? It sounds like something that you can draw a line around, but it isn't. In the United States the defense communication system is largely telephone service that we buy or lease from all of the commercial systems; so, in place of DCS you could almost put a telephone company here, and that's why I also have added a

public communication systems. The commercial telecommunication networks (CTNs) and the PTTs (Postal Telephone and Telegraph systems) provide us with the connectivity that we use to go to installations overseas. There are some communication systems bought and owned by the government, and there are the Defense Switched Network (DSN) and Defense Data Network (DDN) (DSNET is several secure networks for tying computer systems together). All of these together are described as the defense communication system.

We also have theater tactical C³ systems. These tend to be unique in their nature. At one time they were dedicated literally to tactical functions; today, even that has changed. The fleet satellite communication system used to belong to the fleet and be used by the fleet for ship-to-shore or shore-to-ship communications and other interfleet communications. Now we use fleet satellites for communicating with people in Saudi Arabia in this last operation, and within the theater, so it's both intertheater and intratheater.

The Air Force satellite communication system capabilities are part of the fleet satellite communication. Actually, physically it's the same satellite in orbit with two transponders on it, one for the Air Force and one for the Navy to use. Those same systems are used for what I'll call strategic communication purposes, not tactical in a literal sense only.

I'm going to touch on organizations too, because that's the next important relationship. Why are these things important? Well, Desert Storm is a good example. We're operating now some 7,000 miles away. There were intelligence functions, logistic functions, operations functions all to be performed. How do people communicate from the CONUS (Continental U.S.) over there? How does intelligence information get over there versus logistics or operations information? Well, the answer to that is they're all attempting to use the same common resources. Intelligence systems do not exist as one set of systems by themselves. So, for an organization like ours, for example, in the Joint Staff, the J-6 gets involved in and must do some of the adjudicating between whether intelligence is more important than logistics or operations — and that's part of the function of the joint community. That was the reason for my alluding earlier to the importance of Goldwater-Nichols, in terms of CINC support, because from our viewpoint it's more important to us what the theater CINC, the combat commander, who is attempting to run a war, considers to be his priority than what a logistics or intelligence command thinks is their priority to get information into a theater. We exist pretty much to support the combatant commanders and we may also be influenced by national priorities and thoughts, but when you take all of these systems and requirements, including the tactical, and you say, I'm going to use DSCS (defense satellite communication system), then you have a problem. Over 70 percent of our communications to the southwest Asian theater were over this DSCS satellite. This is a super high frequency system which provides very high data

rates, and so all of the functions which required very high data rates for transmission needed to go over this system. We have to decide whether we should allocate more channels to operations, or logistics, or intelligence. So it becomes very important to know that even though these are different kinds of functions, that they're competing in the communications world and in the data processing world, to a degree, with the same basic set of resources.

Does anybody have any questions about the acronyms on this chart? It's not important that you follow it all, as long as you have the general idea that, yes, there are these national systems. I'm sure you read and heard about Joint Surveillance Target Attack Radar System (JSTARS) use in Desert Storm. There were a couple of JSTARS airplanes, which were really prototypes, being used in Europe. They are a version of the 707 airplane that carries a radar, and they were moved down to Saudi Arabia and used very successfully in the theater. JSTARS communicates with other systems, other command centers, even theater, using some of the same resources as these other functions do. Some of the communications were through satellite relay and through UHF radio. Well, I just wanted to give you an idea of the sets of systems and how they really depend on a common source of communication transmission.

Oettinger: At the risk of getting heavy handed, something has to be done rather definitely as far as this notion that you've got of functions, and systems and organizations. They may or may not coincide, and analyzing any situation, understanding which you're looking at and when, is a critical element. It's a thread that runs through Snyder's writings that you've just finished, it's a thread that runs through Coakley and a number of others.* In this field, in particular, confusion of what's a system, what's an organization, and what is a function has been so rife as to make it, I think, almost incomprehensible. Joe has made that so smooth that it might get by you without your grasping fully how important what he said really is.

Toma: You're right. There are a lot of rough spots in all of this. There are a few lines missing on figure 2, and these people aren't really disconnected.

*Frank M. Snyder, *Command and Control: Readings and Commentary*. Program on Information Resources Policy, Harvard University, Cambridge, MA: 1989

Thomas P. Coakley, Editor, *Issues of Command and Control*. National Defense University Press, Washington, DC: 1991.

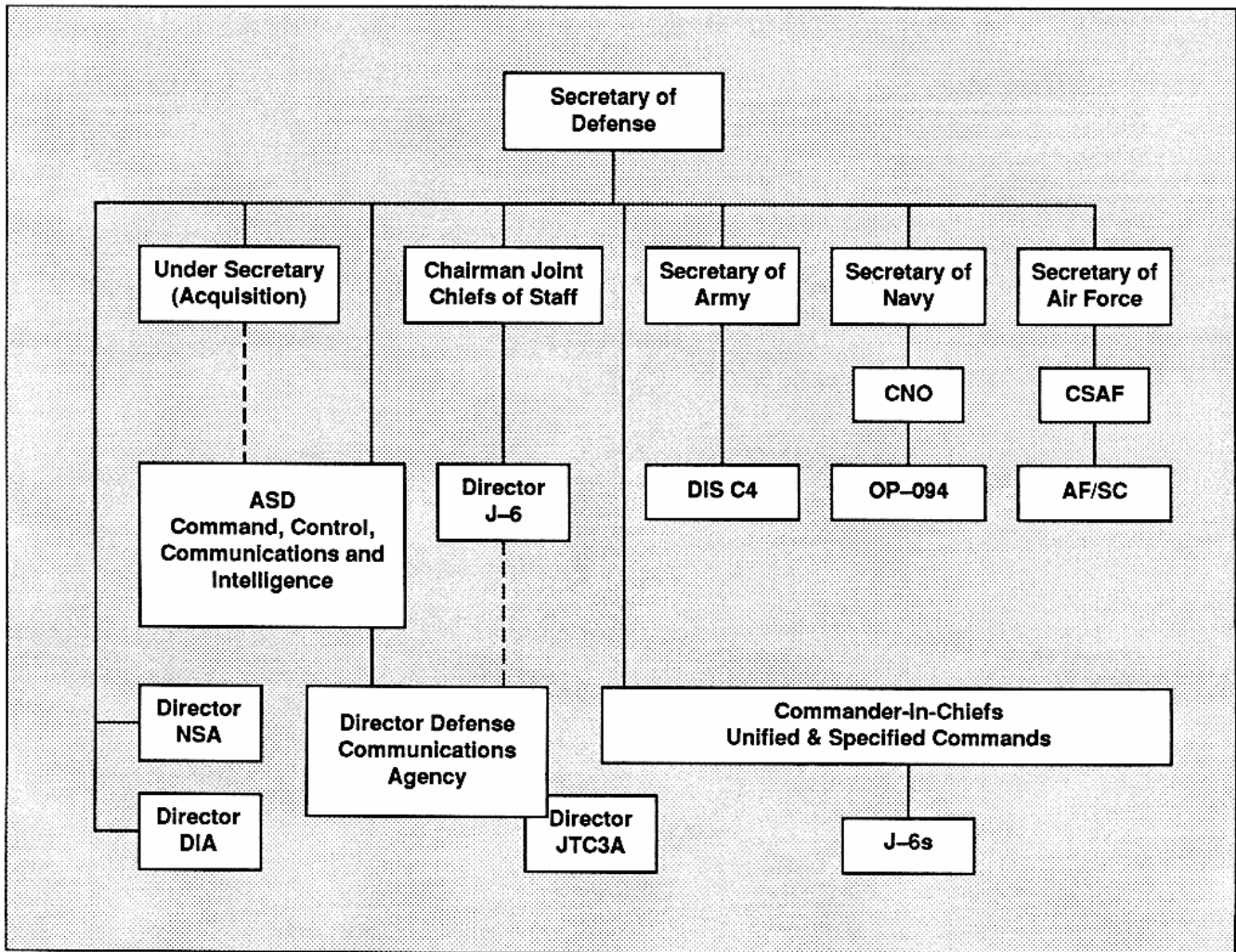


Figure 2
Organizational Relationships

What I'm trying to illustrate here is that these systems are complex and there are a lot of organizations involved in them. Some of them are developed and bought by individual military departments, services, and by agencies. Some of them are developed under joint sponsorship or a joint program office, some of them under the Defense Communications Agency (DCA). A lot of this is historical; it's not that somebody sat down rationally and drew up a chart. Some of these things didn't exist; DCA didn't exist until 1960. NSA, was started in that same time period.

I was telling a couple of the people here earlier that the J-6 in the Joint Staff disappeared in the mid

1970s and reappeared in the late 1970s; it didn't get called "J-6" again until the Goldwater-Nichols Act in 1986. So, organizations don't all come about at the same time. The staffs and the service staffs who deal with information systems, or command and control systems, are located in different places in the hierarchy in the services. What they're responsible for has varied over the years; sometimes they've only been communications people. At times the computer systems were controlled by the comptrollers because people thought of computers as devices that developed payrolls and kept personnel records. I'm saying also you can't be too critical about the way all of this is managed because the people that

have these operations today didn't create it all; they inherited at least 30 or 40 years worth of development, probably more than that.

At any rate, today we have an Assistant Secretary of Defense for C³I systems, who I guess will visit you next week.* As recently as this past November, his role on the Defense Secretary's staff has changed a little bit. He used to work directly for the Under Secretary for Acquisition, which also is a change from a few years ago; now he works directly for the Secretary of Defense. For acquisition matters he goes through the Under Secretary of Defense for Acquisition, but for most of his day-to-day business he works directly for the Secretary of Defense. The Defense Communication Agency works for the Secretary now — it used to work for the Under Secretary of Defense for Acquisition with oversight being provided by the Secretary. The director of the Defense Communications Agency is also provided with guidance and tasking.

Incidentally, all of the charts that I've given you are largely my charts, or charts of people that work for me, so don't take them as the gospel. Sometimes we take some liberties that you won't find in formal structures.

There's also a separate agency that may disappear before long and be absorbed into the Defense Communications Agency. The Joint Tactical C³ Agency works for the director of the Defense Communications Agency. Now, that didn't exist until 1984, so that's a new organization, too, and I'm going to come back to that in a minute because it's important.

I mentioned on the service staffs there are parts of little staffs, and they're all called by different names, who work in the information management, or C⁴I, business. The Army includes facsimile machines and printing, and all sorts of things that are a part of their information systems.

Oettinger: That DCA box is even a bit more complicated. The director of DCA also has a hat as director of the White House Communications Agency, so he provides the President's communications. He's also the director of the National Telecommunications System, which is an administrative figment that is meant to provide some measure of cohesion over the now split-apart domestic telecommunications world, and he probably has a couple of other more nebulous responsibilities. Just to stress again, that, a full understanding of how all of this stuff operates is a very difficult thing to achieve.

Toma: One of the Congressional acts that had to do with computer systems and data processing said that each service would have a single office responsible for that function. It was the Brooks Bill. And the Army chose to focus all of that responsibility at this point, and have them report to the Secretary of the Army; in both the Navy and the Air Force the functions are a little bit more separated.

Student: But isn't that really an acquisition function, isn't he reporting through the Under Secretary of Acquisition?

Toma: No, not on the service staff. These people report to their service secretary, either directly or through the Chief of their service.

Student: I thought he was reporting to the Army Acquisition Executive.

Toma: If you were to take a single program, like let's say, Army's Maneuver Control System (MCS). That program manager reports to the program executive office, and that person reports to the Under Secretary of Acquisition for that program.

Student: Now they report through their service acquisition executive to DOD, to the Under Secretary of Acquisitions.

Toma: But it's for that program. These people have oversight over all of the Army activities in the information management area. They would coordinate their part in the development of the program objectives memorandum, the POMs; they would propose various divisions of fundings for each fiscal year, as a total Army program. In that process, they're going up through the Army and coming back in here, and we can come to that in a moment. The manager of a particular program would follow the other reporting chain. But you bring me to the next point that I wanted to make.

Let me just touch on these two outfits and then I'll make that point on management. We in the C³ community have a large involvement with both the National Security Agency and the Director of the Defense Intelligence Agency (DIA). NSA does almost all cryptographic work and today they're also responsible for computer security standards and guidance in that area, as well as communications security. So, in the development of systems and in their operation, we work quite closely and are supported by them, and in turn support them in some areas, as well as the DIA. The DIA develops threats, for example, against which to design systems, or to develop specifications for systems.

*See presentation by Duane P. Andrews, following in this volume.

Student: I've lost the train here between NSA and DIA in going back to J-6. Is it just an informal link?

Toma: Well, you don't see any lines here (figure 2).

Oettinger: Also because DIA may be going through the Assistant Secretary of Defense; there's talk about that.

Toma: There are a number of relationships beyond what I have on the chart here. As a matter of fact, I used to have a chart where I put J-6 in the middle and I ran lines through all these, and then I ran lines between all of them also, and you can almost do that. But this shows who they work for; at least the NSA works for the Secretary of Defense, that part is correct. Now what they do for the J-6 directly is usually established, either formally, in a memorandum of understanding, for example, or through some programmatic function. For example, right now NSA is the developer of a system called Blacker. It's a system used to secure multichannel communications with which we hope to achieve multilevel security. When it was first being proposed this was a conceptual thing, NSA did R&D. Now that it's getting to the point where the services are going to have to buy some equipment to put them into the defense communication system, the services each have to budget monies to buy these pieces of equipment in certain years.

The J-6 does the coordination of that planning, and this is the point that I was going to come to in a minute. There are a number of horizontal relationships that exist between these groups. For example, General Cassity (whom I work for) is the J-6 and is the Chairman of a board called The Military Communications Electronics Board. The principal himself is a member of that Board, as are the Directors of these agencies, although sometimes they'll send a deputy. And these people will sit and agree upon, for example in the case of Blacker, how many units do we want to buy over the next three years. I'll show you how complex this can get. NSA is working on another system, which technologically is better than this Blacker system, so decisions have to be made, like should we spend a lot of money in the next few years to buy this equipment, or should we hold off and wait until this other concept gets further developed and not put these systems into use until 1995. Those get hashed out at a horizontal level of coordination and there isn't necessarily a piece of paper that says yes, each of us is going to do this, but the people will either agree, and it depends on how formal and how important

the decision is what mechanisms are used. I'll explain as much as you like about this but there are a lot of complexities involved in the whole acquisition process.

Oettinger: The National Security Agency is on the chart because the Secretary of Defense is the Executive Agent for the President. But it obviously also has roles to play with the rest of this chart, which is essentially military organization. So while formally it is an organ of the President, it also has relationships with the military, and what Joe is describing is something in this case that has its roots in some constitutional and high politics, as well as in the low politics of acquisition.

Toma: The Under Secretary of Defense for Acquisition is also the Chairman of the Defense Acquisition Board (DAB), which has a representative from the military departments and from other parts of the staff. The Vice Chairman of the Joint Chiefs of Staff is a member of that particular board. Now these same issues, like the acquisition of a program called Blacker, meet a dollar threshold. Dollar thresholds in multimillion dollar programs are reviewed by this Defense Acquisition Board, or sometimes programs may be selected for review for some other reason, or Congress may direct that a program be reviewed by the Board before a milestone decision. There are milestones, which involve either initial procurement, or full production of a system. That Defense Acquisition Board is used to coordinate between all of these organizations in the acquisition of large programs. The Board has a number of committees; there used to be 10 of them — we're streamlining to 4 now. But one of them is the C³I committee, which Mr. Andrews chairs.* This committee will review programs for different reasons — there might be a dollar threshold, or a program has had problems in development and warrants greater scrutiny. Those programs will be reviewed by the C³I committee before presentation to the DAB for acquisition decisions. I was hedging the answer to your question but this so-called simple acquisition chain is a little bit misleading, too, because it isn't just three people reporting to each other. There are quite a few; depending on the size of the program, there may be a sizable review of decisions and actions in programs as they go along.

Another committee, which Mr. Andrews now chairs, is the Major Automated Information Systems Review Council (MAISRC). The acquisition

*Duane P. Andrews, Assistant Secretary of Defense (C³I).

decisions that used to be reviewed by the defense comptroller for the reasons I gave earlier are now reviewed by the MAISRC; computers were thought of as financial devices and things like that. That was moved recently, largely because both C³I and the Chairman of the JCS went and argued with the SECDEF and said, "You can't put these command and control systems and these computer systems that support command and control over here with (what some people in the other community called) the "green eye shade folks" because they don't understand these command and control systems." Computers are a part of almost all the weapons systems that we employ today and it needs to be more in the environment of the C³I rather than in a comptroller environment.

But there are committees and boards — the ones I've given you are some of the principal ones — but there are more than that who coordinate at different points in the acquisition process including research, development, test, evaluation, and acquisition of systems.

I wanted to come back to the Joint Tactical C³ Agency before I leave this chart. Up until about 1984, the tactical C³I systems were largely left to the particular proponent of the system in the service or in an agency — Army worrying about Army tactical communications, Navy worrying about Navy tactical communications. In fact, from the late 1970s on, there was a fair amount of coordination taking place within the joint community, largely directed under the J-6, to get cooperation from people to develop what everybody is interested in today — interoperability, standard procedures, but a lot of it was still voluntary in the sense that a service may or may not cooperate in working together with another service. In this time period, about 1983, 1984, we, (DOD, and the JCS, in particular) were instrumental in establishing this Joint Tactical C³ Agency and were given the responsibility and authority to review service-proposed procurements or developments first, even for communication systems, which were inherently unique to their service, like the Army's developing a new radio. The Army would be required to send its requirements statements and specifications to this agency and these people would review those specifications and say, "Well, this system may need to interface with some Air Force systems. Let's look and see whether there ought to be a standard adhered to in the development of this system which would enable it to work with other service systems." Today there are even more formal relationships than that, both as

a result of the 1986 act and some subsequent Congressional guidance.

There is another body called JROC, Joint Requirements Oversight Council. The Vice Chairman of the JCS and the Vice Chiefs of all of the services, the four-star generals who are the deputies, sit as a Joint Requirements Oversight Council. Now, by Congressional direction, they are required to review all new service statements of needs or requirements to look at the implications for joint use of whatever system is being developed. In other words, these people are supposed to sit down and say, "Well, yeah, the Navy's got a requirement for" (and this is a real one by the way that is currently under consideration) "an airborne self protection jammer for fighter aircraft, but the Air Force also needs these things, so let's make this a joint program." This JROC body is supposed to provide that kind of advice through this acquisition executive, through some chain. What I'm saying is even though this chart shows who works for whom, there are really multiple relationships through boards and councils, which produce a lot more cooperative effort in developing systems that are for the benefit of the country as well as the Defense Department.

Oettinger: Of course the other side of that coin is that there are sources of infinite delay.

Toma: There certainly can be. But the act provided some provisions there too. It said, for example, that the Chairman now establishes his own agenda, right? He doesn't have to wait for all of the chiefs to agree.

Oettinger: One of my themes has been the difficulty of striking balances, about things that are desirable, like cooperation on the one hand, but getting things done on the other. So the question is, do you want a radio that won't talk to anything else — which is the one extreme caricature, if the service can do whatever the hell it wants — or do you want a wonderful radio that will talk to everybody but never gets produced.

Toma: Sure, and none of these things are without some penalty. Interoperability has lots of penalties that go with it, not the least of which can be cost, for example. Of course at the same time we have guidance that says everything is to work together and be interoperable and survivable and all that. We also have to cut the budget and not spend as much money — and those things aren't necessarily compatible, as a matter of fact most of the time they aren't.

McLaughlin: For the benefit of nonmilitary students, it's worth an illustration what all this is about. I recall Jack Cushman* coming in here in 1981, pointing out the fact that, in at least the four previous wars, you had Army and Marine Corps troops deployed next to each other and dependent upon each other for mutual fire support; however, they were both designing and producing, in the early 1980s, artillery fire control systems that would not interoperate, and so the Army would not be able to get fire support from the Marines and vice versa. So that's why this tactical coordination committee was formed — to keep that kind of noncooperation from developing.

Toma: This chart (figure 3) isn't going to appear anywhere else so let me say this is really a personalized chart on my part, and it leaves out many details but, given there are certain organizations that have been established to perform a number of functions, given that there are all of these systems out here that need to operate together in one fashion or another, and that certain procedures and relationships have developed over the years, what kinds of activities go on in the Joint Staff day in and day out? How do you employ all of these mechanisms, or boards, or councils to get the job done? So this is a personal view; if you're sitting in the Joint Staff, what do you do every day, what are the activities that go on, and what happens on other occasions?

Day in and day out we do things that are on the left side of this chart. Probably our main job is what I've called strategic planning; I mean that in a broad generic sense, the same as General Motors or General Electric does strategic planning. Where is the outfit going? What are our future needs? What are our future resources? What does the competition look like? In our case, what does the threat look like? Where is the world going? Those kinds of things. That's a year-round activity. In the Joint Staff on any given day there are quite a few people spending their time on what you might call the strategic planning activity.

This leads to a number of other things. The strategic planning may lead to the development of specific operations plans by a CINC, and in fact there are some established mechanisms for doing these things. There's the JSCP, Joint Strategic Capabilities Plan, developed by the Joint Staff,

which actually gives guidance to each of these commanders. It says you should develop three operational plans to be able to go to Timbuktu and do something along that line. In the case of the nuclear forces, it tells them the highest priority targets in the Soviet Union are the following kinds of things. You will target weapons against these targets, not quite the way I'm saying it, but that is the kind of guidance that goes out to these commands, as a result of some of this strategic planning. There are also, out of some of this planning, requirements that develop, and I'm sure you have read or heard that the Joint Staff doesn't budget, or buy, or develop systems, and it doesn't. But it does establish some requirements like national level command and control systems. We might say that we want higher powered generators on the airborne command post because we can't transmit radio messages far enough with the existing capabilities. So there are requirements developed within the Joint Staff for national level systems as well as requirements which may be passed on to a service, or sometimes we may be coordinating requirements developed by a service.

Today, again, as a result of the 1986 act, the authority exists for the Chairman of the JCS to do much more in the budgeting and programming area than he has done yet. Whether that authority will be exercised is a question of whether there's a need to exercise it further. The type of actions that I'm referring to are, for example, Congress said the Chairman of JCS may develop alternative budgets if he's not satisfied with the budgets that have been submitted by the services. We haven't done that yet to my knowledge. There is no joint budget that's been developed. There is a JCS budget or a Joint Staff budget, but it's just for running a staff and running exercises, it's not for what the services do. But there are inputs that go into this area, and the process I mentioned earlier, the DAB and, there's also another board I didn't mention, the Defense Resource and Planning Board, which is chaired by the Deputy Secretary of Defense. When the Joint Staff reviews service budgets and has disagreements or differences, like the Air Force may not budget for as much time to fly AWACS (Airborne Warning and Control System) as the Joint Staff thinks is needed because we're now helping in drug interdiction efforts, then the Chairman may, on his own, go into this DRPB and present a differing viewpoint than what the service does. At any rate, there are these kind of activities.

*John H. Cushman, "C³I and the Commander: Responsibility and Accountability" in *Seminar on Command, Control, Communications and Intelligence: Guest Presentations, Spring 1981*. Program on Information Resources Policy, Harvard University, Cambridge, MA: December 1981.

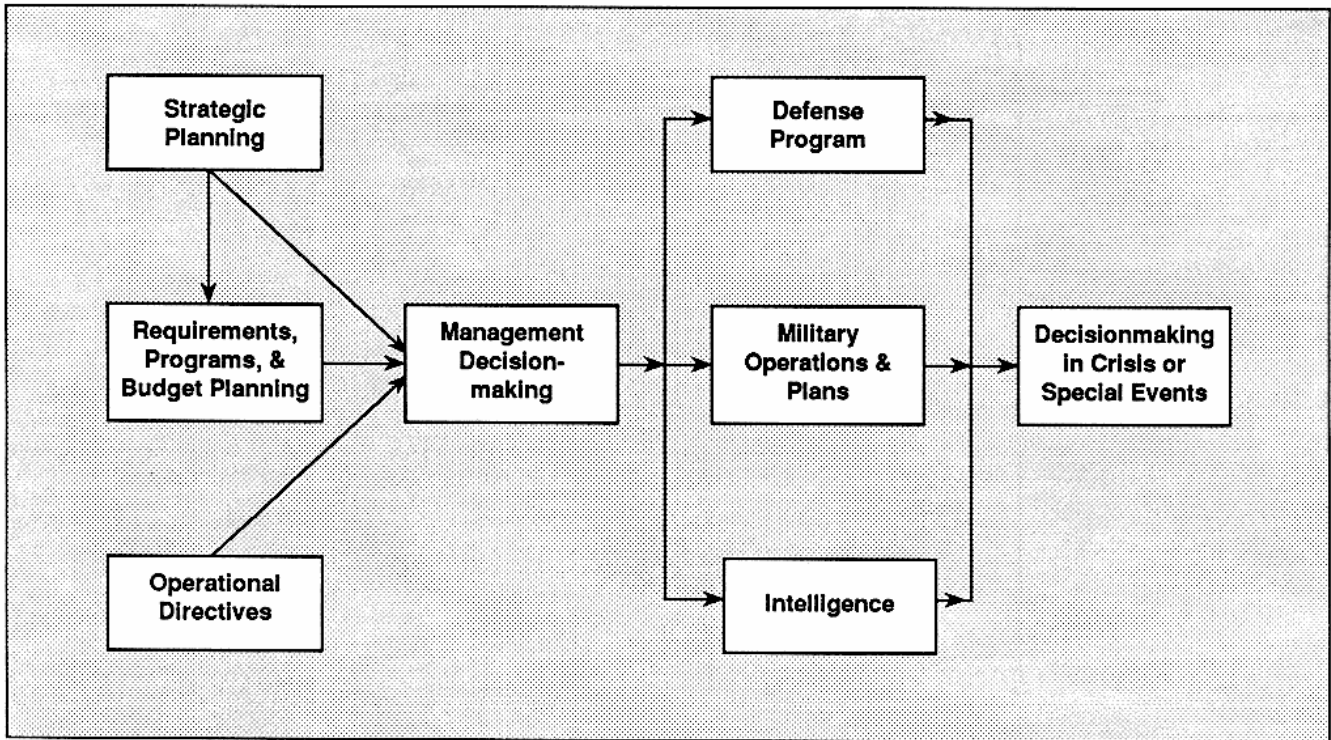


Figure 3
Joint Activities

The third activity that you see within the Joint Staff has to do with the development of operational directives. This is probably the least understood activity. I've often heard people, including some at our war colleges, talk about the fact that the Joint Staff only provides advice. Let me tell you that's not true. For example, I mentioned AWACS a few minutes ago. We frequently deploy AWACS around the globe. If you recall a little while back there was some trouble in Chad and the Libyans were interfering. We deployed AWACS to Egypt to help monitor what the forces were doing. Almost all of the movement of forces — whether it's elements of battle groups at sea or aircraft, or small unit forces — those directives are developed and come out of the Joint Staff. Now, they come from the Chairman under the authority of the SECDEF. The Chairman does not have direct control over these forces, it comes through policy guidance from the Secretary of Defense or from the President through the Secretary of Defense, or it might be under a national security decision. The Chairman does direct forces

and moves them, and monitors them, and that's what I mean by operational directives.

That's what I refer to here (figure 3) as management decision making. This results in the development of military operations and plans. It also results in some intelligence requirements. We may want the intelligence community to develop a capability they don't have currently, or we may want them to give priority to an intelligence requirement that they have not chosen to do.

There are two chains of events. Day in and day out this first process goes on. Periodically, when there's a crisis or a special event, certain actions need to be taken and there are decision-making processes that involve either the Chairman or the Joint Staff, and the options, or the alternatives, that are available then are generally determined by the earlier actions. We can't do something if we haven't built or bought something with which to do it, so the defense programs will in themselves define what types of options you have, as well as what plans you have on the shelf or that you might develop further,

and also what the intelligence community is telling you about the situation.

Student: One quick point about that particular chart (figure 3). I think it might be useful to think in terms of the feedback from the decisions to the daily activities.

Toma: You're right, they're important. I said it was a very simplified chart, which leaves out a lot of things.

These special events that I'm talking about are crises. They're not all the same but there are a lot of them. For instance, back in the beginning of 1990, we were having serious trouble in the Philippines, both at Clark and at the American Embassy. Those things don't happen without a lot of activity taking place in the Joint community, and sometimes within the services if different units are alerted. The number of military actions that you see in the press are less than 10 percent of the situations to which we react — and subsequently do nothing or little about. If our embassies or citizens are seriously threatened, those situations require us to gear up or make plans for taking some action. Those things occur quite frequently, more frequently than you normally see.

In March of last year there was an announcement on this 2-year, \$2-billion anti-drug program. The DOD involvement in this program began about 1989 but this really expanded the DOD's involvement, and this includes things like fleet components. You probably read about some of them being moved in the Caribbean and other places — AWACS I mentioned, or Navy E-2Cs, radar airplanes, and support to the Coast Guard. This effort expanded greatly in this time period and continued throughout the year, even while these other things were going on.

In July, Iraq started massing troops and we all know the subsequent events. But, even prior to this time there were things happening and those things do cause reactions, even though we might not go to war, there are preparations and activities that go on, of course, you know about these.

In August of last year. I don't know if you recall, Mr. Doe in Liberia got into trouble and the rebels were attacking embassies and attacking his government within Liberia. The American fleet units were off of Liberia almost through the end of the year and they evacuated Americans and other people out of Liberia as that was happening.

Then there was the revolution in Somalia in January. So while most people's attention was on

Saudi Arabia and Desert Shield, we had U.S. forces doing other things in other places, in this case Africa, but even in other places not quite as active as these two evacuation operations. In a lot of these cases, where we have evacuation operations, we don't assume that there's going to be a benign environment so when we send American forces in there we have to be prepared to fight in those areas too. The rebels sometimes don't make the distinction between whose side you are on, so anytime we put forces in places like that, we make preparations to defend those units. There's a lot of activity that goes on in that cycle that I was showing on the last chart (figure 3) that involves these special events or critical incidents or whatever else you might choose to call them, in addition to the year-round, long-range planning, budgeting, programming type activities.

I thought I would briefly step through some of the activities that we were involved in during Desert Shield and Desert Storm, and how we in the J-6 or C⁴ systems community viewed some of these things. If you follow the activity closely you'll probably glean most of this from public announcements and press reports.

On 2 August, the day Kuwait was invaded, there was very little U.S. communications infrastructure in that part of the world. We had a couple of satellite terminals in there, mostly they were in Bahrain and places like that. The commander of the Joint Task Force Mid-East and elements of the fleet in the Persian Gulf area had been in the area for some time, back to 1984 when we had different activities there, and there were communications available to them. When we started deploying our forces into Saudi Arabia, our first reaction was to send along some additional satellite terminals. There already were satellites in that region of the globe that could be used, but we needed equipment there. As more forces were sent, other types of equipment were sent over also: terrestrial type systems, microwaves, troposcatter systems, and switches. The switches act like a telephone central that allow your communications to interface with long-haul communications. The Joint Staff has joint resources. For example, there's a Joint communications support element, which in this case was stationed in Florida, at MacDill Air Force Base, which is designed to be available for rapid movement whenever there's a need for more communications in different places. We started deploying elements of those units right away, and then in time we picked up a lot of other stuff and sent it over.

I'll give you an idea of the kind of equipment moved in the first three months or so, there were something like 100 super high frequency (SHF) satellite terminals sent over, and 60 circuit switches, and 5 message switches. By the end of last year, we had about 265 autovon trunks in Saudi Arabia; to compare that, consider that in all of the time that we've been building capabilities in NATO (40 years or so), we've built up to about 174 autovon trunks going to Europe. So what I'm saying is we put an awful lot of communications capability into the Saudi Arabia area.

Student: How many of those autovon cables or communications have been moved? Are they all still up and running?

Toma: I don't know exactly. We've taken down some switches and started moving them out, but I can't tell you at this point just how much has been moved out.

Student: Some of it came off leased satellites. . . .

Toma: Yes.

Student: Were we using STU2s, STU3s? Or something unsecured, like regular old telephone voice?

Toma: You've got to explain STU3. Your question goes back to that chart where I was saying what we call systems sometimes is a little bit misleading.

How does a STU2 (secure telephone unit) or a STU3 work? What it is is an instrument in a room, and that instrument is plugged into a telephone line, and in this case the autovon is a telephone line. Whether it's a scrambled voice, or whether it's a clear voice, it's still the same trunk being used.

Student: Yeah, see I was thinking of accessibility and priority preempts.

Toma: Well, you see there was almost no trouble getting into the theater from here through Autovon because of all of those trunks that were made available.

Student: I was just wondering when the thing started rolling and then all of a sudden . . .

Student: That's a good point. Some remember being in the Indian Ocean calling out on Autovon and getting cut off.

Student: That's what I was thinking about.

Toma: Whatever the call of completion rate was, it was much better to Saudi Arabia than to Europe.

Oettinger: Let's get down to the tank level.

Student: Some big boys' lines, you've got the flash overrides.

Toma: As a matter of fact on the big boys' lines what we had were really hot lines. If you were the director of operations, or the Chairman, and you wanted to talk to General Schwarzkopf, you weren't competing with any priorities, you had a hot line right to the theater.

But even for planners on the staffs autovon was very, very good because there was a large capacity available. As I say, the advantage of the STU3 is that it's a narrowband system that you can literally bring into the room, hook it up, and use it.

Student: I got to work a stint on the crisis action team and had to make several calls over there. I never once got a busy trunk or anything like a busy circuit, I got a few busy signals.

Oettinger: It also helps to have 6 months.

Toma: We were talking about that earlier before you all came in. We had a rather tremendous advantage in this case of being there from August to January before we really had to fight a war. What people were doing all that time was just improving things as they saw needs for them, so we were in pretty good shape by January.

You know we've made a lot of progress technologically in these last 10 years or so, talking about STU3s. What's a STU3? Have you seen one? If you've seen a STU2 and a STU3, that's more impressive. Version 2 was a telephone, but with that telephone you had a large box. STU3 is literally a telephone, period. Why? Because there's a little microcircuit board in the thing that does all your encryption. Probably, 30 or 40 years ago you had something almost like the thing you have in your museum over there to do the same job that that little microminiaturized circuit does, so that's why we can have STU3s today, and they really were a tremendous advantage in this case.

Almost all of our data and message networks are encrypted, and were encrypted in this operation. Some of the voice was still clear, and even for radios, like aircraft radios, we have a thing that's an applique, something you add onto an existing radio system and this is just a nickname for it, Have Quick, which was added to UHF radios, which enabled people in ground-to-air and air-to-ground communications to also talk with encrypted voice signals, which prevents the other folks from listening in. We had a much larger fraction of this Have

Quick available than we've had in previous combat situations.

Student: That eliminates that delay between keying and encryption, like in 28s?

Toma: Yes, there still is a little delay but it's very short.

Then there was the GPS (global positioning system), I'm sure you've read about this, it made a lot of press. The desert doesn't have many signposts and one of the things we learned very early on in Desert Shield was that people needed some help out there finding their way around. The GPS was designed to be a system of 24 satellites around the globe and at any one time you can see three or four and get very accurate positioning. In fact, today there are still just 16 of those 24, so you don't have total coverage, but we found that when the people first got over there, they needed these navigational aids and so DOD got approval to go out and buy commercially produced receivers for this GPS system, and these things got to be known affectionately as sluggers, (small, lightweight GPS Receivers), SLGRs. Thousands were bought off the commercial market and shipped over there so that all of the ground troops could use them. Some of the aircraft and other vehicles already had receivers for this system.

Oettinger: You think about the importance of the clock, the strategic advantage, of good clockmaking in the past versus this. Time — when you didn't have your watch you didn't know what the heck your longitude was and so on, and here you get your position. It's sort of mind-boggling. I tend towards cynicism, as you may have observed. But this ability to know where the hell you are is really remarkable. The other element though is physical benignness in the sense of that environment. I imagine that only happens if that stuff is not in place, so there's some unique features to the Desert Storm.

Toma: In some of these articles that have been written lately, people say they don't know why Hussein didn't move his troops further south when he first went into Kuwait. We probably would have been much more vulnerable if he continued on his way down at the beginning rather than giving us an opportunity to build up.

Student: That issue brings up what you talked about before, in terms of joint requirement documents, because GPS was one of those things that went through multiple iterations in terms of joint

requirements before they finally settled on building a joint box. That joint box weighs 25 pounds, nobody is buying it; the technology is already bypassed because you can do GPS integrated with I&S, or integrate it with Doppler. There are integrated systems out there on the market, so we spent all this time settling out what the requirements are, and then have a GPS receiver that's now basically outdated before it ever even got procured.

Toma: I hear those kinds of criticisms very often and I can just say that's partially true at least. I don't believe that's entirely true because if it wasn't for the support of those development efforts you'd probably never have achieved the technology that enabled you to get to the little slugger.

Student: Look at the spin-off that's going to come off of that thing because you can go buy one for your private aircraft before long. I guess Toyota or somebody is putting them in cars now. Yeah, you're tracking trucks with those things nowadays, with precious cargo or something like that and your navigational aids in commercial airports are going to end up working off them. And not just to the United States because the signal is free, to anybody in the world . . .

Student: Be like HBO and scramble it.

Oettinger: Measures and countermeasures folks. Wait until the next generation.

Toma: Let me mention airspace control in the Gulf (figure 4). I think publicly there've been some statements made about this single air tasking order. This is probably the first significant sized operation that we've been involved in where we did have a single joint forces air component commander who literally ran the air war — Army, Navy, Air Force, Marine Corps — controlled by the same component commander. I would call this one of the successes of the reorganization act of 1986.

Oettinger: Am I confusing this with another story that the particular air command centers then essentially picked up only that part that they wanted for themselves so that it did not have to be disseminated to every attack?

Toma: It was the order, parts of it were sent to those that needed that part, but the control, the plan itself, the tasking was done centrally, yes. Including naval aircraft. This was the first time that the Navy was told where and when to fly, too. One of the big criticisms of Vietnam and other operations while we

- Air tasking order for all forces
- Computer assisted force management system (CAFMS)
- Tactical Digital Information Links (TADIL)
- 386 Microcomputer
- Airborne Interface System (AIS) for JSTARS

Figure 4
Airspace Control

were flying three or four air wars, was the Navy did its thing, the Air Force did its thing, the Army did its thing.

McLaughlin: And SAC (Strategic Air Command) did theirs.

Toma: That's good, right. Four at least.

Student: I don't remember that as really new. I remember the North Atlantic exercises operating with the British, and the French, and the Spanish.

Toma: In some of the exercise we've done it, I don't think we've done this in any combat operation. As a matter of fact, this demonstrated the value of exercises and our combined exercises in NATO helped us to build procedures. Now, in some cases we couldn't interface automatically with all of these folks but we built procedures where all of the forces there (now this included Saudi aircraft, French, British, Italians) were controlled with a single air tasking order. I was just talking joint forces, but it was really combined.

You will find people arguing for more NATO exercises, joint exercise, combined exercise, so that people will learn these procedures and learn the value of having equipment that's common. One of the problems that we had in getting air tasking orders to everybody was not everybody had the same communications capability, like high-speed data links where you could transmit a long order in a short period of time. You can't tie up an HF link, for

example, for four hours to send several pages of air tasking orders, so those kinds of lessons, I think, were demonstrated to people.

This computer-assisted force management system that pertains to the air operations was a system developed by the Air Force which helped do this job. We've had the TADIL (tactical digital information links) under development for 25 years now, and they were used very effectively in this operation. You may have read about this: the Army had taken this 386 processor and put it on the front-end of an Army TSQ-73, it's called a missile minder, which directs Army missile systems. They put this on the front, kind of like a buffer, and this would take messages in various forms. Some of them were sent in voice and put in manually. Some came through tactical data links, but this was what was on the front-end of the Patriot system. The Patriot has a relatively limited range in terms of picking up targets. It wasn't designed to be a long-range interceptor or radar system, but our other surveillance systems and warning systems including national assets, could feed information into these data links and get them to the Patriots so that they could look for the targets when they came their way.

And AIS was a system used to enable JSTARS to get into the same tactical digital data link. But at any rate, these were some of our accomplishments in terms of getting the C³ and I systems to operate together.

McLaughlin: U.S. News and World Report, or some other source, said that within the first couple of weeks, for instance, the Air Force was sending more computers. Do you know the story I'm talking about?

Toma: I'm not sure I know that specific one.

McLaughlin: They decided they were severely underpowered when they started planning this air war and that they needed to automate targeting information that traditionally had been done on paper. . . .

Toma: Automated systems were used to varying degrees — AMPS, automated mission planning systems, there's one called MSS (mission support system). There were a lot of automated systems available but some of them were limited to the forces that had them and could employ them. Some were for Air Force fighter tactical units only and they weren't available to the Navy, and there wasn't a means of providing that information to the Navy. That existed in the intelligence area too. Again, you can't tie up channels for many hours. It's kind of like waiting for a long fax or something, but imagery is more so.

McLaughlin: I guess someone encapsulated it by saying you can't fly 2,000 sorties a day without having most of that stuff automated.

Toma: But we had more of the systems available than ever before, and that's not to say that they all worked together and everybody has them. That's what people are still working toward.

Student: Didn't DMA (Defense Mapping Agency) have all the digital databases? We went through a big hurryup to get that done, and aren't those now on optical disk? All you're really transmitting is the overlay feature; you're not transmitting all the digital data for the map.

Toma: Imagery is not necessarily maps, it's also pictures, for example.

Student: No, I thought we were taking the imagery and designating targets and then sending that information about targets off the imagery.

Toma: That's one way to do it, that's not necessarily the only thing that you want. You're talking about what people want now and what they need. Your judgment and mine of what they need might be different from what a person wants.

Student: What was going into these mission planning stations?

Student: Those already have the maps in them. All you end up doing is putting your coordinates, your IPs, all those kinds of things in there for those systems. Yours is a yes and no answer.

Toma: Let me give you a hypothetical thing. If you were an Army commander and you wanted a picture of some area on the ground somewhere that somebody had taken, that's imagery. That's not map or coordinate information. You want some pictures transmitted to you and that takes a lot of capacity to do that. You have another way you can do that, by the way. You can fly it over. Both of these were used.

Student: It's curious because it probably got the biggest workout in history.

Toma: Do you remember the figures? I think it was something like 800,000 pounds of paper was carried over there. I can't describe what that all was, but there was a lot of paper.

Well, I wanted to give you a picture of what went on in the C³ world there, and I want to wind up with a look toward the future. Both the Secretary of Defense and the Chairman have testified in Congress, and, remember, I talked before about strategic planning, what the Joint Staff does. There's been a lot of activity: What are we going to do in the future? What's the world going to look like? What kind of forces do we need? What's driving this: how do we reduce the forces by 15 or 25 percent and cut the budget so people have to look and say, "Well, what can I do without and how am I going to organize, to meet national objectives or mission requirements and still stay within the budgetary constraints that will be imposed on us for the next few years." This is what the Chairman and the Secretary have defined as their view of future force requirements. They see a continuing need for strategic forces, and that's bombers, missiles, submarines, and those types of things. They see a continuing need for an Atlantic force, some way of going over and helping our NATO allies if need be, or anything over across the Atlantic; our continuing need for Pacific forces and for a contingency force which could do any number of things — go back to Panama if necessary or who knows where else — Honduras, Nicaragua, El Salvador, somewhere.

Oettinger: What does that leave out?

Toma: SOCOM (Special Operations Command). Maybe they're a part of the contingency. So, there are some things. But at any rate, this is the Secretary's and Chairman's view of the baseline forces; we need these force capabilities. Currently people are looking at the unified command plan that's existed in the past. How does that need to be restructured?

Student: Excuse me, Joe, on that last one. Who would have fought the Gulf War under that scheme? The commander of the contingency force?

Toma: I think the contingency force rather than the Atlantic force, yes, as presently perceived. Some of those things imply that you have this first one for sure if you're going to reduce your presence in these various places. You're going to have to have a way of getting back there quickly. In Desert Storm, in the first three months, we made comparisons, like we moved more troops and equipment there than we did in Korea in three years. There's a continuing need for transportation capabilities, space capabilities. In addition to communications we use space for surveillance functions. Weather is very important to operations and navigation, and we've talked about that.

There's also a need for a reconstitution capability. That's not just reconstitution in the sense of pulling forces back together, but it includes industrial capacity, reserve forces, things like that. And we're focusing on research and development — unless we remain technologically ahead of other folks then we lose a major advantage.

Student: I have a quick question. You say two of the four elements are transportation and reconstitution. Two things which are always mentioned, reconstitution not necessarily, but transportation. Yet every time it comes to budgeting they almost always wind up at the bottom of the pile, big losers. Do you see that changing as a result of Desert Storm?

Toma: I think there's going to be more support in the near term but I think in the long term it will be like what you say, if there isn't a need, an urgent need in the next year or couple of years I think you'll see transportation slip again because we tend to do that — which is natural if you're having to cut somewhere.

Out of those requirements, our job is to make sure that the C³ systems continue to support those operational needs and those supporting needs. We see continued efforts in all of these areas technologically. We expect military satellite communications work to go on. You probably noticed a lot of publicity about this Milstar program. Another lesson learned from Desert Storm: just as we said that there weren't any forces that came south and interfered with our buildup, there also was no interference to speak of with our communications. So if people had been jamming us, some of these systems that we have could be very vulnerable to interference, so we expect to continue to improve systems, to be prepared to resist those things.

If you look at the DOD FY92 budget, you will see a relatively stable projection of funding, in the vicinity of \$20 billion dollars in the C³ area, largely because we're convinced in DOD that there is a need to continue these C³ programs, perhaps even more so as we pull back and reduce the size of some of the forces. We don't see a parallel reduction in the C³I capabilities. Now there will be some, and we probably won't initiate as many new programs. We'll probably try to upgrade current programs and take advantage of commercial systems to the extent that we can. But at least for the near future we expect to maintain spending levels and resources in this area.

Oettinger: Any last minute questions?

Student: I was wondering, back to the organization about CINC SPACE. Can you foresee the time when perhaps CINC SPACE will take over more of the operational control of communications, intelligence, operational intelligence, or has that argument been had, and is that over?

Toma: I think CINC SPACE will get more and more into operational control of space systems. The intelligence part that you're specifically mentioning, I don't think I can predict that.

Oettinger: You've got some people who think it should go on forever. Why that would be acceptable is hard to imagine.

Sir, You have done precisely what I hoped you would and wonderfully. And thank you.



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