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COMPUTER-BASED MANAGEMENT LOGISTIC SYSTEMS IN THE DOD

Brigadier General Joseph R. DeLuca, USAF

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Reviewed by Col E. J. Ingmire, USA on 3 March 1964.

INDUSTRIAL COLLEGE OF THE ARMED FORCES

WASHINGTON, D. C.

1963 - 1964

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INDUSTRIAL COLLEGE OF THE ARMED FORCES

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COMPUTER-BASED MANAGEMENT LOGISTIC SYSTEMS IN THE DOD

18 February 1964

COLONEL INGMIRE: During Unit V we've hardly had a lecturer from industry who hasn't mentioned something about computers. I don't think there was anybody who made a field trip who didn't see something of the use of computers in industry. Computers are also used in the Department of Defense very extensively and at a very accelerating pace.

This morning we have here to talk to us on "Computer-Based Management Logistic Systems," in the Department of Defense, Brigadier General Joseph R. DeLuca. He was "Mr. Supply Management" in Mr. Morris' office. He has been pulled off to be"Mr. Cost Reduction" for Mr. McNamara. And he told me that he is getting a great deal of support from the President in this field.

There is one area in which he has not been cooperating with the national effort. He has failed to realize the problems of our burgeoning population and the limitations we should have in demographic areas.

It is my pleasure to introduce to the class, General Joseph R. DeLuca.

GENERAL DE LUCA: With that kind of introduction I don't know whether I ought to speak. For two reasons I don't feel that I should be here addressing you today on the subject of computer-based logistics. First, I'm no longer in the area. That is, it's not my prime concern, and you get obsolete in a hurry in this area.

Second, I've heard some of your excellent OPs on this subject here, which was about two weeks ago. For you visitors, OPs are oral presen-

tations covering a subject in breadth and depth. I heard the critique over there and they did very well. So, with those OPs I don't know whether I can elucidate any further.

Those are the two reasons why I feel that perhaps I shouldn't be here. But, to balance the scale there are two reasons, probably, why I could be here. One is that the definition of a computer expert is a fellow who doesn't have one. Well, I don't have one, so I can talk as an expert.

Second, although Inge said something about population and lack of control, I really find that my family life follows the technology of computers. Over a decade ago the state of the art of technology of computers had to do with sequential processing; things were planned, orderly and batch-processed; you had a stored program and you got out of it what you put in, on a planned basis. Well, we planned for four kids and got four, sequentially. After that the state of the art went to random access.

The first thing I'd like to cover, you hear in the computer field the term "Analogue" computers and "Digital" computers; just a quick differentiation. An analogue computer deals in physical properties; it measures; it deals in continuous variables. It's kind of like voltage meters tied onto rotations, or r.p.m.s or pressure, or humidity, or density, or temperature; and these readings come in. The analogue digital computer measures in these constantly changing variables.

The digital computer counts. It deals in discreet, discontinuous data. That is the technical differentiation. A quick example, if a

city wanted to turn on its lights in the evening they could program with digital computers to turn them on at six o'clock, summer or winter. The analogue computer would be programmed to turn on the lights when it got dark - a fundamental difference. Or, with these same two computers, if a girl was walking down the road, the digital computer would come out with 36-24-36, and the analogue would come out with curves.

Now, each computer basically has devices that bring data into it, store data in there, process data, do arithmetic, control that data and then push it out. So, it's input, processing, output and control. Then, there are auxiliary equipments which help this process of input. You input through punched cards; you input through tapes - paper or magnetic; you can input through a typewriter. And you can come out the same way. Or you can come out on printers. Okay, so much for that. That's the background on the computer.

Now, what do computers do? Well, basically they process data; data processing pure and simple. To process data, obviously you have to generate some knowledge; some source document; you need a source document of some type; whether it's accounts receivable, accounts payable, a requisition, an issue slip, a gas bill or what-have-you; you have some source document. On that source document you have some element of data - a data element - a stock number, gross pay, a quantity shipped - there's a data element on there.

What do you do with these source documents and these data elements? Purely and simply you record them somewhere; you classify them; you sort them; you merge them; you update them; you calculate them; you summarize them. Into what? Other records; other reports. Why? The

only purpose of processing this data is because it's an aid to decision-making. It results in triggering some action. Now, the processing of data can be done manually. We're all familiar with 10 or 15 years ago how we kept records manually - people, pencils, paper. Then, mechanically; we came to the adding machine. I guess if I had to do that chart over I'd say electro-mechanical for things like desk calculators or plug-board punchcard equipment. Then we come to electronics which are the modern-day transistorized solid state computers.

Now, what's happening to us in the world, in the government; in Defense in particular? What's happening? Well, data is all around us. Just describing any one of you there is a mass of data. Just look at your 201 folder or anything else - your height, weight, education, training, the jobs held, potential, age, children. Data surrounds you as people. Data surrounds material. Data surrounds weapon systems. Data surrounds facilities; Data surrounds equipment. Data surrounds money. But what's happening? There has been an explosion of data. Well, you can process that data manually; you can process it mechanically; or you can process it electronically.

But, as Chiefs, or as leaders on command or staff, we have more data to worry about now. There has been an explosion of data. What we have now is, how is the data generated? What's the content of the data? What's the volume of the data? What's the diversification of the data? What's the flow of the data? What's the frequency of the flow? So, now as a Chief or a Manager or a Commander or an Executive, you have to have extracted from that data, intelligence or information to help you make

decisions.

Worse - or better - you have to make the decisions faster. They have longer-range implications. And they have to be reliable. So, the processing of data is nothing more than bringing to you the manager, the executive or the commander, whether it's in business or in tactical operations, data for decision-making - for actions. Okay. Now, it would be very simple if everytime we had an explosion of data surrounding any one of our resources we could hire a thousand more people. But you can't do that today. So, the evolution of processing data brings us to those types of techniques of processing data. That's why these things are data processors.

Now a little bit about the data that surrounds logistics. That happens to be our subject here today. Well, I guess you can see that. The Department of Defense today involves the management over $163 billion, of which $86 billion are weapons that are in use, or equipment - TO&E kind of stuff; $40 billion which are in the supply system inventories, the Army, Navy, Air Force, Marine Corps and DSA; and real property worth about $37 billion. We have four million items. There are over 6,000 activities that consume or use the materiel; a procurement program including goods and services is over $29 billion. There are over 800 activities buying goods and services. There are over 10 million contracting transactions, including under $2,500. There are over 48 inventory control points. There are over 212 depots worldwide.

The receipt and issue transactions alone - asking for something and getting it; logistic systems worldwide - 100 million transactions

annually. That's about 8 million a month; 2,000 maintenance facilities, etc. So, the point is, why do we have computers? Well, we're managing these kind of resources. They have data. So, we not only have to manage the resources well, we have to manage and process the data.

Who processes this data? Who is worried about it? Who wants the knowledge from the data? Well, I'm sure each one of you has worked somewhere in those places, and you've handled data. And if you go back there out of this school the chances are 9 out of 10 that that data is processed through a computer, either at generation point, at output point, or at some intermediate level in between. You will find automation; automation of the record, automation of the input; automation of the output.

Now, those are the whos. What do they process this data around? Well, we have, if you stay on the left-hand side of the chart, a business application, typically in those fields that I have up there. There are what we call "non-business" applications that use the computer, which are those on the lower left. But these are the ones this lecture is concerned with. We have computers processing all kinds of data on this logistics side, which is a business-type application.

Plans and programs; the five-year force structure and financial plan; readiness; budgets; authorizations; requirements; provisions; right down the line - figure control and test data. And I don't want to speak too lightly on these bottom two - models and analyses. This is an increasing application of putting your logistic things through simulation; developing policies through simulation; testing policies

through simulation; compressing time through simulation to determine if the policy would be effective, efficient and economical.

The Army, right now, has two good models working, on equipment in the Signal Corps and in Spare Parts Support, so that we could determine the readiness, availability and requirements. You crank in, just as in war gaming, the different conditions of escalation of warfare; what would happen to the support position of communications equipment on an end item basis and on a spare parts support basis. What does this mean to procurement programs? What does it mean to maintenance programs under condition-state of battle?

So, are we computer-based? Yes. Now, in a general sense the computers that are in the business side of all the computers that we have, you'll find that about 42% of the computers on a dollar rental basis are used in those categorizations; 42% in materiel; 7% in maintenance; 12% in financial; 7% in manpower; 19% in R&D; 9% in Ops and Intelligence; etc. So, computers are throughout the whole cycle of logistics, starting with R&D and working on down through disposal.

By the way, I'd like to make a point. Because the subject is so broad - if I may use the non-sex curve on this one - I'm going to weave in and out of a lot of high points. Within the question period we can give depth to them. But I just want to be sure that they're laid out on the table. I know in OPs you're told,probably, to make two, three or four points, but in this subject I'd like to make about 50 of them. Then you can develop them.

Why ABPS? Obviously I'm trying to get converts and I want to close a gap later. Why ABPS? Well, if you study anybody who has a computer

or why he got that computer, centrally these kind of answers will come out after you wash away all the romance. We want to maximize military effectiveness and efficiency. In management - I'm talking about business applications and not tactical operations - and in the use of resources we want to be responsive. We want to support the fleet. We want to support the maintenance line. We want to keep that airplane in the air. We want to keep that tank moving. Responsiveness to requirements, to readiness, to operations. So, it's the Great Es in the military - Effectiveness, Efficiency and Economy.

And no matter what computer you look at, when you're talking about economy you'll always find coming out that CUBEC formula. The computer will do it quicker; it will do it better; it will do it easier; and it will do it cheaper. CUBEC will always come out of the substantiations for a computer when you're talking economic analysis; not necessarily necessity analysis or performance analysis; but economic analysis will always come out CUBEC. Now, that B includes both accuracy and reliability.

Specifically, when you start getting into supply in particular, the reasons that come out are improved planning; better requirements; reduced lead time; controlled scheduling; minimized inventory; tighten the distribution and redistribution systems; controlled work programs; exploit the resources; know what you've got, where you got it and how much you've got. Manage the work-loads and be responsive. These are the attributes of advantages.

Now, there is a routine towards getting a computer. I've tried to

summarize them basically into about ten steps. I think you've had most of these in the OPs, so I'll just generalize. The feasibility study is pure and simple. You've got a data processing problem; how should you process that data - manually, mechanically, electronically, or don't process it at all? Is it feasible to use a computer? Or, how should you? What are the advantages? What is the cost benefit? Applications is an extension of the feasibility. If you get a yes on that feasibility, applications then, takes you particularly into procurement, or manpower, or requirements, or distribution, or something like that.

The systems spec is a description of your system; the things that I said about data; what's the data generation? What's the volume? What's the frequency? What's the content? How does it flow? You describe the system so that you can then put this system out on the market. To get computers today you have to go competitive. If, for some reason you can't go competitive, then you need a waiver. Then the manufacturer bids on your system and he attempts to bring a configuration of hardware and software to you to process your systems specification. Then there's an evaluation of the hardware and software, and there's a selection of the computer. Then you have to determine how are you going to acquire it. Are you going to lease it or buy it, or to pick up an advantage are you going to take an option to purchase and pay 1% of the rental cost extra, or something like that?

Then there's the problem of site preparation - getting the building; getting the pounds per square inch in the floor; getting the heat; getting the air-conditioning; getting the temperature and humidity controls, etc. Then when you've got all this worked out, including the

funding, there's the approval. I'd like to say just a thing here on approval. Up until September of last year, all approvals for computers in business-type applications came to OSD. Now that computers are, in effect, conventional equipment, you might say, the approval of computers that are secured through that lifeline there, by competition, are approved within the military departments. In other words, the Army can approve its own computers for acquisition; the Navy, the Air Force; DSA; DIA; DASA; NASA; can all approve their own computers if they got them by competition. If they didn't get them by competition, then they come to OSD and the reasons as to why the competition wasn't secured are evaluated.

Mostly the reasons why competition isn't secured is reasons of program urgency, shortage of time, not wanting to reinvest in programming, etc.

Then comes the readiness review about two months before the equipment is going in. A team from the department goes down and looks at the site to see if people, organization, data conversion etc. are in order, and then about a year later there is a performance check-out to see how the computer is running. But that's the routine of acquiring a computer today. How long does it take? It can take six months; it can take a year and six months.

How many computers do we have in the Department of Defense, non-tactical, or non-classified? Well, that's the investment in the Department of Defense by the end of Fiscal Year '64, taking into consideration those that are processed; some 1,145. Now, you can see how this

thing is blocking. There are over 50,000 people directly working on computerized data systems. This includes punchcard equipment. The bill is $673 million annually. So, it is big business. Now, that $673 million is made up roughly of about a third in rental cost. At least 40% in people cost. And the other costs that are involved are site preparation; contract services; supplies; and capitalization of gear that we're going to buy in '64. Anyway, it's a $673 million business in this timeframe.

Now, very quickly, who are some of the manufacturers? ASI--Advanced Scientific Instruments;CDC- Controlled Data Corporation; Digital Electronics; General Electric. That MIT is really Minneapolis-Honeywell; IBM; National Cash; North American Autonetics; Scientific Data; Sperry-Rand; Sylvania. Now, my biggest supply of computers was the guy who was ahead in the state of the art; the fellow who was turning quality products off the production line - available commercial off-the-shelf - and that was IBM.

In 1962 66% of the computers on a numbered basis that we had were IBMs. At the end of '64 IBM will drop to less than half of the computer installations that we have. Now, on a dollars rental basis IBM will drop from a high of over 80% to roughly around 55% of the dollars. So, you can see the competitive input; the hardware configurations that are available on the market today. This is going to create problems, which we'll try to develop a little later.

In general frames the central processing unit, if we're talking of a large-scale computer, will run about $50,000 a month. If you have to buy it it will run - this could be off 50% either way, depending on

which you buy, $2 or $3 million. I just wanted to put it in the order of magnitude because we may want to develop this a little later. A medium computer $15,000; and under a month, if you have to buy it, a quarter to a half million dollars.

Now, when you bring a computer into your command; into your installation; into your activity; things happen - they have to happen. Because, you're changing the way you process that data. So, command and staff, when they bring in ABP, the planning, the directing, the control, the evaluation of their operations are different than before. Some people try to tell you it's not; it's just a new way of processing data. No; there are skills, there are ideas; new people come to the forefront; there is displacement. A computer has limitations. It can't do everything. And computers don't think; they only think as good as we who program them think. They can only do what we tell them to; no more.

But they have tremendous capabilities that we don't have. They can store more knowledge than we can ever read. They can call it instantaneously. They can array it. They can use it. They can display it; more than any individual human or collection of humans can do. They can add, subtract, multiply and divide faster than 1,000 mathematicians. But it's a means; it's not an end. And in logistics sometimes the computers begin to take over. It begins to dictate the system. This is not the fault of the computer; it really was the fault of top management who, in effect, delegated the computer out for some reason, either because he was pressed with primary functions of a different nature, or because he didn't want to make the translation to the computer.

The computer will serve. It won't dictate unless you farm it away from you. Remember, the computer is what is processing your data. What is the system of your data? You have to, as the top executive or the top manager, control the computer, which means you have to understand it; you have to develop the knowledge and the intellect to run the computer from a system, from a policy point of view. You don't have to be a programmer. But too many of we 05s, 06s, 07s, 08s and 09s, have let that computer disappear. Okay, the tool of management is as good as the craftsman; I think that point has been made. Certainly, it brings realignment. There <u>are</u> organizational changes. There <u>are</u> functional changes; procedural changes; personnel changes; a different mix of resources have to come about.

There are costs for introducing the computer into your logistics system, but there are tradeoffs - tradeoffs, performance, availability of more data, better decision-making, faster decision-making, more reliable decision-making; not by the computer, but by the executive who has the data in front of him that the computer can supply. There are profitable payoffs.

Now, people. Most important in combat, in support, and in the management of data. When a data processing - let me develop this point first. All we do is process the data through this computer. When the data is processed in accordance with the data system - inflow, volume, content, frequency, report - from that system, top management and top executives get information. So, it becomes, really, an information system for management. And that's why the highest plateau on this thing is the management information system, which is made up of subs of data

systems which process data.

The key in all this is the management information system that supplies the top executive on performance, or results, or projections. So, the executive has to know his information system. What does he want coming out of this logistic system? The manager, of course, has to know both the information system, the data system, and the data processing technique. But executives and managers are more up there with policy. The systems analyst begins to be the bridge in articulating the policy of the executive, into a system. He does "flow-charting," you might say. He brings the system into visibility to execute or develop the policy of the executive.

The programmer takes the system and begins to break it out into more finite actions - block diagrams, logic charts. He has taken the highest policy, taken the system, and now put it into a series of little actions. If you get a requisition, do this; do this; do this; do this. He is beginning to translate the policy and the system into proedural ways of doing the job. The coder codes the programmer's work into language of the machine. The machine has to operate on its circuitry; it doesn't understand what divide means; it has a little key that pushes a few circuits in there when it divides. So, this fellow has to start talking in the symbolization of the machine. The operator, of course, runs the thing, and the supervisors and maintainers maintain it.

This is a new breed of people who are in here. And I'd like to divorce that for just a second and put it in these terms. What the computer demands of us is a matching of man and machine if they're going to

be worthwhile. It's the man-machine match that these people make worthwhile or worthless. The machine speaks the language of circuitry. And it has to be triggered in that language. Man speaks in the language of the alphabet - words - but he has to bring his words to a system and a procedure which is then coded into machine language. We're trying to bring an inter-face of man to machine.

Of course, as that machine is made, it has to be triggered in its language from inside circuitry. The executive, through policy and system, translates. This is why these two people are kings; the system analyst who brings the policy to a system, and the programmer who starts to make the bridge from English words to machine language - machine match, man match interface.

All right. Now, what's happened over the past 6, 7, 8, 9 or 10 years in the computer business? Well, initially, most of us, you know, we have a thousand computers in the system, and we picked up an immediate advantage, either in readiness or in economy. So, what we did at most of our computer installations is, we converted existing data processing systems to a computer. We didn't redesign these; these were our old manual mechanical ways of doing business. We did some engineering, but not totally, to get the best payoff from the computer. We converted the existing processes to ABP; we just went to a faster, quicker way of doing business. Well, that solved some problems of lack of resources.

So, what we found was that each local computer activity - and it didn't make any difference whether it was the Sacramento Air Materiel

Area, or the Aviation Supply Office. General White is here; he's the father of a computer in ATAC - Ordnance. In the main these ICPs, or these supply command control points, used the computer to convert their existing systems to automatic and did it unilaterally. They had some guidance from higher headquarters, but not too much and not too well.

So, what in effect we did, was we developed data systems and programs and terminology at the local computer activity, knowing full well that at a point in time our system had to get a better match between the system and the machine, and between where we sit in the entire logistic structure of our department or service. So, we knew that the longer-range thing was the problem. This period here was what one might call the "OUDAC" period, or the "OUDAS" period, meaning our own damned computer, keep your hands off; our own damned system, and keep your hands off.

Well, we've been through OUDAC and OUDAS, and now we're going to go a little higher. But anyway, this created inter-face problems. We developed from a data point of view, items of isolation in terminology; in programming; in form; in codes; in formats; in the use of the computer. As long as the co-relationship between our dependence was a part, it wasn't too bad. But the minute things happened in the Department of Defense, and we began to get closer on an inter-servicing basis, or single managers came up, or DSA came up, or we had a reorganization of the Army in logistics - and we had one in the Air Force; we're having one in the Navy; we're trying now to bring the inventory control points - the depots; the maintenance points; the shipyards; the O&R points; to-

gether under a single system, where the data is universal.

This gave us inter-face problems of all types. An Army fellow couldn't talk to a Navy fellow who couldn't talk to an Air Force fellow in the supply business. The identification program was different. Demands meant one thing; procurement meant another thing; purchase meant another thing; issue meant another thing; back-order meant another thing; ship meant another thing; CPM meant another thing. As somebody in the OP here said CE meant Corps of Engineers. Well, it doesn't mean that anymore. I notice they've kept Admiral Rose AFAF; that still stays the same, if I remember your OPs.

But that was unusual that the Navy kept AFAF in the coding system. So, we have inter-face problems with people; systems; data; codes; equipment. Air Force computers couldn't talk to Air Force computers. Some were in an IBM structure configuration; others were in a Sperry-Rand configuration. Not that there was anything wrong in each isolated AMA, but we couldn't exchange AMAs. But when we reorganized or tried to go to a weapon system approach, we began to find internal inter-face problems of management; of data; of codes; of forms; of programs.

When the single managers came into the business and the Navy and the Air Force had to requisition on the Army, or any other combination, every requisition that came into the depot became a special project because the thing was different; the codes were different; where you put them on the punchcards was different. There was no way for the Navy to requisition on the Army without the Army depot or inventory control point re-converting the requisition to set its input to its computer.

Okay. So, now there is a movement in this computer-based logistic system to where the system - and I'll develop this just a little later - the data systems and the programs by which we manage our hardware, are coming under central control. I'll develop this a little later. In other words, we are moving from isolated independence to a co-relation; to a coordination; to an integration within a department; to a better way of inter-communication across departments.

Okay. So, what's the movement today? Well, that's the movement. What are we doing? We're simplifying our systems. We're trying to standardize our data systems. We're trying to automate them. And we're trying to integrate them. And it takes talent to simplify; it takes time to simplify. We can't make it at the pace that's being demanded of us. Look what it took to install MILSTRIP - tremendous universal standardization data in everybody's computers or everybody's mechanical or manual systems.

Now, when you get the data standardization, which is the revolution which is in our logistics business right now, you come to hard work; you have to pick your data element. What is a receipt? What is a transfer? What is an issue? What is a consumable transfer? What is a non-consumable transfer? You have to start defining this within the Army; between the Army and the Navy. This develops definitions; this develops glossaries. Then, once you know that data element - receipt, if nothing more - you code it. Now you get into all of your alpha, numerical, digital, graphical symbolization. Then you have to format it; you have to place it in a form, like your income tax form,

or your W-2 form; it's blocked; they want certain things in certain places. This calls for standard forms. That's why you see this cascading number of forms coming out; these DODD-type forms.

And this leads you to rules and procedures. Computers bring discipline. Computers demand at point of generation, accuracy, quality and input. Otherwise it's the old saying, "garbage in, garbage out." If you put junk in the executive will make his decisions on junk.

Provides? Well, that's self-explanatory. Obviously, if you can do all of that; you standardize your data elements; you reduce the many different kinds of codes you have for the same thing; you save programming time; you save costs; etc., and you improve your inter-face.

Well, this is the movement that's on now. Now, there have been some Defense-wide systems - and I use these purely as examples, because the Army, Navy, Air Force, Marine Corps, DSA, are all doing the same thing within their systems. They're trying to bring their ICPs together, or their shipyards together, etc. But these are data systems that are universal. They not only include we in the Army, Navy, Air Force, Marine Corps, etc., but they also include our MAP countries. They also include industry. They also include the civil agencies from whom we get support or to whom we render support. So, these things spread and it's a universal standardization of data.

Now, you had these in your OPs so I'll just highlight them; MILSTRIP, standard requisition issue procedure. A few years ago if we had a Navy unit that wanted to requisition on the Army, or any combination, it was most difficult to get in there form-wise; format-wise; code-wise; without

disrupting this guy's input, and then without him having to convert to the requisitioning activity input. So, this was done. Well, now, no matter who you are or where you are you can requisition and receive standard forms, formats and codes. This is a requisition slip, an issue slip, a follow-up status, a cancellation status; and we have codes that say "I am this kind of a document" - a document identifier; "Route me this way. This is where I want to go. Ship here. Bill here; this federal stock number, etc."

Then, of course, one had to have a companion to that, which was the materiel issue priority system. Here every activity is categorized by where it fits in the battle plan, whether it's the in combat, near combat, to support the combat, in training, in reserve; and then an urgency of need designator - "I need it because I have an airplane deadline," or, "I need it for routine stock." And so, he who requisitions; he who processes; he who ships; he who receives; are all working off of the same time-urgency-mission characterization.

Now we're trying to move the property under a standard system. So, anything that's being moved in a Defense-oriented movement - rail, air, ship, highway - will move under a standard documentation system, instead of the dozen or so that we had before.

MILSTRAP is the reporting accounting procedure. And this is so that the ICP and the depot can talk the same language on their inventory going up or down; increase in inventory due to receipts; increase in inventory due to adjustments; decrease in inventory due to shipments; decrease in inventory due to financial adjustment, etc. A standard

data element, a standard code; this is under development.

MILDIP is that data interchange program between the industry or the contractor and the procuring, provisioning military activity. What we had before, as the industry developed its own line item configuration in terms of data. It had data banks. Then it compiled this into manuals of some type - an integrated parts breakdown, a production run, etc., and that manual came over to the Army, Navy or Air Force procuring activity, who, in turn, had to break it down into cards, tapes or something. But now we say, "Set up the data bank for the procuring activity; set up the data bank in the producing activity; use standard forms, formats and codes; and for provisioning, for technical item description; for due-in reporting; for design change notification;" when this guy makes the change on his card all he transmits is the change; not the whole physiography; and that thing is impulsed here correct here for this bunch of data banks working together, and you reduce all that mish-mash of flow in the wrong binding before.

MILSTAD is now that we're communicating - this is under development - won't be implemented until the end of next year. MILSTAD is the standard activity address directory. I said we have 6,700 consuming activities. All this is, it's a standard way of addressing each activity in the Department of Defense. It's to sift out the new line code symbolization; the state of the country that he's in; the service that he's in; the installation that he's at; and the activity within the installation that he is. So, it's just like you have a social security number, every activity on every installation in every state or country, in every service, will have a standard address tag up in that building where you can

communicate.

Under development, standard billing and selection. Other characteristics under development; this is cataloging, provisioning, interchangeability, substituteability. Rather than saying "I will describe this chair as a chair, auditorium, folding, cushioned, metal bottom, with arms, etc.,"you start assigning codes to standard terms. So, you can screen new item entry, inter-changeability, substituteability. When a design engineer wants to know if he wants to use a resistor with these parameters, you pluck out of the machine the controlling parameters and you arrange before him what is already in the Department of Defense.

Ideas in concept, in development, not here totally. It's your standard way of measuring the performance of wholesale logistics. The using activity requisitions something; he has it; how long does it take moving through the process?

Now, these are just some key points that are happening inside each of these military services along data processing; data systems; management information systems. In the Army, the chief, of course, for data processing or computers, is the duty policy official in each service; in the Army, the Secretary for Financial Management. The Army has just opened up here last November the Assistant for Information, and eight assistants. General Landrum reports directly to the Vice Chief of Staff.

Mission, development, integration, control, standards, data, information systems - Department of the Army. It's a rough job. The highest level of recognition of systems, the loose thing we've been talking about this morning.

General Besson, now that he has the seven technical services, has split them into seven commands, you might say, five commodity and two service. What did he inherit? Well, this is a real live example of the problem we've been discussing; 69 computers; at least seven different supply systems. Not only is the Army reorganizing its logistics organizational structure, but in doing that they're reorganizing their data system; their information system. They're reducing your ICPs from 11 to 7. They're shrinking their depots from whatever they were to something else, which I have currently now forgotten. They're eliminating their middlemen, like their overseas supply agencies. They're taking out of the depots the stock control function and bringing it up to the ICP with their supply control function; tremendous changes without even talking about the data system.

But here he has 69 computers now, each items unto themselves, and he has to redesign this so that he has a standard data processing with inter-face in requirements, procurement, maintenance and distribution. So, AMC, the Army Materiel Command, has a five-year plan. '64 is the concept year; they design configuration here. '65 is a conversion of data year. '66 an implementation year. '67 a refinement year. '68 AMC plans to be integrated operationally; standard data system; standard equipment; standard computers; standard programming; standard data - five years.

Our probe is trying to bring to the top level of the Army a management information system that is standard and integrated for planning, for programming, for budgeting, for analysis of operations; all one thing. The Navy, the same thing. The Administrative Assistant to the

Secretary - the senior policy official in the Office of Program Appraisal under Admiral Kaufmann, is doing the same thing as AID is doing - De Sanda - two marvelous programs in the very thing we've been talking about; standardization of their stock points. The stock points in the Navy - the six stock points in the Navy - have all gone to an IBM 1410, 1305 man to match this configuration. The ICPs to the UNIVAC configuration.

So that, the Navy for its four ICPs and its stock points has a beautiful inter-face. In fact, if you go up to ASO, which has been maligned more than any other ICPs in the Navy, is now reconstructed. They can tell you where the assets are; how much; what's in maintenance; when it will come out; and interrogate from Admiral Fields' office, in effect, and find out where it's at. Standard ICPs; standard stock point systems.

_____ is trying to crank the same thing into the seven O&R points; overhaul and repair points. Their system now is in the specifications stage and going out for manufacture proposals.

BUSHIPS, the same thing. For its remaining shipyards to be determined, we'll have a standard production, materiel, labor, control system.

The Air Force, by the way, is going UNIVAC. This is under specifications. UNIVAC is the ICP and IBM is the stock point. The Air Force senior policy official for this data systems information system, financial management in the Air Staff, Military, General Grossman is the Director of Data Automation, which covers everything. All nine AMAs have gone through an IBM 78 configuration. 152 bases in the Air Force

are going to the UNIVAC 1050 configuration, starting in September, I guess, at the rate of 10 a month, so that by December '65 all bases of the Air Force will have one standard configuration; standard system; standard data elements solving the inter-face problems.

The Marine Corps the same thing; going through UNIVAC at the ICP in Philadelphia - the two supply centers. Down beneath there is DSA.

DSA on a miniature basis has the same problem as the Army. They supply centers, three single managers, with different equipment configurations - IBM, Minneapolis-Honeywell, RCA - different programs; and they're trying to standardize and come up with a systems spec.

These are the key points that are happening. All right. While General Starbird was here I guess he discussed this with you. Data processing you do at your computer activities. Obviously you need something to feed into it, and you need to pump it out. Communication is very important. _____ with its incremental jumps going through, in effect, nine switching message centers in the U. S. and ten overseas, connecting all Army, Navy, Air Force, Marine Corps and DSA agencies - the civil agencies, contractors, and MAPs eventually, so that we can communicate instantaneously. Within six hours, when the system works totally, even routine messages should have passed.

Another thing that is being worked in service tests with audit in is an automatic address so that you, the customer, don't have to know where in hell we guys who try to run the logistics, move property and organizations; you put your stock number in there; a master table knows where that stock number is now being managed, and you don't have

to start looking at stock list changes to find out; an automatic address system using the document identifier, the stock number, etc. But communication is key; it's vital to data processing and data transmission. It's just like transportation. This moves the data. Someone has to move the property. That's why transportation is vital. You've got to wire in computers for processing, automation for communication and automation for movement of the materiel. Otherwise, you get the data moving fast but you don't move supplies.

I won't have time to develop these; I'll just go right down the line. RAMS was a study here about a year ago; ahead of its time. It created a flurry and there are a lot of ideas in it now that are being implemented on a piece-meal fashion basis. It served its purpose. Standardization I've already covered - equipment, data and programming.

Software is the most important thing in this whole thing that we've been talking about. Hardware, as you know, is the configuration of equipment. Software is all those techniques; all those processes; all those systems; all that documentation; all the programming; to get that computer to work for you. For every dollar we invest in hardware we invest at least $2 in software. It's the programs; it's the systems; it's getting the computer to work for you, your way. Cobalt, the man-machine magic. The machine works on its code for circuitry; man works on his codes for the English language, trying to bring them together.

Cobalt is a way of programming a machine on a common business language approach where you say, "Clear this. Add gross payroll. Subtract income tax. And that machine will take those English words; you have

the translator in the machine - the interpreter, so to speak, which interprets that into zoom, zoom, zoom, and it does it.

ASC - the American Standard Code Information Interchange. These machines,working on this circuitry, transmit this data all in different bit forms - which I won't develop - quinary, bi-quinary, octo, six point, seven point - a combination of impulses which either reflect a one or a two or an A an ampersand or a slash. It has been rough to communicate even between the technical circuitry of the machines, because the electrical impulses meant different things in different data processes and in different transmission belts.

Now through the good graces of the American Standards Association and all the users and the equipment manufacturers, there has been a standard that comes out that says things will be processed in due time; it takes standards time to mature and be converted to in a seven bit form, which will represent 128 characters.

Utilization; the problems in the computer business - are we getting the best use? Part of that is computer sharing. There is a heavy emphasis now to buy when it's right to buy. There's a formula. It involves the equipment you've had; how long you've had it and what it cost to buy. We also have here almost over a thousand computers the contractors are using. They have all the same problems that we have, and so there has to be an in-look into this.

Reutilization. Computers are becoming conventional. They're going to be treated on an inter-service basis to get the best use for the government on whatever trade-in or equity we have developed in the com-

puter, in case we're going to replace it or declare it extra.

There is a house-built 5171, which I won't develop, which in effect says, "This business is getting so big in the federal government; it's a multi-billion dollar business. We have all these problems and therefore we ought to have a head house looking out after these problems." That Bill in the House says that head house ought to be GSA; that it ought to have coordination and control over at least purchase, maintenance, operation and utilization. Obviously, all us big users don't agree with that. We don't mind the administrative control over lease and purchase, or over utilization and maintenance, but we don't like the words "operation" and "control."

The words were stricken from the bill but the language remains the same and so there is some controversy over it. As a result of that, another part of the House - the Civil Service Committee - that was the government operations committee - immediately solved the situation, after due petition by a number of people. They immediately wrote a letter to the President, in effect saying, "There is much controversy in this computer field, on combinability, standardization, data elements, how you run it, who buys it, who sells it, and all that kind of stuff. Before any legislation comes out which we feel is premature we feel that as President you should exercise your duties as the Executive and tell us what the facts are."

"We ask you to make a study, report back by June 30th, and cover all these things in the Executive part of the government; authorization, responsibility, how to organize, how to determine what's required, what

you're doing about standardization; lease purchase, utilization, re-utilization, where you think you're going, etc." So, the President commissioned the Bureau of the Budget to make this study. It is now underway and it will be a significant bench-mark bellwether in this whole problem we've been discussing. It's due to come out by June 30.

The last point - concepts. I've only tried to make two or three points in all this rambling. I think I'll say it just this quick. The computer is here to serve we managers or executives. It can only do what we tell it to. There is a gap between the executive in the Department of Defense in understanding data processing; worse still, understanding data systems; worse still, understanding management information systems. We've got to bring this gap together.

There is the problem of the man-machine match, to keep abreast of evolution. In summation the only point I would make is that the computer properly used is it's hindsight, it gives us insight, and it gives us foresight. Its purpose is only to optimize our management and the use of research.

Thank you.

QUESTION: General DeLuca, you indicated that the gaps between the computers and outstanding personnel lay in the training. Does the military, or do the academies have any new approach to that?

GENERAL DE LUCA: That is a very good point. That is what is trying to be developed now. For all the future officers the curriculum will include computers, their makeup, how they're used, how they serve - ap-

plication - business and non-business. So, all Second Lieutenants coming out will automatically have it. The Army, Navy and Air Force now have opened up airmen training programs in the use of computers - a three-month course - related primarily to understanding the computer and how to program computers. This is the main emphasis at the airman level; how to program; how to operate; how to maintain.

At our level, the 05s, the 06s and the 07s, a very concerted effort to get us to go to refresher schools, either military run like these joint logistics courses, which will have a course in there on computers, or to manufacturing places. And as Admiral Rose just reminded me during the coffee break, every new Flag and General Officer coming into the Washington area will automatically as part of his briefing in process receive a week's training at the Navy school that is being set up to begin to close this gap which is considered so important.

So, in summation, the enlisted level, user level, officer level, etc., the primary emphasis will be on data systems, programming; and on the executive level, how to extract the computer to give you knowledge to make a decision. If I turn it around, as an executive are you sure your policies are being implemented through the computer? Can you use the computer to further extend your policies? That's the kind of training - across-the-board. So - emphasis, programming, data systems.

OSD and the services are each opening up schools in coordination.

QUESTION: Sir, I'm concerned about this class of people we are creating, such as systems analysts and programmers. Actually, he is more becoming the guy who is really designing things and making tremen-

dous decisions all along the line. I wonder what your views are. How are you going to control that?

GENERAL DE LUCA: It's a very critical and crucial point. It is true that the systems analyst and the programmer can, in effect, usurp control. Why does that happen? Because we who should have control have defaulted, avoided or pre-empted, or delegated it out. We gave it away. So, what's the correction? Not to inhibit or shackle those systems analysts; you want that knowledge; you want that creativity and productivity that's in there. The point is, to pour in to us, the executives and the managers, the requisite knowledge to use the systems analyst as the bridge for our policies.

So, the deficiency is in us. The correction has to be us and it means inspiration and perspiration and knowledge.

QUESTION: Sir, I'm very concerned about this great trend toward standardization, or how to use a machine for a technology four years old. Are we building ourselves a standardization like we did with the 03 where we won't be able to take advantage of the non-clerical needs in five or six years, by just a default of investment?

GENERAL DE LUCA: No, I think not. Because, I think if we go through this evolutionary thing that we're doing - you see, standardization in many people's opinion is a bad term. But no; I would look at the standardization that we're talking about here in data elements, in data systems, in being able to configure a computer whose software works for you universally, regardless of the manufacturer, are not things that are going to inhibit us from the new technology, but things that will allow us

to exploit that new technology without encroachment underneath.

So, I think that standardization - which is nothing more than better communication - will allow us to optimize the improvements of that kind.

QUESTION: I want to reach the stage where we can go out and tell a man to build the machine we want.

GENERAL DE LUCA: You're damn right.

QUESTION: I want to take the machine instead of the, say, the programmer, coder, etc., as we're doing now.

GENERAL DE LUCA: We can that better the minute all of our abilities are marshalled toward that point. Because, right now we have disequilibrium, if you follow me, in telling the man in the industry what we want. We have diversification. I'm not against business, but he tries on this diversification - this disequilibrium. If we bring ourselves together this doesn't mean we've got to reorganize, but it does mean we speak the same language.

We bring, then, our demands for capability full force on the industry. That's what that one code did. We're so tired of not being able to communicate; and everything we do has to be reconverted. Certainly, you fellows ought to be able to do this. So, we have pressure because we work together.

QUESTION: You mentioned at least one program which effect the practice between the DOD and industry. Would you comment on the implications of this with regard to competitive free enterprise system in which competition in managerial practices is involved?

GENERAL DE LUCA: From a socio-economic point of view I would not

enter the field. But this thing of just being able to communicate; does it effect capabilities - competition? In fact, if anything, it forces competition. Because, the way you put it on the scale on these points of communication, is the same for all. So, his differences in capability in order to compete and survive have to be in areas other than where all can do well. So, I think it forces competition. I don't know if I got your point.

QUESTION: Yes, you did.

GENERAL DE LUCA: Of course, I'm a believer and therefore I'm biased.

QUESTION: General, my question concerns the maintenance of these machines. How successful are we being in training our own in-house maintenance people who go to IBM, and once they're trained, how are we going to keep them?

GENERAL DE LUCA: We're not doing too well; that's the answer to your first question. Of course, for the first part of the problem we have a curriculum for operator training, but we're not doing too well. This is why we're still staying with a lot of maintenance in-service training contracts. So, the training isn't productive right now; that is, if we use the standards we'd like to use. And the problem of rotation where he moves out is going to give us the same problem in maintaining the computer as you have in maintaining weapon systems.

The only answer I can give is a generalization; we've got to do more training and we've got to make the career field profitable for the people who have those tasks as careerists. Or, we have to be in a better bargaining position for the contract thing. I can't answer your question

because, we do have the problem and the record will show we are deficient. We understand it and we're trying to force people in and keep them in, but they move out faster than we can train them. That's why we're contracting.

QUESTION: In our move toward standardization of means of communication as to the different computers, I get the feeling that we are doing as badly with the technology there as we were doing before with color television. There were about six types of systems that worked different ways and they had to make a decision as to what they would finally do. Has a decision been made as to what we are going to do?

GENERAL DE LUCA: You mean on the technology curve where are we as far as production and implementation?

QUESTION: Yes.

GENERAL DE LUCA: On this inter-mix, technology-wise, I'd say from a production curve, to get this into implementation so that we don't have to go through conversion, we're at least two or three years away. It's this year's conceptual, configuration, policy acceptance, but not resource orientation which hasn't come. And by the time you lock in your labor and your materials and your plant, you're a two or three-year lead-time away.

But that's why we must keep the pressure on, you see. Now, in this standardization here, some of the lead companies resisted the standardization and held up. And not until Defense, which is the biggest user, said, "Okay, we'll take you head on," did that company buckle.

QUESTION: Sir, recognizing the great importance of these things in our logistic system, it also looks like we're becoming almost 100% depend-

ent upon them. Thinking of the wartime protection, the wartime risks; for example, the possibility that one man with an incendiary grenade in his pocket could put a whole system out of order and thereby render our whole system almost helpless, what are we doing, if anything, to try to protect ourselves against such an eventuality?

GENERAL DE LUCA: This is a big risk. I don't want to develop the point too long, but given the conditions that you said - and if we're only talking of one installation, this isn't too bad. Immediately you can patch; you can fix; you can re-orient; if you did your continuity planning well you had a relocation tape for computers or you had the data somewhere else and you pump it in. I think if it's one isolated strike in a computer or in a transmission belt that geographically is localized, the patchwork that communications has in auto-dan - auto-bahn - the elimination of private communication systems in the Army, Navy, Air Force and Marine Corps - which I'm sure General Starbird must have talked about - will give us restoration capabilities that are fast; as long as you are talking about isolated activities; there is no problem.

Or, if that fellow has to revert to manual, if he can get into the irradiated area, he does it. Now, the big problem, of course, is where you change the conditions of the parameters of destructiveness, and now you're right back to no matter what kind of continuity planning you did, if you wipe out a large sector you're in that type of a war and therefore you've suffered that loss. I would be the last guy to say that tomorrow we'll have that computer or that power or that transmission working. That thing is out of action; it's gone.

But, you're in that kind of a war. So, I will not reinstate restoration by words. You escalate the conditions of destruction and the problem gets worse. But, as I said, you're in that kind of a war.

QUESTION: Is there a clear division as to where the automated part overseas stops, at what level, etc., etc., and where the old-fashioned manual practice comes in?

GENERAL DE LUCA: Right now the overseas installations' depot structures are going computer. In fact, both the Army and the Marine Corps are in test phase on mobile digital computers, or direct support units. In the case of the Army it's the Moby Dick Ordnance and Signal; special vans, special computers, right on the spot.

In the case of the Marine Corps it's a conventional van with 1401s, I think. But, it's going right down to the support unit. So, I think that aside from the supply man right in the combat unit, everyone else will be computerized.

QUESTION: Sir, on the other side of this structure that you just talked about, how high does it go? What capability, in other words, will the top man have?

GENERAL DE LUCA: I would say that that top man will have interrupt, pre-empt, and connection capabilities - very definitely. So that, he can quiz any computer in the system. I mean, we're doing this now. The ASO system, he asks any one of his installations, "What have you got?" And I think you can move that up further. The auto-probe system of the Army in effect will cause a computer command to serve the Army right at Army staff level. In fact, General Wickham's outfit, the information and data

systems command, serves all of the Army staff except logistics.

So, I'd say yes, your computer people working in things like planning, programming, budgeting, force structure, financial plans, etc., will have a remote capability to query and ask, certainly.

QUESTION: How about on the Secretary level?

GENERAL DE LUCA: If McNamara remains - yes.

COLONEL NORMAN: General De Luca, thank you very much for bringing our lecture program for this unit to a fitting climax.

GENERAL DE LUCA: Thank you.