



DATA TALK

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FUTURE DATA PROCESSING IN THE EPA

Willis Greenstreet, Director, MIDSD

Before I get into the 1980's ADP Procurement Program, I want to look a moment at ADP in general today.

Machine speeds are increasingly determined by interconnect distances, so that a four-fold circuit speed improvement translates, at best, into a two-fold improvement in machine speed. To achieve significant increases in computation speed and reliability (such as the major EPA applications require), we must change the general architecture, and perhaps the programming and solution structure.

The architecture must be changed to add more parallelism, but this will mean higher costs. We must "tune" the machine structure to the specific EPA problem solution, and "detune" for general use. "Tuning" must be interactive with the problem solvers (the numerical analysts, physicists, meteorologists, etc.). We depend upon their special knowledge and foresight for the solution methodology of six to ten years hence.

EPA has a great investment in established methods (file and data formats, compiler peculiarities, etc.), and is increasingly precluded from experimenting with a new system which significantly changes user methodology. Speed and reliability improvements employ more complex assemblies of hardware and software than those EPA has currently. The design control methods must be sophisticated and complete. This translates into longer development time, and hence greater costs. The costs to investigate a new technology may ex-

ceed the total of EPA's past computer development costs.

To summarize, today the development of the 1980's resources will require a long time and a close working relationship between industry and EPA, especially in the conceptual and developmental stages. Because of circuit complexities, coordination problems, and sophisticated design control methods, this development may take longer than in the past, and the cost will be very high. The incentives, however, have increased for private enterprise to participate.

The existing U.S. Government procurement policies and methods for large computers require competitive bids. The Government employs a "fly before buy" policy, in other words, a full-blown demonstration of the large computer network before they commit to a purchase.

This requirement seems reasonable, but in the past the Government approached the procurement of large computer networks in the same manner as they did for a mini-computer. They wanted to buy large computers off-the-shelf. They wanted to look up the next buy in the GSA schedule. They wanted to pay a volume production price for Unit #1. They expected private enterprise to spend several million dollars or more for a developmental system just to have the opportunity to qualify for a bid. Any company that failed to qualify or qualified and failed to win was out several million dollars.

I can assure you that no one in industry could play this game for very long. For-

(continued on pg. 2, col. 2)

DIRECTOR'S CORNER



Willis Greenstreet

A few weeks ago, I addressed the EPA Conference on the 1980's ADP System Acquisition and Implementation Program (SAIP). Sam Brown asked me to make some comments for the kick-off of the conference and a copy of my introductory remarks is included in this EPA Data Talk. The conference introduced the Agency to SAIP. The consensus was that the emphasis on reliability and maintainability in the program was proper. I am confident that the new government procurement policy for ADP resources (OMB Circular A-109) will allow us to obtain highly reliable ADP resources in the early 1980's.

But what about from now until then?

We have made extensive improvements to the Univac Data Center which was fraught with problems in its early years. It is now operating at a satisfactory or better level.

The capacity of the IBM Data Center seems to be adequate since the installation of the IBM 3032 processor. However, the usability and user satisfaction of those resources have yet to reach my expectations. The Telecommunications Network is still not fully operational or dependable even though we're almost two years into the contract. We still have many dedicated high-speed lines separate from the Network.

A few months ago, I transferred responsibility for the IBM Data Center/Network to Sam Brown. He has established a group in Waterside Mall to manage that contract and hired Curt Lackey from Region IV as Project Officer. Since this is currently our biggest problem area and Sam is personally spending the majority of his time on the 1980's program, he has detailed Don Fulford to Washington to work full-

time on-site at COMNET. Don's main objective is to perform an overall review ranging from operations methodology, to user serviceability, to general management. Don will evaluate whether we can realistically expect any significant improvement. If so, he will prepare a plan to accomplish that and will be given full authority to execute it. He will also advise Sam concerning the adequacy (growth capability and user serviceability) of these resources to serve our needs until the 1980's.

SAIP can provide the more reliable resources required in the next decade.

GREENSTREET (cont. from pg. 1)

Unfortunately, our Government has realized that they will have to support the development of large computer networks in the same way they have supported major defense industries. For example, our Government recognizes the prohibitive expense facing private enterprises in the development of advanced aircraft. They further recognize the risk of advancing the state-of-the-art and the uncertain success of the final product. Consequently, over a decade ago policies of "fly before buy" were introduced. This urge to "kick the tires" before a production commitment is desirable and clearly understood by industry. The great expense of advanced aircraft development results in a Government policy which fully funds multiple sources during development and operating prototype phases. True competition--another desirable process--occurs in the testing of the prototypes with the winner receiving a production contract. He does so only with moderate risk. But, more importantly the loser also has faced only a modest risk. He survives as a business to compete again and to contribute to the security of the country through advancements in the state-of-the-art and has a chance to win the next round.

The Government's new computer procurement process has borrowed a page from the books of major weapons system procurement policy. A phased procurement will be employed in the development and construc-

tion of future large computer networks. The procurement will have four phases.

Phase 1. Definition: A number of parallel system design contracts will be issued to qualified companies. The goal will be to clarify and define the requirement through discussions between the would-be user and the would-be designer.

Phase 2. Design Contracts Option: Several companies from Phase 1 are funded with follow-on design contract options. Designs are specified as completely as time and resources permit, and the problems to be solved are similarly defined more exactly to minimize the risks during the construction phase. In this phase, the design must be verified to the greatest extent possible, using the specified design criteria. Current simulations techniques can achieve this.

Phase 3. Demonstration: A full demonstration of the major prototype for each final design is performed. Even though only one design will be selected by the contracting agency, I suggest that there will indeed be two winners--the so-called loser may decide to invest the necessary funds to complete his new design for other purposes. In any event, there certainly will be two complete, new computer designs.

Phase 4. Implementation: A winning design is selected and an implementation contract is awarded. The selected vendor completes the engineering, builds, and installs the system.

This approach differs from the analogy to the military aircraft procurement in that "building the hardware system" will include a great deal of off-the-shelf equipment. Yet, a configuration for specific criteria and the building of special-purpose interfaces requires high technology systems expertise.

I realize that risks for both the Government and the supplier will still exist. However, by containing the risks, the main obstacle to attracting the key industries is removed. There will still be

no great profit in these stages for industry, but at least the risks are no longer unlimited, since much of it is funded by the Government. Thus, high-technology systems enterprises will participate.

In summary, times have changed. Major advances in computer performance and reliability will no longer come from circuit improvements alone. As a result, a large computer network will have to be "tuned" to the problem in order to achieve maximum performance and reliability. Past Government procurement practices were not attractive to the only resource capable of developing reliable large computer networks, that is, high-technology systems enterprises.

The old policies prevented industry from developing highly reliable technology. With the new policies, Government and industry in the U.S. can cooperate and advance technology for the benefit of both.

I believe what is needed in EPA's 1980's program is a dedication to cooperation between the program manager's office, the computer industry, and you, the user. With the expertise we've put in the program manager's office and your know-how in applications, a large computer network with 100 times the present performance and reliability is achievable, and the stage is set for performance even beyond.

LIKE TO SEE YOUR NAME IN PRINT?

If you have an article that you think might be of interest to the ANP community, or if you have photographs of interest, please submit them to the EPA Data Talk office. You will receive full acknowledgement for any items used.

1980's SAIP CONFERENCE

Mike Steinacher

The first Agency-wide meeting on the 1980's ADP Systems Acquisition and Implementation Program (SAIP) was held in Research Triangle Park, North Carolina, on October 4 & 5, 1978. The purpose of the meeting was to give program management and ADP system managers the background to SAIP, its current status, and near-term plans. The conference was heavily attended.

Willis Greenstreet introduced the conference and welcomed Agency personnel. Sam Brown presented the background and charter of the SAIP. He then presented current status and near-term plans. Mike Steinacher presented an overview of the acquisition process under the new policy of OMB Circular A-109. Don Worley presented some of the detailed considerations in EPA's requirements.

Three projects have been initiated under the Program. Each of these were presented by the contractor performing the project. The Systems Development Corporation is developing a security/privacy study and compiling application system descriptions for a Data Package to be released to interested contractors. The Computer Sciences Corporation is performing a documentation assessment on application systems. An Arthur Young/-General Electric team is developing reliability/maintainability factors for a Life Cycle Cost Methodology which will heavily emphasize the programmatic impact of poor data center reliability.

A Management Advisory Committee (MAC) with general managers at the Division Director level or above was established with representatives from across the Agency. The MAC is composed of:

- Sam Brown, Program Manager
- Willis Greenstreet, Director, MIDSD
- Bill Mathis, Director CMD
- John DeFord, Director, OA, RTP
- Bill Benoit, Acting DAA, OA
- Herb Barrack, Eastern Regional Representative

- Doug Shape, Central Regional Representative
- Mike Anderson, Western Regional Representative
- Bob Neligan, Management Representative, Air
- Bruno Vasta, Management Representative, Toxics
- Ned Notzon, Management Representative, Water
- Brian Molloy, Management Representative, Enforcement
- Randy Shope, Management Representative, R&D
- Marylou Uhlig, Administrator's Staff

A SAIP Technical Assistance Committee (TAC) was also established. ADP representatives from across the Agency attended and will be the primary group to assist the Program Management Office in requirements definition, evaluations, etc. While continuity of membership is important, membership in a group this large will vary throughout the life of the program. About the only requirement for membership is full-time permanent employment at EPA, mainly in ADP. However, total membership will be controlled by the Program Management Office so that activities can be pursued in an orderly fashion. The TAC is presently composed of:

- Regional ADP Branch Chiefs (Region VIII absent)
- Mike Platt, Personnel System Manager
- Sam Conger, Storet System Manager
- Jim Hammerle, SAROAD System Manager
- Elgin Fry, Pesticides System Manager
- Don Thie, Grants System Manager
- Tom Martin, Drinking Water System Manager
- Linda Tucker, Mobile Air, Ann Arbor
- Jerry Slaymaker, Stationary Air, RTP
- Jerry Nehls, R&D, RTP
- Bob Browning, R&D, RTP
- Mickey Cline, R&D, Athens
- Paul Thorpe, R&D, Las Vegas
- Bob Andrews, R&D, Duluth
- Jon Broadway, Air, Montgomery (absent)
- Jim Chamblee, Water, D.C.
- Mitch Cumberworth, Air, Ann Arbor
- Rosanne Light, OE, D.C. (absent)
- Tony Jover, Toxics, D.C. (absent)
- Ed Nime, ADP, Cinn.
- Bruce Rothrock, ADP, Cinn. (Absent)

Kent Smith, FMD, D.C.
Edward Milch, Air, D.C.

Additional attendees, other than the SAIP staff, at the meeting for general assistance purposes were:

Chris Larkin, Budget
Jean Wilkinson, ADP Budget
Morris Yaguda, MIDSD
Ken Byram, MIDSD
Peg Hall, MIDSD
Joe Fallica, Cost Analyst, SAIP
Steve McNamara, Audit, D.C.
Doug Richmond, Contracts, RTP
Jerry Schuller, Contracts, SAIP

Both committees will be formally chartered by the Program Management Office as the acquisition process continues.

The first meeting concerned information/-status reporting, and that objective seemed well accomplished.

ADP BARRIERS OVERCOME

Jerry Miller, Region 5

Human beings are always about one-thirtieth of a second behind. It takes us that long to get sensory data from the real world to the brain and make information of it.

EPA's managers are also always behind. Events occur with startling rapidity and the data they generate are often converted to usable information too late for timely decisions and actions.

We in data processing have spent our professional lives attempting, often futilely, to shorten this time lag, to massage data into information fast enough for it to do some good.

We are making a little progress. New programming and systems analysis disciplines have helped. I think, however, that new and improved tools are our only hope.

The PDP-11/70 minicomputer, together with the INFORM Data Management System, is one

such tool. Excellent tools, as carpenters and mechanics know, apply to limited situations and problems. A screwdriver is a poor tool for driving nails. PDP-11/INFORM is no different. It is effective only when used for the right applications, such as small to moderate tracking systems.

It removes many of the old barriers between the user and his/her data, and thus decreases the time lag we are struggling with.

One barrier which virtually disappears is computer system unreliability. The hardware and software seldom fail. Another broken barrier is speed. Most users interact with the system over hard-wired lines at 9600 baud with excellent response time. INFORM then supplies an immediate window into the data. Yet another barrier which separates users and their information is programming. PDP-11/INFORM does not remove this barrier, but does significantly lower it. Users can enter, look at, modify, summarize, and analyze data with surprising ease.

It's a good tool, as yet underused in our region. We intend to change that in coming months.

RELIABILITY -

THE PRIMARY REQUIREMENT OF 1980's DATA CENTER

Sam Brown, NCC Director

Who would board a large commercial airline jet which, despite several hours of preventive maintenance every week, had an almost certain probability of a catastrophic airborne failure within a few hours?

Why do we expect so much more reliability with an airplane than a computer? They aren't any more expensive! They are not even kept in a special environment. It's just as intolerable to allow the collection of gadgets we call a computer to

possess unreliability as it is to allow the collection of devices we call an airplane to possess unreliability. We expect perfection in an airplane. We allow a small degree of minor problems such as poor lighting or air temperature but not total airplane failure. I expect the same from the contractors competing to design and provide our 1980's ADP resources - the simple perfection of no system failures.

The most vital requirement in the acquisition will be that the resources continuously operate even though a component fails. The priority of this requirement grew out of the maturing of EPA ADP uses from heavy batch processing to the increasing interactive operation - which is becoming wide-spread and will be even more so in the 1980's with vital programs dependent upon ADP resources being available upon demand. ADP system failure in the 1980's environment will have a devastating impact on EPA program effectiveness. Because of increasing dependence of EPA programs on ADP systems, reliability is the paramount objective in the acquisition program.

In EPA's 1980's ADP Acquisition and Implementation Program (SAIP), emphasis will be centered on three cornerstones in priority order:

- o Maximize Reliability & Maintainability
- o Optimize Quality Assurance
- o Minimize Total Life Cycle Costs

In support of these areas, long term action is being taken to modernize and tailor EPA specifications and acquisition strategy to ensure reliability. A major project has been initiated to:

- o Make a comprehensive determination of the reliability and maintenance factors which impact the EPA ADP environment.
- o Implement extensive reliability and maintainability initiatives to make a huge and noteworthy impact on the ADP acquisition in

order to dramatically improve the availability and usefulness of these resources to the EPA programs.

- o Develop a Total Life Cycle Model with the major emphasis on reliability.

In government ADP acquisitions conducted to date, these fundamental steps have been lacking. Total emphasis has been placed on computer capacity and lowest purchase/lease price. A proper acquisition program is now possible under the new procurement policies (OMB Circular A-109) and EPA's acquisition program is designed to achieve:

- o Reliability and Maintainability
- o Quality Assurance via Demo (show me before I buy)
- o Minimum Total Life Cycle Cost (not purchase price)

The three main mechanisms being emphasized to accomplish these objectives are:

- o Evaluation Criteria driven by Reliability Factors
- o Total Package Testing Before Award
- o Top Management Attention

From the outset of SAIP, with reliability specifications and contractual requirements, it will be necessary for contractors to orient their managerial and technical organizations to religiously pursue the reliability objectives. They will have to enter into a type of failure-free warranty wherein they will be financially encouraged to produce the most reliable system possible and stand behind it with responsible service. We will concentrate on reliability at the start vice trying to develop it after award. The ability of a corporation to compete in this new environment will be measured by the quality of the system produced and the reliability it demonstrates in the service environment. Front-end investment in engineering,

development, demonstration, and logistic support are a must since we intend to maximize the gains available in total life cycle costing of the EPA ADP acquisition.

Secondly, full prototype testing of the actual system will be performed before EPA awards a final contract - no paper designs will be procured! The testing will be total, oriented toward EPA's mission requirements and heavily weighted on the reliability objectives.

Under this approach, testing will be examined as a total package with each test element clearly defined, assign, and integrated among appropriate activities. All too often, testing (benchmarking) has lacked central direction, coordination, and purpose oriented toward comprehensive objectives. Integral to the EPA acquisition process will be a system designed to ensure that each system discrepancy is identified, categorized, resolved, and weighted in selection considerations in favor of significantly improved reliability.

Finally, top management attention will be brought to bear with the Administrator making decisions at key points through the acquisition process.

A new day is possible under the new procurement policy of the Office of Federal Procurement Policy. We're going to achieve it. We ain't gonna accept mediocrity no more!

USER ORIENTATION SEMINAR TO BE ENHANCED

John Staley, SDC/ISI User Services

The orientation seminars, begun in July for new users of the major EPA data centers, have proved an effective way to inform the uninitiated about the data processing services and facilities at their disposal. However, the presentations have revealed that their information needs go beyond the "new" users of the centers.

Beginning with the seminars at NCC User Services in RTP on November 14 and at WCC User Support in Washington's Waterside Mall on November 21, the orientations will be presented in a new format. The morning session will be a broad introductory overview of both the WCC and the NCC. The afternoon session will go into more detail about information needed to actually run various applications on the two systems. This format was chosen to accommodate people with varying degrees of data processing expertise and experience. While the morning session will be useful to anyone who will use the data centers, those who neither need nor desire detailed information may choose not to attend the afternoon session.

MIDSD and the user support organizations of both WCC and NCC have been pleased to make the orientations available to the EPA data processing community. We feel the planned enhancements will make an excellent program even better.

For more information about the presentations and registration, contact Sherry Hix, NCC User Services, at (919) 541-3648 (FTS 628-3648), or Pam Stephens, WCC User Support, at (202) 488-5900.

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Comments and suggestions are solicited and should be addressed to:

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REGIONAL DESK

Jack Sweeney

The new fiscal year promises an increasing trend by the Regional Offices toward the use of minicomputers and computer center facilities management contracts. Currently Regions 4, 5, and 10 are successfully operating PDP-11/70 minicomputers and Regions 8 and 9 have recently purchased/leased this minicomputer. The remaining regions are either completing or have completed feasibility studies and, if adequate funds are available, minicomputers will soon be operational in these regions. The minicomputer is proving to be a valuable tool in the regional offices. Its use promises not to undermine the large central EPA computers and national information systems, but rather to more efficiently use the central com-

puters to improve the quality of data in the national systems.

The increasing demand for regional computer center services and the inadequate in-house staffs to meet this demand are resulting in facilities management contracts. Currently, Regions 2 and 9 are employing Computer Sciences Corporation under the DM&O contract to operate their computer centers. Regions 1 and 3 will be implementing similar arrangements this fiscal year, and several EPA laboratories have or will implement similar contract orders. The Region 2 task order includes seven persons providing keypunching, key-verifying, computer operations, and production control services from 7 a.m. to 7 p.m., plus documentation and basic programming tasks. This region has received quality services under this contract and recommends this approach to other regional offices.

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