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# INVENTORY CONTROL—EXPLOITING THE ELECTRONIC DATA PROCESSOR IN THE AIR FORCE

By

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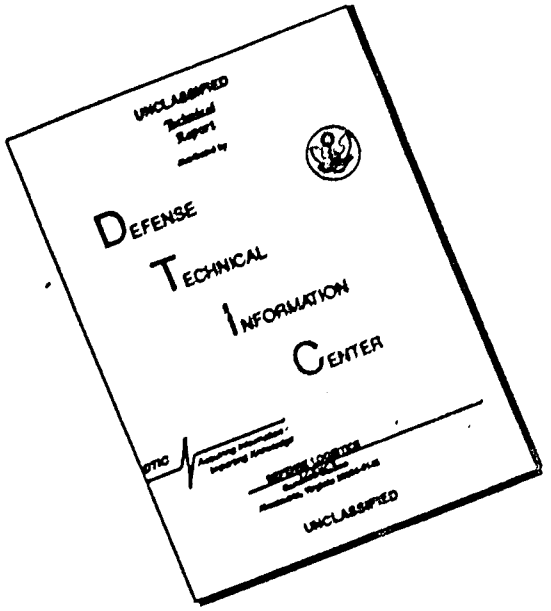


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# INVENTORY CONTROL---EXPLOITING THE ELECTRONIC DATA PROCESSOR IN THE AIR FORCE

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## Introduction

Inventory control quite naturally becomes a prime candidate for EDP assistance inasmuch as inventory control is very much a problem of information control and information analysis. In a business as large as the US Air Force, the mountain of information involved demands at least rapid posting to ledgers for satisfying the bookkeeping requirements of the business, but also requires complex analysis for accomplishing the management function. High speed, large capacity, logically programmed data processors satisfy both these needs.

Integrated data processing, using EDP, provides the means for information aggregation and analysis for the volume of activity anticipated in a major logistical system within a time span that preserves the value of the summarizations. As implied by the term 'integrated,' this approach commits an organization to recognize the interdependence of the many operations in which it is engaged. Even for the manager of inventory (a small but vital facet of the total logistics picture) posting swiftly all

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transactions at all of his stockage points, thus maintaining up-to-date stock balances, is not sufficient information with which to analyze his asset condition. There must be available to him back-up knowledge of system procurement status, existing program requirements, due-in balances, and outstanding obligations owed to other accounts, for it is the whole of this knowledge, plus other information, e.g. the existence and the status of interchangeable or substitute items, which makes for a true understanding of a system-wide asset position.

The EDP application discussed here is that of inventory control of the materiel supporting two major aircraft of the United States Air Force. A single point logistical support concept is in operation for these weapons. All bases flying these aircraft requisition spares from a Weapon Support Manager, who is responsible for the logistical support of these craft. Although the management is centralized, the support materiel is strategically positioned at storage sites throughout the country.

As an indication of the magnitude of this operation, the planning was geared to recordkeeping and analysis of 100,000 items, and an expected daily world-wide transaction load of 20,000 communications from bases to the Manager. The records are kept as magnetic tape files, which are scanned and processed at speeds which enable the entire 100,000 item inventory master file, for example, to be reviewed in less than two hours. The EDP for which this program was planned is the IBM 705-II.

The functions of Air Force inventory control which are part of the program to be described are: 1) Input Data Control, 2) Substitution and Allocation, 3) Transaction Posting and Management Review, and 4) Due-in and Shipment Control. The underlying difference between managing Air

Force stock and managing commodities in other large businesses is in the requirement to respond to the mission of the customer; the Air Force logistician must take the 24-hour alert support demands into account in the overall system design of an inventory control operation.

Input Data Control

In discussing the recordkeeping procedures and management review operations applicable to managing properly such a logistical system, we must keep in mind the need for complete knowledge by the manager for timely information relative to his system assets, repair schedules, consumption data, due-ins, etc. The data flows affecting the logistical system are between and among bases, storage sites, contractors, other Air Force depots and the Data Processing Center (DPC). In order that the DPC be capable of supporting the information requirement of the manager, all activity affecting the system, wherever it occurs, must be reported to the DPC; this is the first step in insuring that the records being kept for the manager are adjusted to reflect current status.

A system utilizing EDP, although capable of processing large masses of data with tremendous speed and accuracy, is exacting in its demands. Input data required by such a system for maintenance of records must be accurate factually and in format or the system will not produce the desired results. Such centralized management control, geared to operate with transaction information communicated from remote bases, cannot be installed overnight; it must be phased into an existing, dissimilar environment and new procedures must be learned. The problem of insuring the receipt of accurate transaction input data for processing at the manager's DPC becomes crucial, particularly at the early stage of implementation. The

lack of mechanization at an input originating location generally means that transactions are either 1) prepared on handwritten forms at the source for later transcription to high-speed EDP input form, or 2) prepared in EDP input form at the source, where it will be an encumbrance upon the normal workload of the base.

One important aspect of Input Data Control for any EDP operation, therefore, must be data checking. Two kinds of checks must be made; one is related only to the information on a single transaction; the other is concerned with verification of the completeness of a group or batch of transactions communicated to the DPC. In both cases accuracy is the general reason for checking; in both cases the data processor itself provides the most capable instrument for accomplishing these checks.

1. Editing the Input to EDP

Single transaction verification is called editing. This includes both error checking and rearrangement of data formats. The former promotes accuracy in the data flow to the EDP and the latter is necessary for processing convenience. The systems designer does not always have complete format control over all of the desired inputs to his system, but usually has the ability to recognize and rearrange data facts on transaction communications originated outside the system.

Programmed EDP error checks include:

1) Requiring the presence of given fields of information on transaction of a certain kind.

2) Range testing information fields against known upper or lower limits.

3) Validity checking, using a table of known acceptable values, all

the key fields.

Batch controls, such as a transaction count, a control total, serial numbering of the transactions in a group, and the restriction of each batch to a single source organization, are necessary to insure that complete, correct transmission of transactions takes place. A centralized recordkeeping process demands that all transactions affecting centralized records be received by the DPC. The omission of transactions, or the inclusion of foreign reports results in erroneous centralized records and impairs seriously the supply effectiveness of the logistics system.

Because this input data checking is a first step in the EDP operation, the manager of the inventory control application is assured that every required check is applied without fail. Routine checks are made rapidly, and judgment-type checks are programmed to the limit of the ability to state them logically; only those exceptions which cannot be conveniently handled by EDP are manually edited. Finally, and most significantly, data errors are detected before they result in file garbles or undesirable logistical system reactions.

2. Screening and Distributing Transactions

Input Data Control functions do not end here. What has been said up to now is equally applicable to any EDP operation: no knowledge of the kinds and number of files maintained is necessary for the editing checks to be made, nor is the purpose required to be known to which the processing equipment will be applied.

The screening and distribution aspect of inventory control requires a stock-number-sequenced file to be maintained for every item of supply which has ever been designated for control by the Manager. This data file is used

in comparison to each incoming transaction in order to insure that the given stock number and its related data are technically correct, applicable to the Manager's control system, and compatible with the records as they are currently being identified at the DPC. Furthermore, management control rules applicable to particular stock items are identified in this file, and transactions are either blocked from further processing or have management action codes addended for cognizance during the processing cycle. If necessary, transactions are distributed to particular processing cycles only, or through particular functions only, or are withheld from processing until after having been thoroughly reviewed by the Manager himself.

3. Indexing Transactions

An important additional use of this file is the indexing operation. In the hundreds of thousands of items of supply in the Air Force, many items are so similar both in design and function that they are completely interchangeable. For the purpose of procurement and identification they have different stock numbers and are catalogued and stored separately. But they are managed in the inventory as a single item. The indexing process is the step necessary to identify these groups of related substitute and interchangeable items. It assures processing through the substitution and allocation function of the inventory control operation (which, it will be seen, is not necessary for any item for which no substitute possibility exists) and guarantees that any analysis of management required statistics is done on this grouped set of parts.

Substitution and Allocation

In any inventory control process there seems always to be the problem of critical items. These may be items that are in short supply for the

known or expected needs of the system, or they may be items which have such a high value that allocation procedures rightfully replace routine supply rules. In the Air Force there is the additional problem of assuring materiel is available to fill requests from bases which have more urgent need by virtue of either the mission of the base or the supply condition that base finds itself in, as compared to others of the same mission. This implies the need for a procedure for allocating spare parts so that the desired equitable distribution of stock will occur.

1. The Subfamily

Since there are certain substitute relationships existing between many of the items, management of the inventory takes these into account when allocating critical items. To do this requires a data file describing the interrelationships that exist between and among the parts, and giving the useable balances of these items in the system. In addition, stock monitoring levels and rules for withdrawing stock to the limits of these levels are established for each subfamily. A subfamily is defined as a set of parts which are completely interchangeably for all applications of these parts.

2. Stock Monitoring Levels

In our application, four stock monitoring levels have been established for the purpose of controlling issues of critical spares. In the substitution and allocation function these same levels are established for each subfamily in order to protect the entire subfamily of parts. Without subfamily levels it would be possible to fill a low priority request for Part A, of itself in sufficient supply, only to discover this part to be needed later as an interchangeable for Part B, which is in critical supply and for

which a high priority request is received.

3. Required Substitutes

The substitution and allocation function performs an additional stock distribution control operation. The Air Force continually seeks to improve its effectiveness and operational capability and therefore supports product improvement programs which serve this purpose. Consequently, the supply system finds itself with interchangeable parts with only quality differences between them. Millions of dollars of useable inventory would be made obsolete unless some procedure could be established for purging the admittedly less desirable parts for those usages which could tolerate the lesser degree of quality. This again is a problem of allocation, and the data of the substitution and allocation file carries indicators which designate these parts as required substitutes. Requisitions for any member of the subfamily are automatically filled in the EDP operation with the stock number of the required substitute, wherever feasible. The importance of this forced usage of satisfactory parts in an Air Force inventory application should not be underestimated.

4. Accumulating Logistical Statistics

In addition to controlling critical item issues, subfamily grouping of parts enables the accumulation of consumption, demand, and other required management statistics in a more meaningful context. Data gathered and analyzed by this logical grouping are expected to yield requirement factors, procurement quantities and repair schedules, to mention a few management reports, which are more representative of the actual needs of the Manager. Any current asset report, submitted either regularly or whenever the stock position reaches one of the family or part stock monitoring levels, also

includes all members of the subfamily.

Transaction Posting and Management Review

An inventory control process is based on a record of inventory and a set of rules with which to effect stock movement into and out of storage locations. With EDP we are able to keep on magnetic tape files balance information and management review codes for each item controlled by the Manager consolidated into a single record which includes all the locations in the system. Thus, a complete picture of each item, regardless of its condition or its location, is available to the data processor whenever stock management rules are applied by the EDP.

1. The Master File

The Master File consists of the entire set of consolidated records, one for each part. Each record carries three groups of information required either for effecting posting and review, or for processing convenience; these are Fixed Indicative Data, System Summary Data, and Location Data.

A. Fixed Indicative Data

Basically, this consists of catalogue-type information, such as stock number, procurement source code, dated-item codes, etc., and shipping information, such as cube, weight, unit of pack, etc. The index number, which allows the identification of subfamilies of parts, is not a part of the Air Force catalogue, but it does accompany the stock number of a consolidated record that is being managed as a member of a subfamily.

It is obvious that shipping information is needed in order to have the processor create a shipping order in answer to a requisition from a base, all management conditions being satisfied, but determination of whether

or not these conditions are satisfied depends on the elements of catalogue data included in the record. Differential processing for different segmentations or categorizations of stock is a powerful technique that is routinely and consistently accomplished in EDP whenever these special characteristics are programmed for computer recognition.

B. System Summary Data

Within this section of each consolidated record are maintained the System Stock Monitoring Levels, which are used, in comparison with current system assets, in determining whether a system shortage or excess exists. So significant to this inventory control application is the concept of using these monitoring levels, that we shall describe this operation in detail even before a more complete discussion of transaction posting.

(1) System Stock Monitoring Levels

Requirement Level -- that level of stock for the entire system such that no system replenishment action is needed when system stock status is above this amount, and a routine replenishment cycle will bring stock to the desired system amount if it is initiated when system stock falls to this level.

Warning Point Level -- less than RL, indicating expected routine replenishment has been delayed. This is the first warning of impending criticality.

Allocation Level -- less than WPL, indicating allocation of materiel to high priority needs only, while other types of requisitions are back-ordered.

Reserve Level -- an amount of stock held for special release only. Coded approval of the Manager is required to draw stock to below

below this level.

It is only by including these monitoring levels that major stock review functions of the inventory manager can be accomplished by EDP. As transaction posting to the consolidated record takes place, continual stock status review takes note of the latest inventory condition within the system.

For processing convenience, System Summary Data includes totals for all conditions of materiel. Comparisons with the System Monitoring Levels is facilitated if serviceable assets held at all storage sites in the system are carried in a summary total. For this purpose the following summarizations are established:

(2) System Summary Balances

Serviceable Summary -- stock positioned at any of the storage sites of the system which is ready for issue to a using location.

Due-In Summary -- stock moving into the system; these are assets soon to be available to satisfy requisitions and are included in the analysis of system asset position.

Due-Out Summary -- an existing backlog of unfilled orders of all priorities.

The above quantities, when compared to the System Stock Monitoring Levels, tell the Manager if the stock is at a satisfactory operating level. Defining the System Stock Status as:

System Serviceable + System Due In - System Due Out

we have a value to be compared to the monitoring levels. Before any shipping order is written by the EDP, the System Stock Status is recomputed and compared to the Stock Monitoring Levels to determine whether or not the originating requisition has high enough priority for the shipment to be

affected. Furthermore, if a shipment is made, causing the System Stock Status to cross one of the Stock Monitoring Levels, a complete listing of the consolidated record for this item is produced for management attention, and a transaction is created which will later cause a listing of the schedule of all materiel due into the system from outside sources. All members of the subfamily will be included in this listing.

Completing the set of information in the System Summary Data of the Master File are Reparable Summary and Work Order Summary balances which give the Manager a picture of the materiel in unserviceable condition which is either available for repair or has already been scheduled into the repair cycle.

C. Location Data

For each of the storage sites under the control of the Manager, balances of serviceable and reparable stock and balances of items reserved for special projects are recorded and posted against as transactions affecting them are processed through the EDP. A Stock Control Level is carried with each set of location data. When the Manager receives a notice of system short supply, this Stock Control Level tells him the latest computation of each storage site's desired stock position. Any replenishment is then scheduled into the sites in accordance with these levels.

2. Transaction Posting

We discussed the necessity for transaction reporting in a centralized recordkeeping system without indicating what kinds of transactions our inventory control operation requires. We have stated the necessity for all reports of balance changes in the system, but implied in any EDP operation of this scope is a large file maintenance job. Transaction inputs are also

required to adjust the various pieces of management data in the many files which support the separate functions of this computer application. The following list is a set of transaction types reported to the DPC that are necessary for adjusting the DPC files to correspond with reality.

Transaction Notices Which Change Balances

Inventory Adjustments

Change of Status, e.g., serviceable to reparable

Receipts

Shipping Directives

Requisitions

Reversals of Previous Balance Change Transactions

Transaction Notices Relating to File Information

Insertion of a Complete Record

Deletion of a Complete Record

Catalogue Data Changes, e.g., price, stock number

Level Changes

Requests for Information

Within each of these categories there may be several separate transactions which the processor must recognize, e.g., inventory adjustment of a serviceable balance, and inventory adjustment of a reparable balance. The detailed planning for each processing path in an EDP is very exacting in its demand that none of these transaction possibilities be overlooked. The description which will follow will not be of the individual transactions flowing into the DPC, but rather, of the general types. The reader should extend these descriptions, especially those for file mainterance changes, in order to account for 55 separate transactions required to make this

application operate.

A. Transaction Notices Which Change Balances

(1) Inventory Adjustment -- a revision required to bring the records in balance with the physical inventory. Reasonable tolerance limits are established within which adjustments will be accepted; otherwise management action is required to determine the cause of the imbalance. For this, and for all other balance changes, both system and location balances of the consolidated record are changed.

(2) Change of Status -- since all conditions of stock are maintained in the consolidated record, any transfer of materiel from one condition to another requires a transaction to indicate the balances affected. Frequently serviceable materiel is withdrawn from issue until a modification is made. For the time it is undergoing modification, a suspense balance is recorded. This is accomplished by a change of status transaction.

(3) Receipts -- incoming materiel increases balances on hand and decreases due in quantities. Variations which add to the total kinds of receipt transactions are: a) items coming from contractors, b) Air Force shipments from depots, and c) trans-shipment within the system from one storage site to another.

(4) Shipping Directives -- a device for allowing management-originated shipments, either as a result of special approval procedures or as a result of urgent requisitions communicated by telephone or radio.

(5) Requisitions -- this is the primary action-originating transaction communicated to the DPC by a base. The action taken in answering requests from the bases or the repair facilities depends on a number of variables all of which must be considered with each requisition. The urgency

the demand is perhaps the most important. In the Air Force this is expressed on a requisition in terms of the mission rating of the requesting unit and the days remaining before the item can be used. But one must consider this urgency in a relative way, else stock might be issued out of turn. Of course, this is not serious if there are ample issuable stock in the system to satisfy all priorities of demands, so the total system holding, regarded in terms of the total system requirements, is another factor which must be considered when answering requisitions.

(6) Reversals -- a simple error-correcting procedure which allows for undoing EDP action which had occurred incorrectly for any reason.

B. Transaction Notices Relating to File Information

(1) Insertions, Deletions -- allow for the expansion or contraction of the Master File as a routine processing step concurrent with balance posting.

(2) Catalogue Data Changes -- in a centralized recordkeeping system it is imperative that the Master Files be the most current record of price, stock number, unit of issue, and every item of data required for a complete and accurate logistical computation. Recognizing that there may be time lags in bringing the many scattered base, storage site, and depot records to current status, the EDP application must be designed to change transaction information that is incorrect. This has been discussed as a part of Input Data Control, which has its file made current by Catalogue Data Change transactions.

(3) Level Changes -- as requirements for inventory change due to variations in plans and programs, stockage objectives also must change. Especially when there is a complete and consolidated record giving the

entire asset picture for the whole system, Stock Monitoring Levels should be responsive to requirements changes matched against known stockage position. Management review results in transactions which update the Stock Monitoring Levels either periodically, or as a result of action taken after a system short supply condition had been noted by the EDP and communicated to the Manager.

(4) Requests for Information -- a means provided for interrogating the Files in order for the Manager to view information not to be available soon enough from a routine report; or, a means of providing an information flow on an infrequent basis in lieu of a full periodic report. Since report printing is the most time-consuming operation of a DPC, a Request for Information, coded to enable the EDP to extract specific pices of information, serves the purpose of the Manager and at the same time relieves the DPC of what might be an overwhelming time burden.

C. Sequencing Transactions for Processing

It is important to note that the Air Force operates on a 24-hour day and that transactions are communicated with the DPC around the clock on high-speed transceiver equipment. The question then arises concerning the order in which these transactions must be processed and the frequency of processing. Although requisitions are received throughout the day, shipments to the bases are on a routine Military Air Transport Service schedule. There is obviously some period of time before the scheduled departure of these flights where the batch processing of requisition transactions is feasible. For the present, it is believed that the highest priority requisitions may be batched and processed into a shipping order with a two-hour batch cycle, while all other transactions are processed in a single 24-hour

batch cycle.

The sequence of introduction of transactions into the 24-hour, or major batch, cycle is of some interest. Since the files are arranged in stock number sequence, the major breakdown arranges all transactions into this order. Then, if there is more than a single input for any stock number, a further sequencing must take place. Actually, the only critical order from the balance-keeping point of view is that of placing receipt notices before requisitions and shipping directives. However, the complete rule states that all file maintenance transactions for a given stock number precede change balance transactions, and that within change balance inputs, the order is:

(1) Receipts

(2) Reversals

(3) Inventory Adjustments

(4) Status Changes

(5) Shipping Directives

(6) Requisitions (including previous Backorders)

Finally, for equitable stock distribution, the Requisitions and Backorders are ranked in accordance with mission rating of the requesting unit and the days remaining before the item can be used. Then, if allocation procedures are to be invoked, the proper distribution of stock occurs through the use of the Stock Monitoring Levels.

3. Outputs of Master File Processing

The outputs of Master File processing are either reports or action notices. Although some of these reports are not explicitly published documents, they must be included, since the use of the Request for Information

make available timely management data on an ad hoc basis.

A. Reports

(1) The Master File -- From the point of view of the Manager, this file represents a continuous report providing him with detailed documentation of his asset position for each item in his inventory. On a regular basis, e.g., quarterly, some categories of stock will be reported completely in accordance with Air Force regulations on critical item control. On occasion, inquiry may be made to determine current stock status, which would yield a special report for management review.

(2) Transaction Register -- Each input to the EDP operation generates at least an entry onto the Daily Transaction Register. Where balances have been changed by a transaction, the new balance caused by the posting is added to the transaction before it is placed on the Register. In the case of requisitions, action coding is added to indicate the DPC action in response to the request. The Transaction Register is the audit trail provided to verify action taken within the data processor, and may be listed for visual checking when required in any number of different presentations, e.g., for each storage site location aggregated monthly and sequenced by stock number action for each day; for each stock number, a running list of daily activity within the system.

(3) System Short Supply Notices -- This output results automatically as soon as an EDP review of System Stock Status against any of the System Monitoring Levels indicates one of these system balances has been reached. Any transaction reducing a system balance causes this review to take place, thus assuring constant surveillance of the inventory position for the Manager. It has often been said that the strict enforcement of the

existing stockage review procedures would in itself be a great step towards improving Air Force inventory management; if this is the case, then an EDP application cannot help but be of benefit by providing the Manager with timely information which helps him to foresee logistical trouble spots, as in the case with the System Short Supply Notices.

B. Action Notices

(1) Short Supply Triggers -- Mention must be made here of the interfile communication required within the DPC. Because of the capacity limitations that exist in today's data processor, the functions of inventory management have been described as separate operations as an S&A function, an Input Data Control function, etc. There just are not enough information storage locations and procedure storage locations in the minimum access memory of the 705 for all of these functions to be performed simultaneously.

The Short Supply Trigger is therefore created within the Transaction Posting operation in order to complete the report to management which is started with a System Short Supply Notice. The Due-In File will receive the Trigger, which results in a listing of all assets expected into the system, with scheduled arrival dates, for the stock number or subfamily in short supply. With management data thus gathered and presented from any file that contains data required for analysis in this system shortage situation, the Manager can act judiciously.

(2) Status Notices -- If a requisition cannot be filled at the DPC, either of three actions result any of which requires a Status Notice to be sent back to the base from which the request originated. Either a Backorder results, or a Cancellation of the requisition is effected, or

the requisition is Indorsed over to an Air Force depot which holds prime responsibility for the item requested.

(3) Shipping Orders — Perhaps the most significant action notice product of the Transaction Posting and Management Review is the Shipping Order. This is a directive issued by the DPC which directs a storage site to ship a specific quantity of an item to a designated consignee in such a manner as to arrive before a given date. The list of preferred choices of consignor had previously been made for each requisition during the Input Data Control function, but since this was done on a strictly geographical basis and without benefit of storage site balance information, the Master File provides the means for choosing the correct shipping location.

C. Due-In

We have previously referred to reports of due-in assets. It is vital in any inventory control process to know of existing contracts for serviceable materiel, but, further, the schedule of arrival of materiel is of extreme importance. Because of production limitations, storage limitations, build-up factors in usage rates and budget considerations, deliveries to the Air Force are phased to bring certain quantities of goods into the system at a pre-determined rate. It is the purpose of the Due-In function of our inventory control operation to record and monitor the contractual obligations entered into between the Manager and suppliers. Because the Manager uses other Air Force depots as a source of supply, this is more than a procurement status monitoring. Because the vast majority of the 100,000 items in the total expected inventory are Air Force procured, the file size is worthy of high-speed EDP analysis. With the establishment of a Due-In File, there is the obligation to maintain the information in a current status.

Since the purpose of maintaining this set of records is to be able to inform the Manager of the status of due-in serviceable assets, all transactions affecting these records must be processed against the File. The reports from this file are not usually required with any periodicity, so the processing cycle is left open. In other words, unless a management request for Due-In information occurs, there may be little need to update this file. Transactions are accumulated for an acceptable maximum number of days, and the file is updated with this batch of information at the end of this time or when an information request is made. The kinds of data needed to establish records are either of two types: 1) purchase requests establish contract due-in items, or 2) requisitions to a depot establish the system due-in from the Air Force. In both cases it is the original order which establishes the basic record.

Changes to this record, whether system, Air Force, or contractor originated, update the information in this file. In the main, these transactions are of the following types:

(1) Receipts Notices

(2) Quantity or Delivery Schedule Changes

(3) Contract Amendments and Supplements

The management information published from this file is mostly in the form of status reports. The Short Supply Trigger, an output of the Transaction Posting and Management Review function, has already been described. A Request for Information, similar to that described previously, also produces a visible display of the requested due-in record. These status reports are of a special nature and would force a processing cycle to occur, at which time the report would be extracted from an updated, current

file.

At regular intervals, e.g., quarterly for critical items, a Due-In Status Report is published for management review in conjunction with a listing from the Master File. The information published would include an analysis by the EDP of such things as overdue shipments, shipments arriving according to schedule, quantity variations in excess of that allowed in the contract, etc.

Summary

It is important that we re-emphasize the functional approach to the whole inventory control problem. The use of EDP in the decision-making areas of this process is feasible, especially when one counts up the many, many decisions which are essentially of a clerical nature. Furthermore, if the management policy-making echelon of the Air Force (or any business) wants to be sure that policy bearing on clerical-level decisions is categorically complied with, mechanization is mandatory. A virtue of large-scale EDP is in the numbers and kinds of decisions of this type that can be spelled out within the instruction storage and file data storage capacities of this type of equipment.

But we must hasten to repeat that our approach to this inventory control problem is predicated on the philosophy that it is not at all sufficient to employ EDP in clerical-level decision-making exclusively. Data analysis, using information aggregated in significant inventory terms, e.g., the subfamily, is a rewarding result from the use of EDP. In this way, policy-making is influenced by timely EDP analysis of pertinent inventory data. Stated in another way, many inventory management decisions can be formulated, the data assembled and analyzed and the decision executed in

today's EDP; at the very least, the data processor is employed to bring together all the data relevant to the decision-making process for presentation to the management echelon in a comprehensive, consolidated fashion, thus facilitating the Manager's decision-making process, e.g., the Short Supply Notice and the Due-In Status Report.

Finally, it must be recognized that a price is paid in electronifying information processing. The requirement for complete accuracy of input data, both in format and in technical contents of the input, requires rigid procedures which non-mechanized systems have been able to do without. The EDP editing and screening process incorporated into Input Data Control adds a large measure of confidence to inventory managers in the validity of their files that in the past they have been reluctant to accept.

A word must be said for the ability that the large-scale EDP gives to the business systems designer for effective integration of interrelated business processes. In good systems analysis lies the crux of worthwhile EDP utilization; here is a tool for implementing methods well known to the Industrial Engineer.