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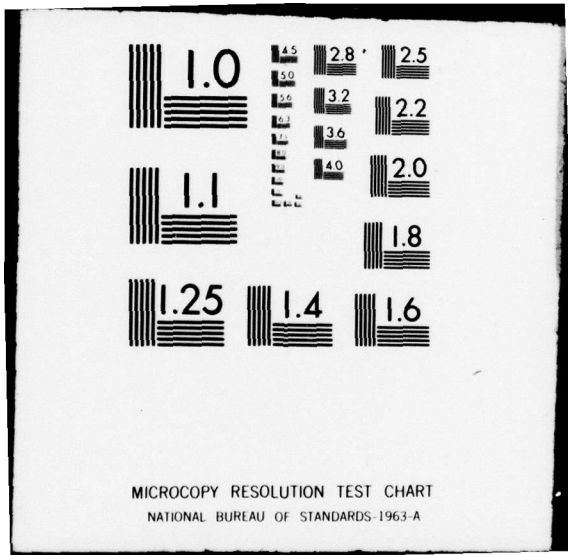
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**ANNUAL REPORT
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**U.S. ARMY
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RESEARCH
OFFICE**

November 1978

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This report describes work done by the US Army Inventory Research Office during the period October 1977 - September 1978. Reports published during the period are listed, along with papers presented at professional meetings and notes on other professional activities.		

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TABLE OF CONTENTS

Page

OVERVIEW.....

COMPLETED STUDIES.....

ONGOING STUDIES.....

SUSPENDED AND TERMINATED PROJECTS.....

LOGISTICS MANAGEMENT ASSISTANCE.....

PROFESSIONAL ACTIVITIES.....

REPORTS PUBLISHED.....

DISTRIBUTION.....

ACCESSION for

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US ARMY INVENTORY RESEARCH OFFICE

OVERVIEW

This report covers IRO activities in FY1978. Annual Reports for previous years go back to FY1966.

Four projects were completed during the year. One was cancelled at the sponsor's request. Nineteen projects are shown as being carried over into FY1979. Eight of these, however, were in a suspended state during most of the FY78 and remain in a suspended state for a variety of reasons. These are discussed by project in the body of the report.

The normal study program was interrupted in April 1978 when the IRO was asked to do an intensive study of DARCOM's declining stock availability. All analysts were assigned to this project from April through June and since then two analysts have continued to spend most of their time on this work.

Another major shift of resources that disrupted normal work program schedules was due to Project 260, Operational Readiness Oriented Logistic Support Model (ERPSL). A task arising from discussions of the DARCOM Logistics Systems Review Committee asked IRO to concentrate on developing models for handling the provisioning of low density systems with high operational availability requirements. This came in July. Up to five analysts, and never less than two, were (and continue to be) engaged in this work at a given time. A DARCOM Technical Working Group was formed on IRO's recommendation to help prosecute this effort. Results to date have exceeded expectations and justify their heavy resource expenditure.

The permanent strength of the IRO professional staff remained unchanged during this FY. However, we had the services from May through September of Meyer Kotkin, a PhD candidate in Operations Research at University of Michigan, whose area of specialization is multi-echelon models. His contributions to Project 260 were outstanding. Arrangements were made for him to continue to work part-time in the TARCOM Systems Analysis Office when he returned to Ann Arbor in October.

A major change took place in our administrative staff when Mrs. Mollie Lamont retired on 31 August 1978 after 16 years of dedicated service as our Secretary and Chief of Administrative Services. Her place was taken by Ms. Susan Derr, who came to us from Corps of Engineers.

US ARMY INVENTORY RESEARCH OFFICE
COMPLETED STUDY SUMMARY

TITLE: Guidance for Major Items Management Systems (MIMS)

IDENTIFICATION NUMBER:

IRO Project No. 248

REPORT:

Letter Report to Sponsor dated 30 August 1978.

SPONSOR:

DARCOM Directorate for Plans, Doctrine and Systems, DRCPS-S

PROJECT OFFICER:

Steven Gajdalo

INITIATION/COMPLETION DATES:

May 1976/July 1978

ABSTRACT:

Study objective was to develop guidance for automation of the Major Item Management System (MIMS) and to recommend ways to correct certain problems in connection with processing of authorization data and in control of major items that are themselves assemblages of other major items.

MAJOR CONCLUSIONS/RECOMMENDATIONS:

A conceptual framework for an integrated Major Item Management System was developed and turned over to the sponsor for use by the Major Items Functional Coordinating Group, which has taken over responsibility for development of specifications for MIMS under CCSS.

Problem areas in processing authorization data were defined and presented to sponsor. It was then learned that these problems were being addressed by USA Concepts Analysis Agency in their "Management of Change" study. Their recommended changes paralleled those made in this study.

It was found that an adequate audit trail for financial control of major assemblages now exists within present automated systems, although recommendations were made to improve linkages between APARS/SAMPAM/CCSS.

IMPLEMENTATION STATUS:

Recommendations are with the MIMS Functional Coordinating Group for use in their system design effort.

RELATED STUDIES:

"Management of Change," US Army Concepts Analysis Agency, June 1977 (revised September 1977), Report No. CAA-SR-88-7.

"Major Items Management System Umbrella (MIMS Umbrella), Hunter W. Tyler, Logistics Studies Office, USA Logistics Management Center, September 1978.

US ARMY INVENTORY RESEARCH OFFICE
COMPLETED STUDY SUMMARY

TITLE: Operational Analysis of Item Manager Decision Making

IDENTIFICATION NUMBER:

IRO Project No. 252

REPORT:

None

SPONSOR:

DARCOM Directorate for Materiel Management
Associate Director for Requirements and Resources, DRCMM-RS

PROJECT OFFICER:

Alan J. Kaplan/Bernard B. Rosenman

INITIATION/COMPLETION DATES:

April 1977/February 1978

ABSTRACT:

A questionnaire approach determined what item managers viewed as the major areas in which improvements might be made to improve their effectiveness. There was a good degree of consistency in their replies, and their concerns appeared legitimate.

MAJOR CONCLUSIONS/RECOMMENDATIONS:

Areas identified were amount and quality of training received; inter-directorate coordination; problem item reporting.

IMPLEMENTATION STATUS:

Areas are being addressed as part of ongoing DARCOM management improvement efforts.

RELATED STUDIES:

None

US ARMY INVENTORY RESEARCH OFFICE
COMPLETED STUDY SUMMARY

TITLE: Improvement of Insurance Model

IDENTIFICATION:

IRO Project No. 256

REPORT:

None

SPONSOR:

DARCOM Directorate for Materiel Management
Associate Director for Requirements and Resources, DRCMM-RS

PROJECT OFFICER:

Alan J. Kaplan

INITIATION/COMPLETION DATES:

August 1977/December 1977

ABSTRACT:

The model in CCSS, used for insurance and other low demand, mission essential items, was not functioning properly. Problems were identified and solutions found.

MAJOR CONCLUSIONS/RECOMMENDATIONS:

- a. There were implementation problems which needed to be corrected.
- b. NS02 items should normally be demanded one unit at a time. Model and maximum release quantity should reflect this.
- c. Until demand history accumulates, some restrictions should be placed on purchases, while permitting some safety level and a modified EOQ.

IMPLEMENTATION STATUS:

Recommendations are being implemented in CCSS (Release 57).

RELATED STUDIES:

None

US ARMY INVENTORY RESEARCH OFFICE
COMPLETED STUDY SUMMARY

TITLE: Procurement Costs for Small Purchases

IDENTIFICATION NUMBER:
IRO Project No. 262

REPORT:
"Order Cost for Small Purchases," Steven Gajdalo, IRO, and Robert Nick, PRO, Joint IRO/PRO Final Report, September 1978. (For Internal Use Only)

SPONSOR:
DRC Directorate for Materiel Management
Associate Directorate for Requirements and Resources, DRCMM-RS

PROJECT OFFICERS:
Steven Gajdalo, IRO
Robert Nick, PRO

INITIATION/COMPLETION DATES:
January 1978/September 1978

ABSTRACT:
The study objectives were to determine if procurement costs are significantly different among the Services and what could be done to streamline small purchase procedures in use at the MRCs and thus reduce costs and Administrative Lead Times.

MAJOR CONCLUSIONS/RECOMMENDATIONS:

1. There is no basis for comparing order costs because they are not computed according to the DoDI 4140.39 methodology. Order costs should be computed under controlled conditions using a standard set of procedures.
2. Extent of use of simplified small purchase procedures suggested by the ASPR guidelines varies.

IMPLEMENTATION STUDIES:
Materiel Management Directorate will sponsor a study to develop order costs under controlled conditions.

RELATED STUDIES:
None

US ARMY INVENTORY RESEARCH OFFICE
ONGOING STUDY SUMMARY

TITLE: Measurement and Implications of Production Lead Time Variability

IDENTIFICATION NUMBER:

IRO Project No. 229

SPONSOR:

DARCOM Directorate for Materiel Management
Associate Director for Requirements and Resources, DRCMM-RS

PROJECT OFFICER:

Martin Cohen

INITIATION/PROGRAMMED COMPLETION DATES:

January 1975/April 1979

PROBLEM:

Variability of the Production Lead Time for the manufacture of secondary items results in increased uncertainty in the amount of stock that will be demanded before the next replenishment order arrives. This uncertainty is reflected in higher safety levels and thus increased inventory costs to maintain needed supply performance. There have been reports of increasing lead times in recent times. This has been attributed to the economic conditions that have been causing inflation in all sectors of the national economy. In previous studies the problem of runaway lead times has not been addressed except in qualitative terms.

OBJECTIVE:

Develop and compare various models of the production lead time (PLT) process for use in forecasting. Select the most accurate model and measure the residual error when used in forecasting PLT for a typical catalog of Army secondary items. Incorporate this residual error in the safety level formulas. Consider effect of exogenous economic variables in developing the models.

CURRENT STATUS:

This study was interrupted several times because the project officer was needed for higher priority work. A data base has been developed consisting of all procurements for all Army-managed aviation components in the period 1973 thru 1977.

Forecast algorithms based on non-economic models have been developed. Preliminary work with economic models suggests that significant resources will be required and that this work should be deferred for a subsequent study.

Remaining work will be devoted to comparing the previously developed models by simulating their algorithms using the aviation data.

RELATED STUDIES:

None

US ARMY INVENTORY RESEARCH OFFICE
ONGOING STUDY SUMMARY

TITLE: Improvement of Distribution Effectiveness

IDENTIFICATION NUMBER:
IRO Project No. 253

SPONSOR:
DARCOM Directorate for Materiel Management
Associate Director for Supply and Distribution, DRCMM-S

PROJECT OFFICER:
Robert L. Deemer

INITIATION/PROGRAMMED COMPLETION DATES:
February 1977/March 1979

PROBLEM:
Concern for the low number of requisitions that are not filled from the closest area oriented depot.

OBJECTIVE:
Develop and validate procedures for modifying release of low priority backorders so that distribution effectiveness can be improved with little or no degradation to supply performance.

CURRENT STATUS:
Analysis of MIRCOM data indicates stock to fill low priority backorders can be held at the first depot to receive stock from procurement under certain circumstances. The type of procurement action determines how long the stock can be held by the first receiving depot. Analysis of data from the other MRCs must be made to see if the MIRCOM results hold for them and determine their actual waiting time if applicable.

RELATED STUDIES:
"Performance Standards for Depot Initial Fill Rates," Alan J. Kaplan, IRO Final Report, May 1972, AD-744786.

US ARMY INVENTORY RESEARCH OFFICE
ONGOING STUDY SUMMARY

TITLE: Implementation of Quantity Discount Procedures at DARCOM Materiel Readiness Commands

IDENTIFICATION NUMBER:
IRO Project No. 254

SPONSOR:
DARCOM Directorate for Materiel Management
Associate Director for Requirements and Resources, DRCMM-RS

PROJECT OFFICERS:
Steven Gajdalo, IRO
Wayne Zabel, PRO
(This is a joint project with Procurement Research Ofc, Ft. Lee, VA)

INITIATION/PROGRAMMED COMPLETION DATES:
July 1977/July 1979

PROBLEM:
The Materiel Readiness Commands do not take advantage of the economies of quantity discounts when procuring secondary items. Doing this would be especially timely now in view of declining resources and supply performance over the past few years.

OBJECTIVE:
To develop and test economic procedures to obtain quantity discounts in the procurement of secondary items.

CURRENT STATUS:
Proposed Quantity Discount procedures for MRC use have been developed and test approved by DARCOM. The test is underway at MIRCOM and TARCOM.

RELATED STUDIES:
"Project EOQ: A Success Story in Implementing Academic Research,"
L. M. Austin, Interfaces Volume 7, Number 4, (Aug 1977).

US ARMY INVENTORY RESEARCH OFFICE
ONGOING STUDY SUMMARY

TITLE: Design of a Prioritized Depot Scheduling System for Secondary
Item Repair

IDENTIFICATION NUMBER:
IRO Project No. 255

SPONSOR:
DARCOM Directorate for Materiel Management
Associate Director for Requirements and Resources, DRCMM-RS

PROJECT OFFICER:
Arthur Hutchison

INITIATION/PROGRAMMED COMPLETION DATES:
July 1977/October 1979

PROBLEM:
There are problems in the secondary item repair system in maintaining readiness and emphasizing reduction in Repair Cycle Time inventory investment costs. Defense of the PAA budget requests is impaired since the elements of RCT are not clearly defined or measured.

OBJECTIVES:
Develop a requirement driven depot operation where MRCs identify quantity and urgency of repair programs. Depots develop short term induction schedules based on MRC requirements.
Develop a management system which emphasizes reduction of RCT for high dollar secondary items.

CURRENT STATUS:
A secondary item priority scheme was developed which assigns priority codes to all execution year programs based on the item's stockage level. Implementation will be in two phases. Under Phase I, MRCs will identify items in a projected backorder status where un-serviceables are available for repair. Depots will accelerate production up to the quantity which will prevent the item from going into backorder. Phase II introduces the full requirements-driven procedures.
An intensive management program was developed which places emphasis on reducing RCTs for high dollar items in a buy/repair position. Each year a limited number of items will be identified for this program. Advance resource planning will be performed by the MRCs and depots in order to surface any shortcomings. Depots will give priority to these programs in order to meet the MRCs quarterly requirements. Reduction in RCTs will be made for budgeting purposes based on the performance of this program.

RELATED STUDIES:
"Requirements-Driven Repair Scheduling System for Secondary Items,"
Arthur Hutchison, IRO Final Report, September 1977, ADA046579.

US ARMY INVENTORY RESEARCH OFFICE
ONGOING STUDY SUMMARY

TITLE: War Reserve Requirements for New Weapon Systems

IDENTIFICATION NUMBER:

IRO Project No. 258

SPONSOR:

DARCOM Directorate for Plans, Doctrine and Systems, DRCPS-P

PROJECT OFFICER:

Donald A. Orr/Bernard B. Rosenman

INITIATION/PROGRAMMED COMPLETION DATES:

September 1977/

PROBLEM:

Heretofore War Reserve requirements have not been developed for new weapon systems until they have actually been deployed. It is desired, however, to estimate what these requirements will be for budgetary purposes far in advance of that time.

OBJECTIVES:

To develop a procedure for estimating War Reserve budgetary requirements for new weapon systems that are scheduled for deployment in the POM/FYDP period. The procedure must be capable of use during early phases of weapon system development when data on expected failure rates, maintenance support planning, etc., are only partially available.

CURRENT STATUS:

The Bare Bones Standard Initial Provisioning (BBSIP) Model, previously developed by IRO, was adapted for use for War Reserve computations. This new model, The Bare Bones War Reserve Model, was tried out on six new weapon systems by estimating their funding requirements for 1980-84 POM. Briefings on the procedure and results of the computations were given at DARCOM, DA and DoD, resulting in approval of its use as a standard procedure.

Decision was then made at DA to apply the procedure to compute War Reserve requirements for weapon systems expected to enter the inventory during the 1981-85 POM period. Computer programs and computational procedures were revised to conform to changes in War Reserve guidance. Seminars are to be given to Project Manager and Materiel Readiness Command personnel. Computations are expected to be completed by PM/MRC personnel with IRO assistance in February 1979.

RELATED STUDIES:

"Bare Bones: A Method for Estimating Provisioning Budget Requirements in the Out-Years," Donald A. Orr, IRO Final Report, July 1977, AD-A044508.

US ARMY INVENTORY RESEARCH OFFICE
ONGOING STUDY SUMMARY

TITLE: Operational Readiness Oriented Logistic Support Models

IDENTIFICATION NUMBER:
IRO Project No. 260

SPONSOR:
DARCOM Directorate for Materiel Management
Associate Director for Requirements and Resources, DRCMM-RS
Associate Director for Maintenance, DRCMM-MP

PROJECT OFFICERS:
Alan J. Kaplan/Martin Cohen

INITIATION/PROGRAMMED COMPLETION DATES:
October 1977/

PROBLEM:
Multi-echelon models offer great potential for achieving needed system operational availability at least cost. While a number of models exist, none was fully satisfactory either conceptually or in terms of ease of use.

OBJECTIVE:
Promote use and evaluation of multi-echelon models.

CURRENT STATUS:
IRO instigated the formation of a DARCOM working group to oversee efforts in the multi-echelon area. Improvements in existing models have been made, and programs oriented to DARCOM needs and current DARCOM computer systems and data bases have been developed. These programs will be widely used, and at the same time efforts to refine them will continue.

RELATED STUDIES:
None

US ARMY INVENTORY RESEARCH OFFICE
ONGOING STUDY SUMMARY

TITLE: Integrated Forecasting Techniques for Secondary Item Classes

IDENTIFICATION NUMBER:

IRO Project No. 263

SPONSOR:

DARCOM Directorate for Materiel Management
Associate Director for Requirements and Resources, DRCMM-RS

PROJECT OFFICERS:

Edwin P. Gotwals III/Donald A. Orr

INITIATION/PROGRAMMED COMPLETION DATES:

December 1977/April 1979

PROBLEM:

With the addition of four years of demand history to the TSARCOM data base, it is reasonable to review and/or update the "k-parameter" for the new forecast algorithm cited by Orr in his previous work and to extend IRO's research efforts in demand forecasting to both "common" and "inactive" secondary items.

OBJECTIVE:

Develop updated parameters and algorithms for the remaining class of items and to synthesize concepts into an overall implementation package for demands and returns forecasting at the wholesale level.

CURRENT STATUS:

Extensive statistical analysis has been done utilizing the new base in an effort to compare the Kalman Filter type forecast algorithm with alternatives supplied by the Commodity Commands. These findings along with simulation results will be presented to the Redesign Working Group for their appraisal. Innovative modelling has been underway for the low demand items with the intent of developing an improved forecast technique for this class of items.

RELATED STUDIES:

"Demand Forecasting with Program Factors," Martin Cohen, IRO Final Report, September 1975, AD A017858.

"Demand Forecasting Using Process Models and Item Class Parameters: Application of Ancillary Variables," D.A. Orr, IRO Final Report, April 1976, AD A026081.

US ARMY INVENTORY RESEARCH OFFICE
ONGOING STUDY SUMMARY

TITLE: Stock Availability Improvement Program

IDENTIFICATION:
IRO Project No. 267

SPONSOR:
DARCOM Directorate of Materiel Management
Associate Director for Requirements and Resources, DRCMM-RS

PROJECT OFFICER:
Bernard B. Rosenman/W. Karl Kruse/Sally Frazza

INITIATION/PROGRAMMED COMPLETION DATES:
April 1978/March 1979

PROBLEM:
Declining supply performance led to the formation, in January 1978, of DARCOM Ad Hoc Group to Improve Stock Availability. After some preliminary analyses, IRO was tasked in April to undertake studies, along with others, to find causes for this condition and to recommend ways to improve performance. IRO was asked to concentrate on system problems, with emphasis on those related to the CCSS.

OBJECTIVES:
By on-site operational analysis and by data analyses, to find causes of declining stock availability. If found to be caused by system related problems, to recommend system changes for their correction and to estimate budgetary requirements to implement improvements.

CURRENT STATUS:
Failure to consider Procurement Lead Time variability and DoD-imposed constraints on Variable Safety Levels/Economic Order Quantities were found to have an important bearing on supply performance. Failure to update Backorder Penalty Costs and Procurement Costs, as well as an error in the Incremental Deliveries computation, were also found to contribute. These and other findings in the Procurement International Logistics and Depot Maintenance areas were briefed to the Ad Hoc Group in June, along with other recommendations on budgetary techniques and performance measurement.

System Change Requests were prepared to modify the CCSS VSL/EOQ module. Simulations were then begun to estimate budgetary impacts of these changes at each of the MRCs.

US ARMY INVENTORY RESEARCH OFFICE
ONGOING STUDY SUMMARY

TITLE: Improvement of Requirements Computation Processes for EW/SIGINT Support

IDENTIFICATION NUMBER:
IRO Project No. 270

SPONSOR:
DARCOM Directorate for Materiel Management
Programs and Projects Office, DRCMM-L

PROJECT OFFICER:
Robert L. Deemer

INITIATION/PROGRAMMED COMPLETION DATES:
July 1978/February 1979

PROBLEM:
Concern for the low accommodation and stock availability of EW/SIGINT materiel.

OBJECTIVE:
Develop procedures or use existing procedures which can be applied to EW/SIGINT type items to improve the accommodation and availability.

CURRENT STATUS:
Two main problems have been defined. They are the initial provisioning methodology and the procedure for determining when to stock an item. The ERPSL provisioning model can improve the provisioning aspects of the problem and be acceptable for budget submission. A stockage model (both range and depth) is being developed for comparison with the present procedures. This is being accomplished by use of the basic CCSS stockage model and empirical information to test the improvement of use of such a method.

RELATED STUDIES:
"Evaluation of Several VSL/EOQ Models," R. L. Deemer and W. K. Kruse, IRO Final Report, May 1974, AD-781948.

AR 710-1 "Centralized Inventory Management of the Army Supply System," Chapter IV.

US ARMY INVENTORY RESEARCH OFFICE
ONGOING STUDY SUMMARY

TITLE: Pilot Test of Methodology for Projecting Resource Requirements

IDENTIFICATION NUMBER:
IRO Project No. 271

SPONSOR:
DARCOM Plans and Analysis Directorate, DRCPA

PROJECT OFFICER:
Donald A. Orr

INITIATION/PROGRAMMED COMPLETION DATES:
August 1978/March 1979

PROBLEM:
Future DRC manpower and funding requirements require rational justification. One such methodology - external, causal drivers - was developed by IRO to allow Readiness Commands to project necessary resources; this method places less emphasis on historical, possibly non-rational, expenditure of resources and relies on causal predictable variables (e.g. weighted items managed, fielded systems, demands) and related needed resources. The DARCOM Directorate of Resources Mgt requested that IRO perform a test of our concepts at CERCOM.

OBJECTIVES:
Assess the availability of typical data necessary to compute drivers and determine the difficulty in extracting data. Compute drivers for recent years and relate to actual resources expended and resources that should have been needed. This effort is to be done by AMS codes in Materiel Mgt and Maintenance Support Directorates.

CURRENT STATUS:

- a. MM - Sufficient data was available and easily obtainable. Weighted drivers have been computed for 1976-1980. Manhours have been related to these drivers.
- b. MS - Required data is hard to extract for Maintenance Support drivers. CERCOM is writing a utility program to perform some extraction. Manhours expended thru 76-78 have been obtained.

RELATED STUDIES:
"Methodology for Project of Resource Requirements," A. Kaplan, D. Orr, IRO Final Report 207, November 1973, AD 771049.

US ARMY INVENTORY RESEARCH OFFICE

SUSPENDED AND TERMINATED PROJECTS

A number of projects were suspended during FY1978 and were still in a suspended status at the end of the fiscal year. In some cases, suspensions were necessary because of the influx of higher priority work or a shift in work program activities. In other cases, suspensions were due to sponsors' requests. In addition, one project was terminated at the sponsor's request. The projects affected are as follows:

SUSPENDED PROJECTS

<u>Project No.</u>	<u>Title</u>	<u>Sponsor</u>
257	FAILURE FACTORS FOR CONTINGENCY PLANNING Work plan for this project calls for participation by at least two MRCs, MRSA and possibly other DARCOM activities. Sponsor's survey of these activities indicated that they could not furnish required manpower resources at this time.	DRCMM-M
259	FORECASTING METHODS FOR PARTS SUPPORT OF DEPOT OVERHAUL This project requires collection of parts consumption and other data on a controlled basis. Difficulties were encountered in setting up a data collection program when the project was first initiated. Then, the need to shift personnel to the Stock Availability Improvement project caused suspension.	DRCMM-RS
261	RIMSTOP IMPLEMENTATION IRO has been tasked by the Army DCSLOG to assist in the implementation of DoD Directive 4140.44 and DoD Instructions 4140.45 and .46. These documents prescribe standard stockage policies for secondary items at the Intermediate and Consumer levels of inventory. A recommended approach for phased implementation in the Army's retail supply system was developed at DCSLOG's request. Work was then suspended at DCSLOG's request pending completion of some preliminary analyses at the Army Logistics Center	DALO-SMS

<u>Project No.</u>	<u>Title</u>	<u>Sponsor</u>
264	DEVELOPMENT OF A STANDARD SYSTEM FOR COMPUTATION OF CONTINGENCY REQUIREMENTS IRO's task under this project is to develop functional guidance for a standard methodology for computing war reserve and contingency requirements. This is to be done through the medium of a DARCOM Working Group. Work was suspended at the sponsor's request owing to the fact that personnel needed for the Work Group were preempted to take part in MOBEX.	DRCPS-P
265	EVALUATION OF PROVISIONING METHODOLOGY Work plan for this project envisions cooperative effort with MRCs, MRSA, AMSAA and perhaps other DARCOM activities. Sponsor's survey indicated that requisite personnel resources could not be spared for this project at this time.	DRCMM-M
266	REQUISITION REFERRAL POLICY UNDER SIMS-X This project entails evaluation of several possible policies for routing requisitions from overseas customers when SIMS-X is activated. Work was suspended due to the need to reassign personnel to other higher priority work.	DRCPS-S
268	SUPPLY MANAGEMENT MINI-COMPUTER APPLICATIONS This project entails assisting DARCOM Headquarters in determining, from a functional user's point of view, how the capabilities of mini-computers might best be exploited in a distributed processing mode. The ALMSA is currently programming a first-phase mini-computer supply management application and IRO is assisting in this effort in a minimal way. Work on later phases, when more innovative approaches will be explored, has been deferred until this initial application is operational.	DRCMM-RS

<u>Project No.</u>	<u>Title</u>	<u>Sponsor</u>
269	INVESTIGATION OF MINIMUM BUY CONCEPT	DRCMM-RS

IRO has been tasked to develop a model for determining when it is economically advantageous to buy more than the needed amount of stock for non-stocked items in anticipation of additional demand later on. This work was suspended because of the need to assign personnel to the Stock Availability Improvement project.

TERMINATED PROJECT

213	IMPLEMENTATION OF LOGISTICS PERFORMANCE INDICATORS	DRCMS
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This was a follow-up project to a previous IRO study in which a model was developed to quantify the benefits anticipated from implementation of a new management information system, where the benefits are expected to arise not from personnel or ADP savings but from improvements in the functional operation itself. The objective of this project was to measure actual differences in costs resulting in the implementation of CCSS at four MRCs.

This project suffered a number of suspensions due to influx of higher priority work. Then it was found that several lapses had occurred in the data collection effort. The sponsor finally decided that the resources required to re-constitute the data base were too large for the benefits expected from completion of the study and requested termination.

US ARMY INVENTORY RESEARCH OFFICE

LOGISTICS MANAGEMENT ASSISTANCE

In addition to its formal work program, the IRO provides assistance upon request to DARCOM Headquarters and its Commands, and to other DA and DoD activities. This assistance involves work of a short term nature, generally requiring no more than a few man-months of effort. Some of the tasks worked on in FY1978 are described below.

Repair Cycle Float - DA conducted several meetings during the year to review recommendations of various study groups, including the IRO, on how policies governing Repair Cycle and Operational Readiness Floats should be changed. IRO gave several briefings and took part in discussions at these sessions and reviewed drafts of new and revised ARs that are in preparation.

Revision of ARs - The Materiel Readiness Support Activity is revising two ARs, AR710-1 and AR700-18, that cover areas to which IRO has made technical contributions. The former deals with wholesale supply management, the latter initial provisioning. IRO is providing continuing assistance to the MRSA in this effort.

Functional Coordinating Groups - IRO continues to provide representation on the FCGs for Supply Management, Maintenance Management, Provisioning, War Reserves and Major Items. This involves attendance at meetings where System Change Requests are evaluated and doing short term studies on problems of immediate interest to the Groups.

XML Tank Provisioning Task Force - Dr. Orr served as IRO representative on this Task Force formed by the Commander of TARCOM at the request of the XML Project Manager, to review and evaluate provisioning decisions made by the PM to date. The Bare Bones SIP Model was applied in determining provisioning requirements for major components of this system.

Management of Gas Cylinders - This short term study was done at the request of Installations & Services Directorate to give advice on policies to be followed by the DARCOM laboratories and other activities buying and turning in gas cylinders. Mr. Kaplan did the study which resulted in a set of simple formulas for determining what size cylinders to buy and when to turn them in.

Requirements Objective/Order and Ship Time Study (ROOST) - This was a contract study done under the auspices of the Army DCSLOG. Mr. Rosenman served on the group that did the pre-award evaluation of the contractors; Mr. Kruse served on the Study Advisory Group.

DoD War Reserves Conference - The IRO hosted this conference, which was held in Philadelphia on 10-13 January 1978. Representatives from DoD,

Army, Navy, Air Force, Marine Corps and Defense Logistics Agency Headquarters attended as well as a number of their field activities. The Conference was devoted to discussion of policies governing computation of War Reserve requirements that are to appear in a forthcoming DoDI.

DARCOM Base Line Study - Messrs. Kaplan, Orr and Rosenman spent some time with the group assembled by DARCOM to do this study. Some of our ideas on the "driver" concept of resource requirements projection found their way into the study.

Over-Ocean Cargo Forecasts - Mr. Deemer met on several occasions with representatives from DARCOM Headquarters, the Logistics Control Office, ALMSA and the MRCs to provide assistance in the development of System Change Requests for implementation of the cargo forecasting procedures developed by IRO in 1976.

Inter-Depot Transfers - Messrs. Gajdalo and Kaplan did some analyses for DARCOM Headquarters to determine what would be required to update a previously developed IRO model so that it could be used to determine when inter-depot transfers of materiel should be made and in what amounts. Some short term recommendations were made; longer range work may be needed later on for proper treatment of probabilistic effects.

Operations Research Training in Egypt - Mr. Rosenman was in Egypt 17-27 October as one of a team of DoD personnel assembled to give a series of lectures to Egyptian officers on topics in military operations research. Arrangements for the lectures had been made by the Egyptian Ministry of Defense through the US Dept of Defense and the State Department.

US ARMY INVENTORY RESEARCH OFFICE

PROFESSIONAL ACTIVITIES

Papers published in technical journal and presented at society meeting are reported here:

Technical Paper

"A Note on EOQ Under Fund Constraints," Alan J. Kaplan,
Naval Research Logistics Quarterly, Vol. 25, No. 2, June 1978.

Paper Presented at Society Meeting

"Determining Operational Readiness Float," W. Karl Kruse, IRO,
Larry Smith, AMSAA, 41st Military Operations Research Symposium,
Fort McNair, Wash., DC, 11-13 July 1978.

Other Professional Activities

Mr. Kaplan has been serving as a referee for the journal MANAGEMENT SCIENCE.

Mr. Rosenman was appointed to a second term as Chairperson of the Geographical Sections Committee of the Operations Research Society of America. In addition, he lectured in applications of inventory theory and related topics in graduate seminars at Cornell, Rutgers and the University of Pennsylvania. He also was a guest lecturer in the Army MBA Comptroller-ship program at Syracuse University.

Mr. Hutchison received his M.S. in Operations Research from the University of Pennsylvania in May 1978.

US ARMY INVENTORY RESEARCH OFFICE

REPORTS

The following reports were published in the period October 1977 - September 1978.

"Economic Procurement Cutback Rule," W. Karl Kruse, Technical Report, October 1977, ADA046617.

"Waiting Time in an S-1,S Inventory System With Arbitrarily Distributed Lead Times," W. Karl Kruse, Technical Report, October 1977, ADA047285.

"More on Simon's Two Echelon Model," W. Karl Kruse, Technical Report, November 1977, ADA047713.

"Annual Report Fiscal Years 77 and 1977," December 1977, ADA048818.

"On the Optimal Stock Levels in a Multi-Echelon Maintenance System," Meyer Kotkin, Technical Report, June 1978, ADA057973.

"Probabilities of Zero Demand," Sally Frazza, Technical Report, September 1978, ADA060010.

"Waiting Time in a Continuous Review (s,S) Inventory System With Constant Lead Times," W. Karl Kruse, Technical Report, September 1978, ADA060845.

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