

Technical Report 5-20278 & 5-20279
Contract No. DAAH01-98-D-R001
Delivery Order No. 22

**Diminishing Manufacturing Sources and Material Shortages
Research and Support**

(5-20278 & 5-20279)

Final Technical Report for Period
11 August 1998 through 30 April 99

October 1999

Prepared by:

Gary A. Maddux

Systems Management & Production Lab
The University of Alabama in Huntsville
Huntsville, Alabama 35899

Prepared for:

U.S. Army Aviation & Missile Command
Redstone Arsenal, AL 35898
Attn.: Mr. Terry Mullins

20000309 066

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE October 99	3. REPORT TYPE AND DATES COVERED Final Report: 11 Aug 98 thru 30 Apr 99	
4. TITLE AND SUBTITLE Diminishing Manufacturing Sources and Material Shortages Research and Support			5. FUNDING NUMBERS	
6. AUTHOR(S) Gary A. Maddux				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Univ. of Alabama in Huntsville Huntsville, AL 35899			8. PERFORMING ORGANIZATION REPORT NUMBER 5-20278 & 5-20279	
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) AMSAM-RD-SE-IO (T. Mullins) U.S. Army Aviation & Missile Command Redstone Arsenal, AL 35898			10. SPONSORING / MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES				
12a. DISTRIBUTION / AVAILABILITY STATEMENT Approved for Public Release; Distribution is unlimited.			12b. DISTRIBUTION CODE A	
13. ABSTRACT (Maximum 200 words) The Industrial Operations Division (IOD), Systems Engineering and Production Directorate (SEPD), AMCOM has the mission and function of providing microelectronic technology assessments, and producibility and supportability analyses for AMCOM weapon systems. IOD evaluates the impacts of nonavailability of microelectronic parts on the life cycle supportability of the AMCOM weapon systems and evaluates the producibility of AMCOM weapon systems. IOD required engineering support in performing microelectronic technology trend assessments for several AMCOM systems and in assessing the impact of nonavailability on those systems. The Systems Management and Production Laboratory at UAH was tasked to provide this engineering support and analytical capability.				
14. SUBJECT TERMS DMSMS			15. NUMBER OF PAGES 3	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT	

PLEASE CHECK THE APPROPRIATE BLOCK BELOW

DAO# _____

☐ _____ copies are being forwarded. Indicate whether Statement A, B, C, D, E, F, or X applies.

☒ DISTRIBUTION STATEMENT A:

APPROVED FOR PUBLIC RELEASE: DISTRIBUTION IS UNLIMITED

☐ DISTRIBUTION STATEMENT B:

DISTRIBUTION AUTHORIZED TO U.S. GOVERNMENT AGENCIES ONLY; (indicate Reason and Date). OTHER REQUESTS FOR THIS DOCUMENT SHALL BE REFERRED TO (Indicate Controlling DoD Office).

☐ DISTRIBUTION STATEMENT C:

DISTRIBUTION AUTHORIZED TO U.S. GOVERNMENT AGENCIES AND THEIR CONTRACTS (Indicate Reason and Date). OTHER REQUESTS FOR THIS DOCUMENT SHALL BE REFERRED TO (Indicate Controlling DoD Office).

☐ DISTRIBUTION STATEMENT D:

DISTRIBUTION AUTHORIZED TO DoD AND U.S. DoD CONTRACTORS ONLY; (Indicate Reason and Date). OTHER REQUESTS SHALL BE REFERRED TO (Indicate Controlling DoD Office).

☐ DISTRIBUTION STATEMENT E:

DISTRIBUTION AUTHORIZED TO DoD COMPONENTS ONLY; (Indicate Reason and Date). OTHER REQUESTS SHALL BE REFERRED TO (Indicate Controlling DoD Office).

☐ DISTRIBUTION STATEMENT F:

FUTHER DISSEMINATION ONLY AS DIRECTED BY (Indicate Controlling DoD Office and Date) or HIGHER DoD AUTHORITY.

☐ DISTRIBUTION STATEMENT X:

DISTRIBUTION AUTHORIZED TO U.S. GOVERNMENT AGENCIES AND PRIVATE INDIVIDUALS OR ENTERPRISES ELIGIBLE TO OBTAIN EXPORT-CONTROLLED TECHNICAL DATA IN ACCORDANCE WITH DoD DIRECTIVE 5230.25. WITHHOLDING OF UNCLASSIFIED TECHNICAL DATA FROM PUBLIC DISCLOSURE, 6 Nov 1984 (indicate date of determination). CONTROLLING DoD OFFICE IS (Indicate Controlling DoD Office).

☐ This document was previously forwarded to DTIC on _____ (date) and the AD number is _____.

☐ In accordance with provisions of DoD instructions. The document requested is not supplied because:

☐ It will be published at a later date. (Enter approximate date, if known).

☐ Other. (Give Reason)

DoD Directive 5230.24, "Distribution Statements on Technical Documents," 18 Mar 87, contains seven distribution statements, as described briefly above. Technical Documents must be assigned distribution statements.

GARY A MADDUX

Print or Type Name

Gary A Maddux 18 Oct 99

Authorized Signature/Date

256 890 6343 x 223

Telephone Number

PREFACE

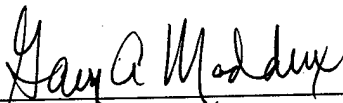
This technical report was prepared by the staff of the Research Institute, The University of Alabama in Huntsville. The purpose of this report is to provide documentation of the work performed and results obtained under Delivery Order 22 of AMCOM Contract No. DAAH01-98-D-R001. Mr. Gary Maddux was the principal investigator. Mr. Terry Mullins, Industrial Operations Division, Systems Engineering and Production Directorate, Research, Development, and Engineering Center, U.S. Army Aviation & Missile Command, provided technical coordination.

The views, opinions, and/or findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy, or decision unless so designated by other official documentation.

Except as provided by the Contract Data Requirements List DD Form 1423, hereof, the distribution of any contract report in any state of development or completion is prohibited without the approval of the Contracting Officer.

Prepared for: Commander
U.S. Army Aviation & Missile Command
Redstone Arsenal, AL 35898

I have reviewed this report, dated October 1999 and the report contains no classified information.



Principal Investigator

TABLE OF CONTENTS

1.0	INTRODUCTION.....	1
2.0	OBJECTIVES	1
3.0	STATEMENT OF WORK	1
4.0	DMSMS RESEARCH ACTIVITIES	2
5.0	CONCLUSIONS AND RECOMMENDATIONS	3

1.0 Introduction

The Industrial Operations Division (IOD), Systems Engineering and Production Directorate (SEPD), Research, Development, and Engineering Center (RDEC), Aviation & Missile Command (AMCOM) has the mission and function of providing microelectronic technology assessments, and producibility and supportability analyses for AMCOM weapon systems. IOD evaluates the impacts of nonavailability of microelectronic parts on the life cycle supportability of the AMCOM weapon systems and evaluates the producibility of AMCOM weapon systems. IOD required engineering support in performing microelectronic technology trend assessments for several AMCOM systems and in assessing the impact of nonavailability on those systems.

In order to facilitate the analysis of these technologies, the Systems Management and Production Laboratory at The University of Alabama in Huntsville was tasked to conduct research regarding nonavailability problems occurring throughout the Department of Defense (DoD).

2.0 Objective

The objective of this task was to conduct research and analysis of trends within DoD and industry over the past three years and make recommendations concerning new and innovative approaches related to Diminishing Manufacturing Sources and Material Shortages (DMSMS) management. The results of this research culminated in the 1999 DMSMS Conference. This conference addressed a number of technological, managerial and logistical issues related to DMSMS, and included representatives from the Services, other Government agencies, the electronics industry, and the defense contractor community.

3.0 Statement of Work

The statement of work, as outlined in delivery order 22, was as follows:

3.1 Task 1 – DMSMS Conference

UAH shall supply the material, personnel, expertise, and other resources to accomplish the following subtasks.

3.1.1 Development of DMSMS Invitation List.

UAH shall perform research to determine and up-to-date listing of industry and Government points-of-contact (POCs) that are actively involved in the management and solution of DMSMS related problems. In addition, a listing of important topics and concerns shall be solicited and validated as to widespread applicability. Results of this research shall be maintained and used as the basis for invitation to the conference.

3.1.2 Survey of Industry/Government Needs

UAH shall perform a survey of industry/government needs and requirements to proactively address DMSMS problem areas. This survey shall be conducted by an appropriate media, with use of both call-for-papers and electronic solicitation via the Internet.

3.1.3 Conference Support

UAH shall provide detailed support for all aspects of the 1998 DMSMS Conference. This support shall include coordination of event meeting times and location, event planning, speaker coordination, registration of attendees, on-site event support for audio-visual preparation, set-up and administration, and post-event closure of the conference.

3.2 Task 2 - Identification of DMSMS Trends in the Arrow System

UAH shall analyze and determine a support strategy for nonavailable Arrow spare parts. UAH shall identify and recommend solutions to nonavailable parts to the Arrow program. UAH shall research technologies/methodologies as solutions to the nonavailable spare parts and identify possible applications to the Arrow Program.

3.3 Task 3 - Evaluation of Simulation Based Design Techniques for DMSMS Resolution

UAH shall analyze and determine a strategy for applying Simulation Based Design (SBD) techniques to DMSMS problems. UAH shall investigate possible SBD technologies for design modeling and identify the tools or methodologies available to support DMSMS analysis and solutions for use in spare part design. UAH shall research applications used by other government agencies, and provide inputs regarding the application of the technologies/methodologies as solutions to the nonavailable spare parts. UAH shall also conduct a search for industry tools and techniques for application and use on government weapon system spare parts. All tools, techniques, methods, and the strategy shall be documented in the final report.

4.0 DMSMS Research Activities

Under this task members of the UAH Systems Management and Production Lab performed a detailed engineering research and analysis on the current processes and procedures used to determine the state of DMSMS. Specifically, trends within DoD were analyzed to determine the potential effects of obsolescence on AMCOM weapon systems. The findings from this research led to the 1999 DMSMS Conference, which was attended

by approximately 400 members of the defense community. The proceedings from this conference were delivered to the Government under separate cover.

In addition, DMSMS support was provided to the Arrow weapon system to mitigate the adverse effects of obsolescence. Efforts were also undertaken to develop simulation and visualization based tools to address DMSMS. The results of these two subtasks were published and delivered to IOD under separate cover.

5.0 Conclusion and Recommendations

During the time frame allocated by the delivery order, members of the UAH Systems Management and Production Lab, with the cooperation of representatives from AMCOM Systems Engineering and Production Directorate performed research and analysis of microelectronic trends to address the DMSMS needs of AMCOM project offices. Because of the rapidly changing microelectronics industry, it is imperative that this analysis be refreshed on a periodic basis.