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Technical Report 5-20212 & 5-20213
Contract No. DAAH01-98-D-R001
Delivery Order No. 16

**Microelectronic Spare and Repair Part Status Analysis
For the Multiple Launch Rocket System (MLRS)**

(5-20212 & 5-20213)

Final Technical Report for Period
17 June 1998 through 17 June 1999

August 1999

Prepared by:

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Prepared for:

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

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 16 of AMCOM Contract No. DAAH01-98-D-R001. Mr. Gary Maddux was the principal investigator. Mr. Colby Pitts and Mr. Robert Harvey served as lead engineers. Mr. Doug Johnston, Industrial Operations Division, Systems Engineering and Production Directorate, Research, Development, and Engineering Center, U.S. Army Aviation & Missile Command, provided technical coordination.

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

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



Principal Investigator

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1.0 Introduction

The Industrial Operations Division (IOD), SEPD, RDEC, AMCOM has the mission and function of providing microelectronic technology assessments, and producibility and supportability analyses for AMCOM systems. IOD evaluates the impacts of nonavailability of microelectronic spare and repair parts on the life cycle supportability of AMCOM systems. IOD required management and engineering support in performing microelectronic technology and availability assessments for the impact of nonavailability on the Multiple Launch Rocket System (MLRS). IOD provides supportability and producibility engineering support for MLRS primarily in the spare parts area. IOD also required management support for coordinating and insuring resolution of MLRS producibility and supportability problems.

In order to facilitate the assessment of this system, the Systems Management and Production Laboratory at The University of Alabama in Huntsville Research Institute was tasked to conduct an in-depth analysis as to the life cycle health of the MLRS weapon system's component parts.

2.0 Objective

The purpose of the work performed under this task order was to provide management and engineering support to analyze the availability of microelectronics used in the MLRS, to provide management support for producibility and supportability problems, to investigate and develop solutions for problem parts, and to present those findings.

3.0 Statement of Work

The statement of work, as outlined in delivery order 16, was as follows:

- 3.1 Define/refine assessment methods; build/validate/maintain a current system obsolescence database; research and analyze electronic component availability data; assess system impact; evaluate component substitution and redesign or other solution options; support obsolescence avoidance initiatives; report results; coordinate obsolescence information with pertinent organizations.
- 3.2 UAH shall analyze the availability of microelectronics used in MLRS. UAH shall assess the impact of the nonavailability of the microelectronics on system supportability. UAH shall evaluate and develop problem resolution approaches. Analyses results shall be recorded in databases which will be compatible with current IOD databases and delivered in digital and written report format to the government. Results shall also be documented in a final report. All results shall be delivered to IOD.

- 3.2.1 UAH shall define/refine assessment methods. Analyze current analysis methods. Develop additional approaches as required. Document analysis methods, data sources, criteria and reporting formats.
- 3.2.2 UAH shall research and analyze microelectronic component availability data. Search for data on microelectronic obsolescence and availability. Identify alternate sources, part numbers and qualified substitutes for obsolete or unavailable components. Verify compliance with military and commercial standards. Recommend specific alternate and substitute parts.
- 3.2.3 UAH shall assess system impacts. Identify specific component availability and obsolescence problems affecting MLRS. Derive quantitative statistics to demonstrate the impacts at the system, LRU, circuit board and component levels. Propose potential approaches to resolve availability and obsolescence problems and to reduce their impacts on system supportability.
- 3.2.4 UAH shall identify technology insertion opportunities. Identify opportunities for insertion of new microelectronic technologies into systems through redesign. Identify LRUs or boards which are candidates for redesign based on their use of obsolete microelectronics.
- 3.2.5 UAH shall provide engineering and management expertise and interface with MLRS and pertinent organizations as required to direct this effort and provide maximum benefit.
- 3.2.6 UAH shall promote IOD teaming through coordination and involvement with the Industrial Base and Value Engineering Groups when appropriate.
- 3.3 UAH shall provide management support for the MLRS activities of IOD and shall report directly to and receive direction from the assigned IOD MLRS representative (assigned by the Contracting Officer Representative (COR)) unless otherwise coordinated and approved by the COR. UAH shall be responsible for initiating, administrating and coordinating the microelectronics and producibility/supportability tasks of IOD and insuring accurate and timely task completion. UAH shall be attentive to the MLRS program environment and promote efforts to further the IOD work level and areas supported within MLRS.

4.0 Assessment of the MLRS Weapon System

Under this task members of the UAH Systems Management and Production Lab performed a detailed engineering analysis on the component parts of the MLRS weapon system. Specifically, microelectronic components were analyzed according to their availability and expected life cycle. To ascertain this information, UAH worked with the electronics industry, the MLRS Project Office, and other government agencies.

The results of this task were published in the *Microcircuit Obsolescence Assessment of the MLRS Weapon System* 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 and the MLRS Project Office investigated the life cycle supportability of the microelectronics of the MLRS weapon system. Because of the rapidly changing microelectronics industry, it is imperative that this assessment be refreshed on a periodic basis. Only through the diligent monitoring of a complex system can its sustainability issues be properly addressed. It is recommended that the MLRS Project Office adopt a proactive obsolescence management philosophy so that the total cost of ownership is reduced over the system's life cycle.