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A requirement for the implementation of IPD is an understanding of technology trends, engineering management and statistical methodologies, which are major components in developing a successful strategy for weapon systems. The Engineering Directorate requires support and expertise in these critical areas to meet its requirement to the AMCOM community. A training/education program was developed and a plan to offer such was made to ED engineering personnel. A strategy was developed by which the engineering capabilities particularly in the areas of systems engineering and quality engineering could be refreshed through a series of seminars and training programs. A list of strategic initiatives was developed to aid in the integration of the missile and aviation groups.

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A Research and Analysis of Technology Trends, Engineering Management, and Statistical Methods

(5-21029)

Final Technical Report for Period
30 August 2000 through 30 September 2001

February 2002

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Redstone Arsenal, AL 35898
Attn.: Ms. Patti Martin

PREFACE

This technical report was prepared by the faculty of the Industrial and Systems Engineering and Engineering Management Department at 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 091 of AMCOM Contract No. DAAH01-98-D-R001. Dr. Dawn R. Utley was the principal investigator. Drs. Phillip A. Farrington and Paul J. Componation served as co-principal investigators for the project. Ms. Patti Martin, Engineering Directorate, Missile Research, Development and Engineering Center, provided technical guidance.

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.

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

I have reviewed this report, dated February 2002, and the report contains no classified information.

Dawn R. Utley
Principal Investigator

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1.0 Introduction

The Aviation and Missile Command Research Development and Engineering Center (AMRDEC) has been identified as the U.S. Army Aviation and Missile Command (AMCOM) proponent for Integrated Product Development (IPD). As the Command's focal point, the ED is committed to providing the AMCOM community with a solid analytical foundation for the implementation and management of IDP teams.

A requirement for the implementation of IPD is an understanding of technology trends, engineering management and statistical methodologies, which are major components in developing a successful manufacturing and support strategy for weapon system life cycle cost reduction. The ED requires support and expertise in these critical areas to meet its requirement to the AMCOM community.

2.0 Objective

The objective of this task is to provide analytical support to the ED in the development of strategic plans to support aviation and missile manufacturing. This task shall include as analysis of the current AMCOM and ED infrastructures to support the weapon system manufacturing process. An outcome of the task shall be recommendations regarding the AMRDEC and ED strategies for implementing technology trends, engineering management, and statistical expertise.

3.0 Statement of Work

The statement of work, as outlined in delivery order 091, was as follows:

3.1 UAH shall investigate current methodologies used within the AMRDEC and ED to organize and maintain its engineering capability to provide expertise to the AMCOM project offices. This investigation shall determine past procedures used by the AMRDEC and ED to implement management philosophies, such as IPD, and manufacturing technologies, such as statistical process control (SPC).

3.2 UAH shall perform data gathering activities including interviews of key AMRDEC and ED personnel to determine the effectiveness of current engineering management approaches in the development of aviation and missile manufacturing plans and strategies.

3.3 Based on the findings of the above action items, UAH shall develop and document an improvement strategy for the implementation of engineering management approaches and statistical methodologies with the AMRDEC and ED. This strategy shall include an evaluation of current deficiencies within the AMRDEC and ED engineering functions, and recommendations on how these deficiencies can be addressed.

4.0 Conclusion and Recommendations

During the time frame allocated by the delivery order, members of the UAH Industrial and Systems Engineering Department, with the cooperation of representatives from AMCOM Engineering Directorate, conducted research and analysis into the current methods and strategies for maintaining its engineering capabilities. As a result, a training/education program was developed and offered to ED engineering personnel. Graduate courses were identified that met specific needs of ED and commitments were made to teach a series on site at the Arsenal.

A strategy was developed by which the engineering capabilities particularly in the areas of systems engineering and quality engineering could be refreshed through a series of seminars and training programs. Ideas were shared and a plan developed for further detailed development of specific needs within ED. Such future activities were to include survey instruments on the current systems engineering tools in use and what was needed for future work, quality engineering assessment surveys, and engineering management training.

Discussions were held with key personnel about the merging of the aviations group and the missile group and the resultant management challenges and opportunities present. A day long off-site with the executive management group was held. As part of this off site an intensive strategy session was held in which strengths and weaknesses were discussed followed by a brainstorming session to generate possible solutions and opportunities. After small group discussions and evaluations of alternatives, a list of strategic initiatives was developed to aid in the integration of the two groups and new directions set for the new merged group.

The result of each activity led to the establishment of future follow-on contract work to develop and put in place the recommendations that resulted from the research under this contract.