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The Production Engineering Division (PED) of the System Engineering and Production Directorate (SEPD), Research, Development and Engineering Center (RDEC) was identified as the U.S. Army Missile Command's (MICOM) proponent for Integrated Product Development (IPD). As the Command's focal point it became apparent that a Command IPD system was needed to aid programs with the implementation and conduct of IPD. In an effort to develop such a system a Missile IPD Demonstration was proposed and the results of this task fed directly into the demonstration and the eventual Command IPD system. This report documents work performed on this effort.

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Integrated Product Development Tools Integration and Development (5-33897)

Final Technical Report for Period
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July 1999

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Prepared for:

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Attn.: Mr. Brian Davis

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 72 of MICOM Contract No. DAAH01-92-D-R006. Mr. Keith Crowe and Ms. Jennifer Demirjian were the principal investigators. Mr. Brian Davis, Production Engineering Division, Systems Engineering and Production Directorate, Research, Development, and Engineering Center, U.S. Army 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.

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

I have reviewed this report, dated 15 July 99 and the report contains no classified information.

Gary A Maddux

Principal Investigator

TABLE OF CONTENTS

1.0 Introduction

The Production Engineering Division (PED) of the System Engineering and Production Directorate (SEPD), Research, Development and Engineering Center (RDEC) was identified as the U.S. Army Missile Command's (MICOM) proponent for Integrated Product Development (IPD). As the Command's focal point it became apparent that a Command IPD system was needed to aid programs with the implementation and conduct of IPD. In an effort to develop such a system a Missile IPD Demonstration was proposed and the results of this task fed directly into the demonstration and the eventual Command IPD system.

2.0 Objectives

The objective of this task was to provide the necessary engineering management analysis and support through the allocation of resources for the development and integration of IPD tools into the Missile IPD Demonstration. The demonstration initiated the establishment of a command IPD system.

3.0 Statement of Work

The statement of work, as outlined in delivery order 72, was as follows:

3.1 Integrated Product Development Tools Integration

UAH shall investigate existing tools and methodologies in use within the Missile Command (including prime contractors) that would support an IPD development philosophy. The types of tools would include, cost modeling, analysis, simulations, scheduling programs, budget databases, materials databases, and process databases. With this information and information collected through the IPD Demonstration, UAH shall integrate the existing tools/methodologies and develop any necessary software required for the integration into the demonstration.

3.2 Advanced Integrated Product Development Tools

UAH shall investigate the use of advanced tools to support the IPD development philosophy. Tools to be investigated include, CAD/CAM, advanced manufacturing modeling, quality function development (QFD), system engineering tools, virtual analysis, and management techniques. Based on the results of the investigation (cost, hardware/software requirements, ease of use, etc.) UAH shall make recommendations for incorporation of selected tools into the Missile IPD Demonstration.

4.0 Description of Work Performed

The work performed under this delivery order consisted of an investigation of the various tools and technologies in use within the MICOM and its prime contractors that support the use of IPD. In addition to moving to integrated product teams (IPTs), the IPD philosophy encourages continual learning and the use of tools and technologies that enhance their efficiency and effectiveness. This research effort reviewed numerous tools and technologies that can assist the IPT in addressing a number of life cycle concerns early in the design process.

The primary output of this research was an integrated set of Internet-based tools that allowed the team to communicate more easily. Communication has been identified as one of the key drivers to facilitate collaborative engineering. The Internet was chosen as the primary vehicle of communication because of its widespread and growing usage.

The Missile IPD Toolset developed under this task included an action item database, a collaborative team calendar, an IPT organization chart, and other smaller components. The toolset was fully tested used both real and fictitious data, and it has been implemented to support existing IPTs.

5.0 Conclusions and Recommendations

During the time frame allocated by the delivery order, members of the UAH Applied Research Program, with the cooperation of representatives from MICOM SEPD, performed an analysis and evaluation of communication requirements to support IPPD. The successes of this task have led directly to the incorporation of Internet-based application software for a number of MICOM project offices. The testbed that was developed under this statement of work remains in operation in the Manufacturing Technology Division