**REPORT DOCUMENTATION PAGE**

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 DCMA Headquarters (ATTN: 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
   Aug-96
3. REPORT TYPE AND DATES COVERED
   Final Report: 8 Mar 96 thru 30 Jun 96

4. TITLE AND SUBTITLE
   Manufacturing Research for Multispectral Missile Seekers and Millimeter Wave Infrared Polarimetry

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
   5-34401

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
   AMSAM-RD-SE-MT (D. HOLDERFIELD)
   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 Systems Engineering and Production Directorate has the mission and function of evaluating new technologies and determining the impacts of same on the producibility and supportability of MCOM missile systems. SEPD required engineering support in performing assessments on the above technologies. The Systems Management and Production Laboratory at The University of Alabama in Huntsville (UAH) Research Institute (RI) was tasked to provide this engineering support and analytical capability.

14. SUBJECT TERMS
   multispectral missile seekers, millimeter wave, infrared polarimetry

15. NUMBER OF PAGES
   2

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT
18. SECURITY CLASSIFICATION OF THIS PAGE
19. SECURITY CLASSIFICATION OF ABSTRACT

20. LIMITATION OF ABSTRACT

Page numbers: 19991004 025
PLEASE CHECK THE APPROPRIATE BLOCK BELOW

☐ 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:
   FURTHER 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)

statements, as described briefly above. Technical Documents must be assigned distribution statements.

[Signature]
Authorized Signature/Date

[Name]
Print or Type Name

[Telephone Number]
Manufacturing Research for Multispectral Missile Seekers
And Millimeter Wave/Infrared Polarimetry

(5-34401)

Final Technical Report for Period
8 March 1996 through 30 June 1996
August 1999

Prepared by:
Gary A. Maddux

Research Institute
The University of Alabama in Huntsville
Huntsville, Alabama 35899

Prepared for:
U.S. Army Missile Command
Redstone Arsenal, AL 35898
Attn.: Mr. Daron Holderfield
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 94 of MICOM Contract No. DAAH01-92-D-R006. Mr. Gary Maddux was the principal investigator. Mr. Daron Holderfield, Manufacturing Technology Division, Systems Engineering and Production Directorate, Research, Development, and Engineering Center, U.S. Army Missile Command, provided technical coordination. Technical expertise and insights in multispectral missile seeker applications was provided by Mr. William Pittman, Missile Guidance Directorate, Research, Development, and Engineering Center, U.S. Army Missile Command.

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 Missile Command
              Redstone Arsenal, AL  35898

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

[Signature]
Principal Investigator
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>2.0</td>
<td>OBJECTIVES</td>
<td>1</td>
</tr>
<tr>
<td>3.0</td>
<td>STATEMENT OF WORK</td>
<td>1</td>
</tr>
<tr>
<td>4.0</td>
<td>DESCRIPTION OF WORKSHOP</td>
<td>2</td>
</tr>
<tr>
<td>5.0</td>
<td>CONCLUSIONS AND RECOMMENDATIONS</td>
<td>2</td>
</tr>
</tbody>
</table>
1.0 Introduction

The Missile Research, Development, and Engineering Center is currently investigating manufacturing technology issues related to multispectral missile seekers and millimeter wave/infrared polarimetry. These new technologies can lead to applications which will significantly improve the performance of missile and other DoD weapon systems.

The Systems Engineering and Production Directorate has the mission and function of evaluating new technologies and determining the impacts of same on the producibility and supportability of MICOM missile systems. SEPD required engineering support in performing assessments on the above technologies. The Systems Management and Production Laboratory at The University of Alabama in Huntsville (UAH) Research Institute (RI) was tasked to provide this engineering support and analytical capability.

2.0 Objective

The purpose of this research task was to conduct analysis and evaluations of manufacturing processes and technologies in the areas of multispectral missile seekers and millimeter wave/infrared polarimetry. UAH conducted research to identify and categorize emerging technologies based on the potential for DoD weapons applications and manufacturing technology maturity.

3.0 Statement of Work

The statement of work, as outlined in delivery order 94, was as follows:

UAH shall provide the personnel, resources, expertise and materials required to perform the following efforts:

3.1 Conduct analysis and evaluations of manufacturing processes and technologies related to multispectral missile seekers and millimeter wave/infrared polarimetry manufacturing technologies. Emphasis shall be placed on identifying activities in the DoD sector related to new manufacturing processes and technologies, new components and subsystems that offer performance increases, and design characteristics (compatibility with current military hardware requirements).

3.2 Identify technology alternatives related to multispectral missile seekers and millimeter wave/infrared polarimetry with analysis of interactions between manufacturing technology processes and trade off considerations.
4.0 Description of Workshop

The work performed on this task led directly to the Workshop on Multispectral Missile Seekers and Millimeter Wave/Infrared Polarimetry, which was held at the Sparkman Center Auditorium in 1996. The objective of this workshop was to review the progress of these technologies applicable to DoD weapon systems.

5.0 Conclusion 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 the multispectral missile seeker and millimeter wave/infrared polarimetry technology. Results of these efforts were presented at a locally held workshop. Detailed findings can be found in the proceedings of that workshop, which was compiled by UAH and delivered under separate cover.