FMU-160B: 105mm PROXIMITY FUZE FOR THE AC130 GUNSHIP

45th Annual Fuze Conference

April 16-18, 2001
Long Beach, CA

Bob Hertlein, Dave Lawson
KDI Precision Products, Inc.

Telly Manolatos
Electronics Development Corp

KDI Precision Products, Inc.
An ISO 9001 Registered Company

http://www.kdi-ppi.com
<table>
<thead>
<tr>
<th><strong>Title and Subtitle</strong></th>
<th><strong>Contract Number</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>FMU-160B: 105mm PROXIMITY FUZE for the AC130 Gunship</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Author(s)</strong></th>
<th><strong>Grant Number</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hertlein, Bob; Lawson, Dave; Manolatos, Telly</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Performing Organization Name(s) and Address(es)</strong></th>
<th><strong>Program Element Number</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>KDI Precision Products, Inc.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Sponsoring/Monitoring Agency Name(s) and Address(es)</strong></th>
<th><strong>Project Number</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>NDIA (National Defense Industrial Association) 211 Wilson BLvd., Ste. 400 Arlington, VA 22201-3061</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Performing Organization Report Number</strong></th>
<th><strong>Task Number</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Permit Number</strong></th>
<th><strong>Work Unit Number</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Distribution/Availability Statement</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Approved for public release, distribution unlimited</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Supplementary Notes</strong></th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>Abstract</strong></th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>Report Classification</strong></th>
<th><strong>Classification of this page</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>unclassified</td>
<td>unclassified</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Classification of Abstract</strong></th>
<th><strong>Limitation of Abstract</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>unclassified</td>
<td>UU</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Number of Pages</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td></td>
</tr>
</tbody>
</table>

Presentation Outline

- Application
- Need for Improved Proximity Fuze
- Design Goals
- Design Approach
  - RF Front End
  - Signal Processor
  - Battery
  - S&A
Application

- AC-130 Gunship
  - Air Force Special Operations Command (AFSOC)
  - Modified M137 105mm Cannon
Need for Improved Proximity Fuze

- High Fragmentation (HF) Version of HE M1 (MOD) Cartridge
  - Maximum effectiveness requires precise HOB regardless of target reflectivity and approach angle
  - Proximity fuzes currently available are not optimized for the HF round
    - Wide HOB variation
    - Average HOB not optimum
    - Insufficient reliability
Design Goals

- Tight HOB Control
  - Nominal HOB = 15 ft
- Impact Back-up Mode
- Highly Reliable
- Surface Mount Technology
- Maximum Commonality to Existing Designs
  - Proven Reliability
  - Reduced Cost
Design Approach

- RF Front End
- Signal Processor
- S&A
- Battery
RF Front End

- Based on Highly Successful M734A1 Multi-Option Fuze for Mortars (MOFM)
  - MMIC Transceiver
  - Circular Patch Antenna
    - Wide Bandwidth
    - Broad Coverage
  - Additional IF Gain Stage
Signal Processor

- Same Signal Processor as the M734A1 MOFM
- Utilizes DDR Technology
  - Accurate HOB Control
  - Robust Anti-jamming Performance
- Highly Integrated
  - Single Chip Solution
  - High Reliability
  - Low Cost

http://www.kdi-ppi.com
TYPICAL PERFORMANCE

M734A1 - 120mm Prox Mode, Charge 0, -40°F, 1500 QE
HOB Histogram

Frequency

Height (feet)
MK41 is a Qualified Design
Low Cost
Performance Parameters:
- Setback g Level: 26,000 g
- Spin Rate: 410 rps
- Velocity: 3075 ft/sec
Battery

- Manufactured the Netherlands by Thales Munitronics
  - Formerly Signaal USFA
- Chemistry: Lithium
- Proven Design for Artillery
- Performance Parameters:
  - Operational Life: 150 seconds min
  - Current: 150 mA
  - End of Life Voltage: 5.5 Volts min
  - Rise Time: 100 mSec max
  - Required Setback: 2000 g’s min
  - Required Spin: 2500 rpm min
  - Operating Temperature: -40F to +145F

http://www.kdi-ppi.com