Requirements to Current and Future Small Arms

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Authorized by: Wolfgang Bantle

8.5.2007
SA80  Reliability Growth Investigation

07/96  Request for tender by MoD for reliability growth investigation

11/96  Contract awarded by MoD

12/96 - 04/97  Reliability growth investigation at HK-O

06/97  Presentation of results at Abbey Wood
SA80  Reliability Growth Investigation

1. Weapon Measurement 4 Weapons
2. Barrel Measurement
3. Evaluation with Various Ammunition
4. Firing at Different Temperations
5. Test Report
6. Design Proposals
<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>07/97</td>
<td>Request for tender to modify an initial quantity of weapons</td>
</tr>
<tr>
<td>09/97</td>
<td>Tender submitted to MoD</td>
</tr>
<tr>
<td>01/98 - 06/98</td>
<td>Further discussions with MoD</td>
</tr>
<tr>
<td>07/98</td>
<td>Presentation of proposal at Warminster</td>
</tr>
<tr>
<td>07/98</td>
<td>Modification of 100 IWs &amp; 100 LSWs is agreed and work starts</td>
</tr>
<tr>
<td>01/99</td>
<td>100 IWs &amp; 100 LSWs delivered to MoD on schedule</td>
</tr>
</tbody>
</table>
Firing Cycle | Rounds Fired
---|---
1) 30 rpm for 40 sec | (20)
2) 10 rpm for 6 min | (60)
3) 30 rpm for 1 min | (30)
4) 10x 4 round bursts in 1 min | (40)

*Total: 150 rounds in 8 minutes 40 seconds*
<table>
<thead>
<tr>
<th>Firing Cycle</th>
<th>Rounds Fired</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) 60 rpm for 3 mins</td>
<td>(180)</td>
</tr>
<tr>
<td>2) 0 rpm for 1 min</td>
<td>(0)</td>
</tr>
<tr>
<td>3) 60 rpm for 3 mins</td>
<td>(180)</td>
</tr>
<tr>
<td>4) 0 rpm for 2 mins</td>
<td>(0)</td>
</tr>
<tr>
<td>5) 60 rpm for 2.5 mins</td>
<td>(150)</td>
</tr>
<tr>
<td>6) 0 rpm for 10 mins</td>
<td>(0)</td>
</tr>
<tr>
<td>7) 30 rpm for 10 mins</td>
<td>(300)</td>
</tr>
<tr>
<td>8) 0 rpm for 2 mins</td>
<td>(0)</td>
</tr>
<tr>
<td>9) 60 rpm for 2.5 mins</td>
<td>(150)</td>
</tr>
</tbody>
</table>

*Total: 960 rounds in 36 minutes*
Alaska, February 1999
Reliability Results

- SA80 IW Modified: Reliability 96%
- SA80 LSW Modified: Reliability 86%
- SA80 IW Unmodified: Reliability 22%
- SA80 LSW Unmodified: Reliability 5%
Kuweit Trials, June 1999
Reliability Results

- SA80 IW Modified
  Reliability: 97.8%

- SA80 LSW Modified
  Reliability: 87%

- SA80 IW Unmodified
  Reliability: 22%

- SA80 LSW Unmodified
  Reliability: 2%
03-05/00 Negotiations concerning quantity production

Reliability to high?
SA80 Project Timelines

- **06/00** SA80 go ahead by Defence Secretary
- **10/00 - 01/01** SA80 contract negotiations between MOD and HK
- **01/01** 150 IW's and 150 LSW's Standard Production Weapons delivered to MoD on time
- **02/01** SA80 Main Contract, issued by MoD
- **02/01** ISRD - Trial Alaska
- **03/01** ISRD - Trial Brunei
Trust!
Tests have now shown if it does break it'll be your fault.
Golden Triangle

User

Industry

Procurement Agency
Requirements to Current and Future Small Arms

- Lethality
- Reliability
- Interoperability
- Modularity
- Special Requirements
Lethality

UGL 40mm x 46 - Trajectory Comparison LV vs. MV

Effect on Trajectory

Projectile Weight
LV – 180g
MV – 180g / 250g

Range (m)

Height of Trajectory (m)

0 2 0 4 0 6 0 8 10 12 14 16 18

0 2 0 4 0 6 0 8 10 12 14 16 18

0 2 0 4 0 6 0 8 10 12 14 16 18

Commercial in Confidence
Lethality

Energy 5.56mm x 45

Energy versus Range

Energy [J]

Range [m]

- Barrel 10"
- Barrel 14.5"
- Barrel 16.5"
- Barrel 20"

Commercial in Confidence
Lethality

Muzzle Velocity 5.56mm x 45

Velocity versus Range

Range [m] vs. Velocity [m/s]

- Barrel 10"
- Barrel 14.5"
- Barrel 16.5"
- Barrel 20"
Lethality

Energy 7.62mm x 51

![Energy versus Range Graph](graph.png)

<table>
<thead>
<tr>
<th>Range [m]</th>
<th>Energy [J]</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>3500</td>
</tr>
<tr>
<td>100</td>
<td>3000</td>
</tr>
<tr>
<td>200</td>
<td>2500</td>
</tr>
<tr>
<td>300</td>
<td>2000</td>
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<tr>
<td>400</td>
<td>1500</td>
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<td>500</td>
<td>1000</td>
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<tr>
<td>600</td>
<td>500</td>
</tr>
<tr>
<td>700</td>
<td>0</td>
</tr>
<tr>
<td>800</td>
<td>0</td>
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</tbody>
</table>

- **Barrel 12"**
- **Barrel 16"**
- **Barrel 20"**
Lethality

Muzzle Velocity 7,62mm x 51

 Velocity versus Range

- Barrel 12"
- Barrel 16"
- Barrel 20"

Range [m]

Velocity [m/s]
Lethality

Battlefield Mission for Individual - Light Support Weapon

<table>
<thead>
<tr>
<th>Minutes</th>
<th>Rounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.6</td>
<td>100</td>
</tr>
<tr>
<td>8.6</td>
<td>150</td>
</tr>
<tr>
<td>36</td>
<td>960</td>
</tr>
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</table>

SA80 LSW
Lethality

Weapon Weight

Requirement

0 Kg or less
Commercial in Confidence

Accuracy Requirement

Lethality

SA80
Sniper Rifle
Assault Rifle

100m

11.84cm

2.96cm

11.84cm

4 M.O.A.

1 M.O.A.

4 M.O.A.
Special Requirements

Climatic Scenarios

Commercial in Confidence
Special Requirements

Over the Beach Test

1. Bolt hold open, magazine with 1 round inserted.

2. Weapon immersed in water 0.5m below surface.

3. Bolt closed (under water).

4. Weapon permitted to drain for 2 seconds maximum.

5. Chambered round fired.
Meeting the Challenge

Key Features

Gas System

Barrel Nut

Firing Pin Safety

Commercial in Confidence
Meeting the Challenge

Key Features

Enhanced Buttstock

Gas Block

Free Floating Rail System

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Meeting the challenge

Modularity HK417

12"

16"

20"

Commercial in Confidence
Meeting the challenge

Modular Accessories - UGL
Meeting the challenge

Modular Accessories

2 Stage Trigger System

Handle Grip V1/ V2

Safety BFA

Harris Bipod Interface
Meeting the challenge

Modular Accessories

Sling Adapter

Cocking Lever

MFAS - Tool

Rear Sight
XM320

Project Timelines

- **02/05** Contract Award
- **11/05** Delivery of 60 XM320’s and 60 DNS’s
- **12/05** LUE
- **03/06** PPT
- **07/06** PQT
- **09/06 (06/07)** OT
- **04/07** Milestone C

Commercial in Confidence
<table>
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<th>Date</th>
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<tr>
<td>06/07</td>
<td>Procurement of 60 Trials Weapons</td>
</tr>
<tr>
<td>06/07</td>
<td>OT</td>
</tr>
<tr>
<td>10/07</td>
<td>Procurement Phase</td>
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</tbody>
</table>
XM320

Build Standard 1/2005

Commercial in Confidence
XM320

Weapon Modifications
Customer Feedback to Industry

Define Key user requirements

Funding $$$

Recognition of Costs for Trials Weapon

Identify Testing Requirements

Provide CLEAR Program objective

Compare Life Cycle Costs

Realistic Timelines

Customers
Industry Feedback to Customer

Incorporate latest Technology

CLS proposal

Risk Plan

Cost saving measures

Life Cycle Costs

Cost for trials weapons

Realistic Timelines

Commercial in Confidence
Golden Triangle

User

Industry

Procurement Agency

Commercial in Confidence
Final Point

We All owe our best efforts and cooperation to continually strive to improve upon the equipment that is relied upon to protect our way of life every day!

No Compromise!
Requirements to Current and Future Small Arms