M14 to MK 14
Evolution of a Battle Rifle

Dave Armstrong (ISEA - Sniper Weapons), NSWC Crane, Code 4081
The M14’s Difficult Starting Point

- M14 – slated to replace all shoulder arms to be complemented by M60 MG

M1 Garand – “Greatest battle implement ever devised” Gen. Patton

M3 “Grease Gun”

M1 / M2 Carbine

Browning Automatic Rifle (BAR – M1918A2)

Harnessing the Power of Technology for the Warfighter
Specialty M14 Configurations

Field Stripped M14

M21 Sniper Rifle

M14A1 (aka E2)

Distribution Statement A - Approved for public release; distribution unlimited.
Gene Stoner’s Aircraft Alloy AR-15

M16A1
6.6 lbs – 20.5” barrel

XM177E2
6.2 lbs – 11.5” barrel

The M14’s “Competition” from Colt at the time – really filling a different role

Assault Rifle vs. Battle Rifle

German FG42 - 10 lbs
Paratroop Rifle in 8X57mm

AK-47 Assault Rifle
10 lbs

M14 Battle Rifle
9.7 lbs

All weights – with empty mag.

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Evolution Toward the Assault

MP-43 /44   Stg 44
uses 30 round magazine - 12 lbs loaded

The “Leap” to a true 300 yard/meter capable Assault Rifle / Sturmgewehr

PPSh-41 with 71 round Drum - 12 lbs loaded

.30 Carbine
7.62X25 and
7.92X33 Kurtz loaded

M1 Carbine
5.5 lbs

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The Details of Winning Battles

- Inflict casualties in larger numbers than the enemy.
- Inflict casualties at a greater range than the enemy and thus take fewer casualties.
- Inflict casualties at a greater rate than the enemy can tolerate - overcoming training, discipline, and morale, to dominate the field of battle.
- The Germans began demonstrating some of these in WWI
- By the End of WWII the world had a solid respect for the effects of pure volume of fire – firepower.
- Russia quickly produced the SKS and AK-47 chambering the intermediate 7.62X39mm Cartridge to support the new fire and maneuver storm troop tactics the Germans had demonstrated.
- Rate of Fire had become a primary measure of effect in battle.
- The primary combat arm would need only a 300 meter range.
Early 1960’s

M79 Grenade Launcher – began use in 1961 beginning to replace M14 in that role

ARPA (now DARPA) Tests AR-15 against M2 Carbine for use by South Vietnamese Troops

Results of this testing and use of the 1000 AR-15s procured by DARPA lead to the thought that the AR-15 would also be ideal for US Troops.

1984 Exercise – M21 and M16A1 w/M203 Grenade Launcher

M203s are first issued in early 1970s

The M203 Rifle Mounted GL evolves out of SPIW concepts
THE SPIW - Undone by Specifications

Special Purpose Infantry Weapon Efforts

Springfield Armory First Generation SPIW - 14.5 lbs

Olin / Winchester SPIW

H & R SPIW - 23.9 lbs
Fired 3 Flechette per shot
Vietnam M14 / M21 Use

AN/PVS-2 and M14SS-1 Suppressors

Fixed Bayonet

Vietnam Sniper
Sniper Rifle Updates

Navy M14 Port Security (double lugged) and Match Rifles (single lug)

USMC DMR with AN/PVS-10 Day / Night Sight and OPS Supp.

Army XM25 / M25 (also used suppressed)

USMC M40A1 - first M40 was 1966

M24 – Army Commercial Competition 1988
Current/ Future 7.62mm Sniper Weapons

Last Navy Sniper M14 – SSR (Sniper Security Rifle)

MK 11 MOD 0 (Navy SR 25)- Suppressed

Army XM110 – w/minor changes M110

SCAR-H MK 17 SSR Sniper Support Rifle (Prototype)
Recent Navy M14 / MK 14 Use

Navy EOD MK 14 MOD 0 – (representative optic)

SEALs with MK 48 LMG & 2 MK 14 MOD 0s

SEAL - Advertising Photo

Navy M14 Line Throwing

Burial at Sea
Recent Army M14 Usage

7.62mm NATO remains cartridge of choice for certain tasks

Baghdad Night / Day

Army Sharp Shooters - Mosul, Iraq

Army M14 in Iraq
Navy M14 Muzzle Compensator

Navy Optimized M14 Brake/Compensator Top

M14 with Beretta BM59 type folding stock (Top) AKM below

Original M14A1 Compensator
Arctic Stock for M14 Starting Point

Example of Sage Arctic Stock Upgrade to GI Fiberglass/Plastic

Arctic Stocked M14 with KAC-RAS

Top – M14 bipod leg used for telescoping mechanism on A1 wood stock.

Middle – M4 Carbine Type modified GI fiberglass stock.

Bottom – Later Sage Mod (orig. had no cheekrest).

Not Shown – Butler Creek Side Folder Mod.

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Original EBR Concept Demonstration

GI fiberglass top / 1st Sage below

LMT rail mounted M203 concept ("ammo bearer" recommended)

Lightening cuts, Paint and 16 inch prototype barrel

Forward mounted AimPoint and light bipod
Original Enhanced Battle Rifle Concept

EBR System Features – Starts with Chassis Stock

- See thru Rings
- Screw-on Flash Suppressor
- Optic
- Bolt Release
- Sling

Harnessing the Power of Technology for the Warfighter
M14 EBR Test Configurations

Test EBR configured with Light and Reflex Sight

Pocket Scope (M983) behind AimPoint (or any Reflex sight)

M983 in front - not great / behind 1.5-5X – not bad

AN/PVS-17 MNVS (2.25X) – Nice (w/PEQ-2)

UNS – Universal Night Sight (now AN/PVS-22) – excellent capability
M14 to MK 14 MOD 0 Changes

- Stock System (Chassis)
- Operating Rod Guide
- Front and Rear Sights
- Gas Cylinder Lock
- Stripper Clip Guide (1913)
- Extended Bolt Release
- 18 inch barrel (vs. 22 inch)
- Improved Flash Suppressor
- Accessories – rings, bipod, grip, sling, case, cleaning kit, tool
MK 14 MOD 0 and MOD 1

MK 14 MOD 0

MK 14 MOD 1 – First Issued

MK14 MOD 1 – after Suppressor Down Select

Harnessing the Power of Technology for the Warfighter
MK 14 MOD 0 vs MOD 1

MK 14 MOD 1 with AV/PVS-26

Air Force MK 14 MOD 0 w/ Leupold 3.5-10X

Latest Navy MK 14 MOD 1 (2.5-10X NXS)

Special EBR folding Tool

Weight comparison: Empty - No Bipod, No Supp, No Mag. Mag. weighs 1/2 pound empty, weight includes forward grip – no optic (or riser on MOD 1).

<table>
<thead>
<tr>
<th>MOD 0</th>
<th>MOD 1</th>
</tr>
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<tbody>
<tr>
<td>11.4 lbs</td>
<td>10.6 lbs</td>
</tr>
<tr>
<td>Bipod .74 lbs</td>
<td>Bipod 1.04 lbs</td>
</tr>
</tbody>
</table>

MOD 1 Sound Supp. = 1.27 lbs
MK 14 vs M4A1 Length

Top - MK 14 MOD 1: 37.0 inches
Middle - MK 14 MOD 0: 35.0 inches
Bottom - M4A1 Carbine: 30.5 inches

(all weapons with stocks at shortest length)

MK 14 MOD 0 – 1.5-5X Optic Concept
Original M14 is 44.4 inches long

MK 14 MOD 0
Operator’s Manual
M14 EBRs in use

Air Force MK 14 in Transit
More “Drop In” M14 EBR Conversions
Other M14 Related Developments

Original Rock – SOPMOD M14 – had reconfigured gas system and metal stock

JAE 100 - Sniper Type Stock - No bedding required

Latest Troy Industries M14 Stock

McMillan MFS-14 System

Smith Enterprise Day / Night Optic Mounts

Distribution Statement A - Approved for public release; distribution unlimited.

Harnessing the Power of Technology for the Warfighter
Many SOPMOD Kit Type Accessories are useful on M14 EBRs / MK 14s to include the latest Array of Night Vision and Thermal Clip-On Units as well as the various Lasers, Lights and Optical Sights and most anything else mountable to Mil Std 1913 Rails.
Fighting at 300 meters and Less

- **FN P90**
  - 5.7X28mm

- **HK MP7**
  - 4.6X30mm

- **MARS**
  - 5.56X30mm

- **KAC – PDW 6X35mm (8 inch)**
  - (10 inch barrel also available)

- **MK 18 CQC or CQBR on M4**
  - 5.56X45mm

- **SCAR-CQC**
  - 5.56X45mm

*Harnessing the Power of Technology for the Warfighter*
OPTIMIZATION of Weapon / Ammo Load

Weapon System Weights -
Need to fit within an Ideal 45 lbs (50 lb maximum) fighting load including other Kit

An M203 Grenade Launcher
adds 3 lbs plus 3/4 lb per M433 HEDP round

<table>
<thead>
<tr>
<th>Cartridge</th>
<th>7.62x51</th>
<th>7.62x39</th>
<th>5.56x45 M14</th>
<th>5.56x45 M4A1</th>
<th>5.56x45 M4-10&quot;</th>
<th>5.56x30 MARS</th>
<th>5.7x28 FN P90</th>
<th>4.6x30 HK MP7</th>
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</thead>
<tbody>
<tr>
<td>Weights-lbs</td>
<td>M14</td>
<td>AKM</td>
<td>M4A1</td>
<td>M4-10&quot;</td>
<td>MARS</td>
<td>FN P90</td>
<td>HK MP7</td>
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<tr>
<td>Weapon</td>
<td>8.6</td>
<td>8.5</td>
<td>6.6</td>
<td>6.3</td>
<td>5.5</td>
<td>5.6</td>
<td>3.9</td>
<td></td>
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<tr>
<td>Cartridge</td>
<td>0.055</td>
<td>0.047</td>
<td>0.026</td>
<td>0.026</td>
<td>0.022</td>
<td>0.014</td>
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<tr>
<td>Magazine</td>
<td>0.50</td>
<td>0.70</td>
<td>0.24</td>
<td>0.24</td>
<td>0.19</td>
<td>0.21</td>
<td>0.19</td>
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</tr>
<tr>
<td>w/210 rnds</td>
<td>20.7</td>
<td>18.7</td>
<td>12.2</td>
<td>11.9</td>
<td>10.3</td>
<td>8.6</td>
<td>7.0</td>
<td></td>
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<tr>
<td>w/300 rnds</td>
<td>25.9</td>
<td>23.1</td>
<td>14.7</td>
<td>14.4</td>
<td>12.3</td>
<td>9.9</td>
<td>8.3</td>
<td></td>
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<tr>
<td>w/420 rnds</td>
<td>32.9</td>
<td>28.9</td>
<td>17.9</td>
<td>17.6</td>
<td>15.0</td>
<td>11.6</td>
<td>10.1</td>
<td></td>
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<tr>
<td>w/510 rnds</td>
<td>38.1</td>
<td>33.3</td>
<td>20.3</td>
<td>20.0</td>
<td>17.1</td>
<td>12.9</td>
<td>11.4</td>
<td></td>
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</table>
Minutes of Combat at 45 shots per minute (possible ambush rate of fire) with a 10 pound ammunition load:
- Magazine weight not considered

<table>
<thead>
<tr>
<th>Rnds</th>
<th>Cartridge</th>
<th>Time (+/- 6 sec)</th>
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<tbody>
<tr>
<td>182</td>
<td>7.62 NATO</td>
<td>3 minutes</td>
</tr>
<tr>
<td>385</td>
<td>5.56/9mm NATO</td>
<td>6 1/2 minutes</td>
</tr>
<tr>
<td>210</td>
<td>7.62X39</td>
<td>3 1/2 minutes</td>
</tr>
<tr>
<td>455</td>
<td>5.56X30MARS or 6X35KAC (est.)</td>
<td>7 1/2 minutes</td>
</tr>
<tr>
<td>714</td>
<td>5.7X28 /4.6X30</td>
<td>&gt;11 minutes</td>
</tr>
</tbody>
</table>
Expected Target Distribution (OICW Study)

Target Availability Distribution

Top Down (Avg.):
Urban (18m)
Jungle (75m)
Rural (155m)
Desert (204m)
M14 to MK 14 - Evolution of a Battle Rifle

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