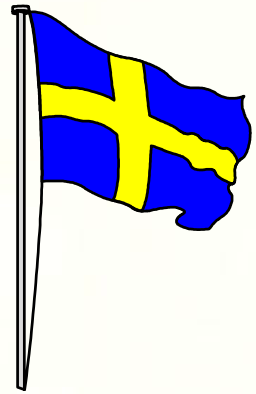


The Swedish Squad Support Weapon Program

Presentation to

"NDIA 50th Joint Services Small Arms Symposium"

Las Vegas, May 11, 2004

Per G. Arvidsson

Product Manager Small Arms Systems
Swedish Armed Forces Materiel Command
Tel: +46-8-782 4181, Fax: +46-8-782 4298
E-mail: per.arvidsson@fmv.se
Web-site: www.fmv.se

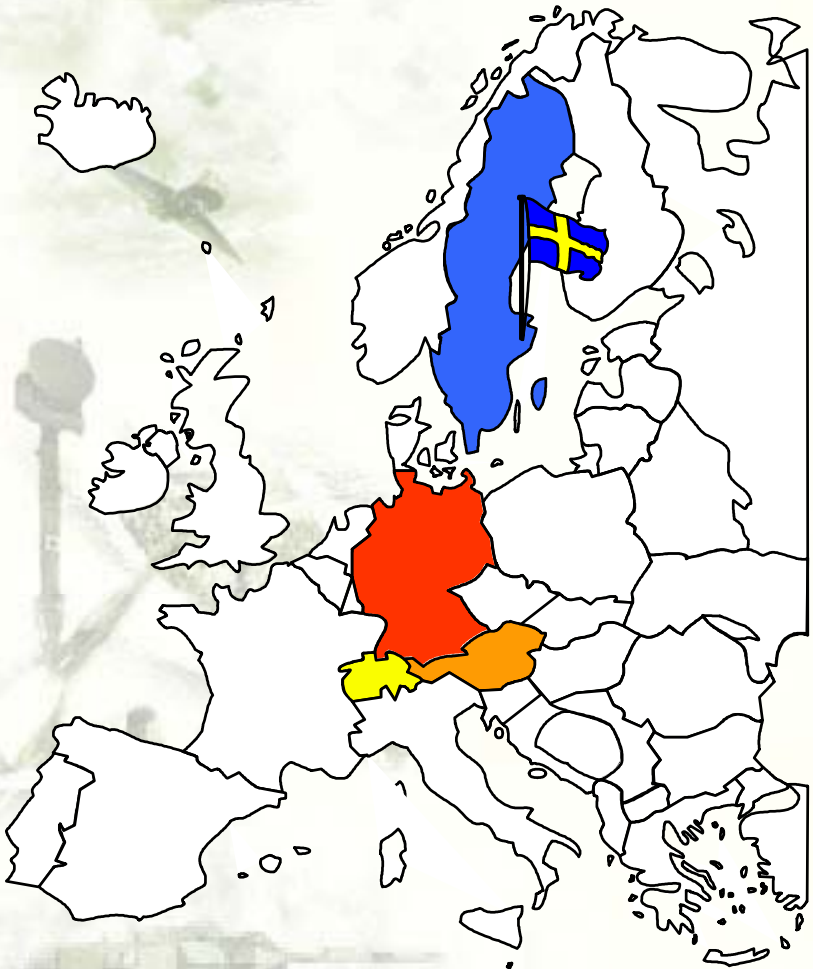
FMV

Agenda

- Sweden and FMV
- Current Swedish SA Programs
- Some statistics from the NATO IWMP
- 40mm ballistics
- Background on SSW
- Industry Feasibility Study

FMV

Sweden is a high tech, large, cold country with low population...



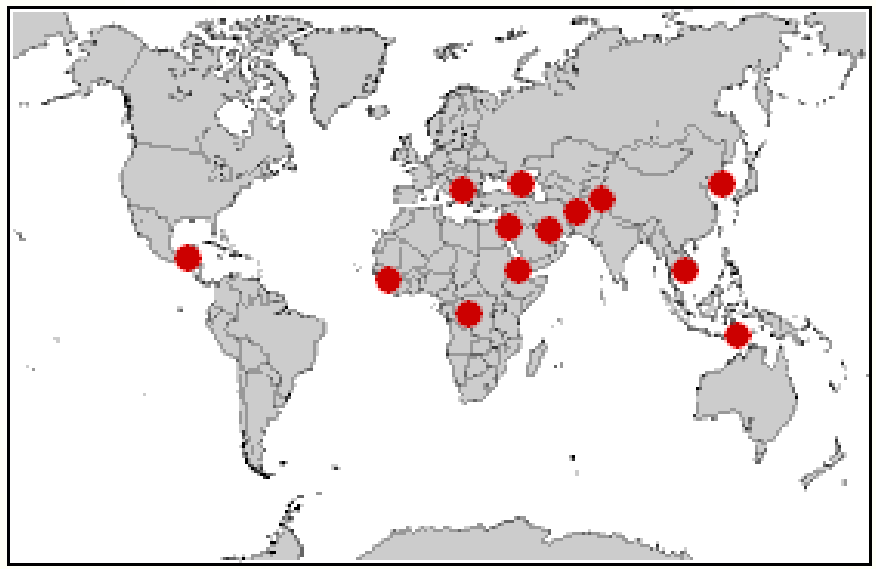
Area: 450,000 km^2
Population: 8.8 million
Temperature: +5ºC (41ºF) average over area and year.

Sweden has the same area as Germany, Switzerland, and Austria combined, but with only 1/10 of the population!

FMV

Sweden has a long history of international missions!

Sweden has been participating in most of the missions since we joined the UN in 1946.



Swedish international missions in 2004

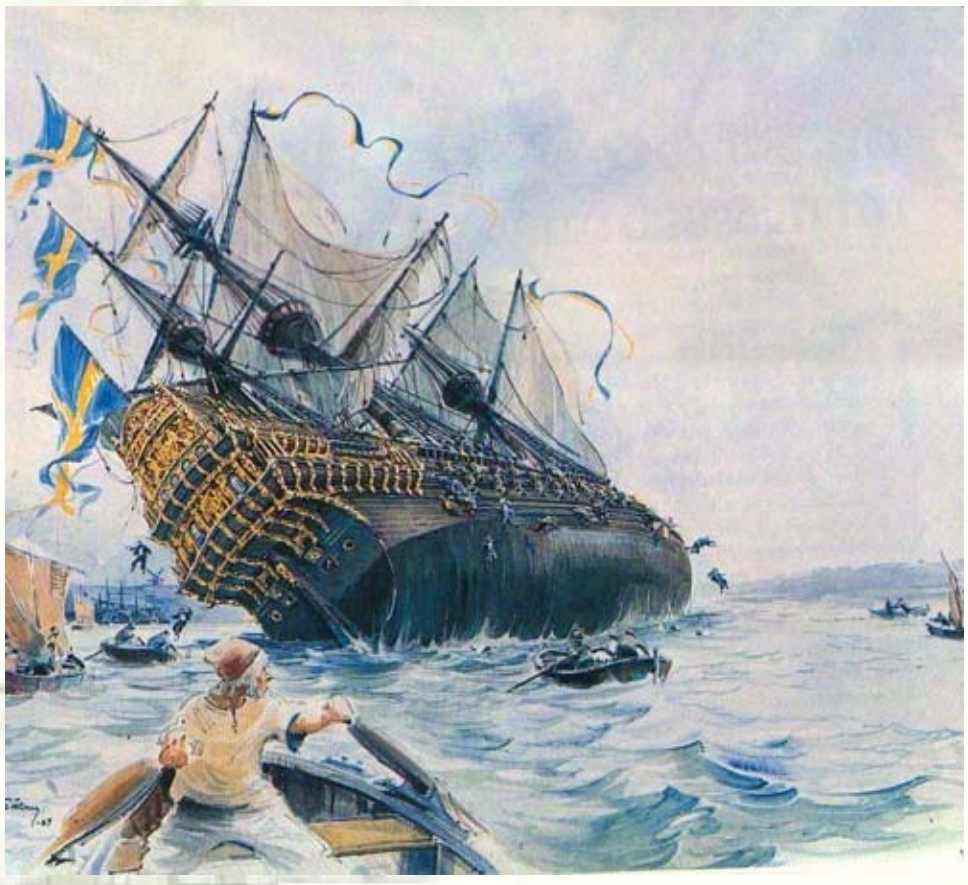
Försvarets Materielverk (FMV)

FMV is the technical and procuring agency for the Swedish armed forces.

FMV receives assignments from the armed forces for the development, procurement, upkeep and subsequent de-mil of all defense materiel.

We date back to ***1630***!

The Vasa ship was the reason…



After the Vasa sunk on her maiden trip in 1628, king Gustavus Adolphus ordered that FMV's predecessor should be founded.

Current Swedish small arms

5.56 mm Ak 5

12.7 mm Barrett

12.7 mm HMG M2HB QCB

7.62 mm PSG 90

5.56 mm Minimi

40 mm AGL Mk 19

9 mm Glock 17

40 mm GL M203

FMV

Some of our current Swedish programs

- Red-dot sight
- New ammo: ”green”, dim tracer and AP
- Upgrade program for:
  - Ak 5
  - MAG
  - Minimi
  - Barrett
- Non Lethal Weapons
- PDW
- FLSW

FMV

What is FLSW?

The ***Future Light Support Weapon*** program are two parallel programs:

- AGL tests: Replace the 40 mm HV Mk19 crew served automatic grenade launcher at the platoon level.
- SSW study: Replace the 40 mm LV M203 add-on single shot grenade launcher on the ak 5 rifle at the squad level.

History

Swedish FLSW Program

SWE/FIN AGL Program

Nordic AGL Program

NORDAC

New Observers

CA

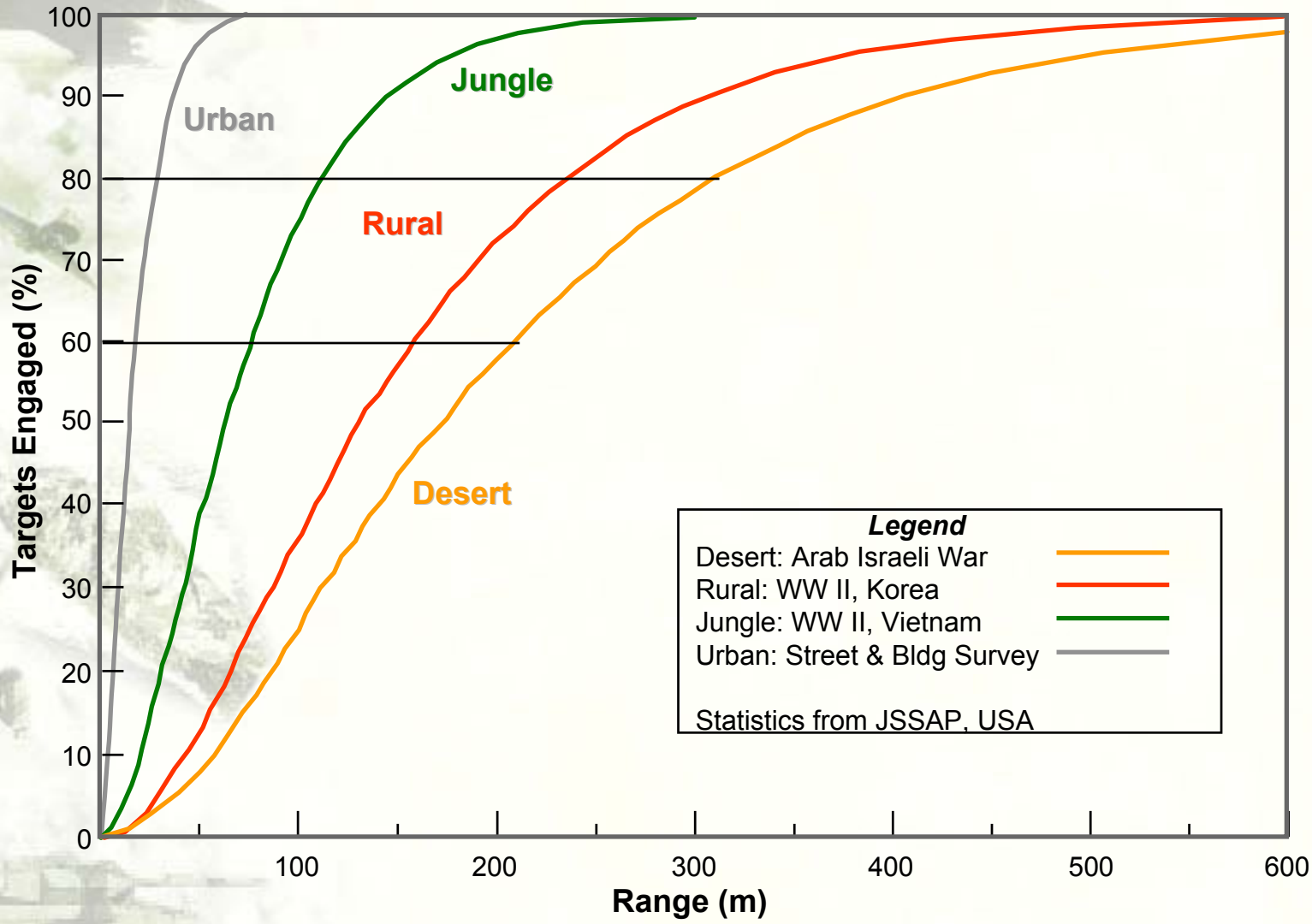
UK

SWE/US Information exchange agreement

US SOCOM

FMV

Ranges are short!



Information taken from the NATO Infantry Weaponry Master Plan

FMV

Future infantry combat ranges

- Today 45% of the worlds population live in cities.
- 70-85% are expected to live in cities by 2025.
- MOUT will most probably be more common.
- Combat ranges for low level units will not increase!
- Short ranges however often means quick engagements. Future weapons must therefore be able to quickly engage targets.

Information taken from the NATO Infantry Weaponry Master Plan

FMV

USMC after action report Iraq

- Engagements conducted with small arms occurred in the 20-30 meter range.
- Shots over 100 m were rare.
- The maximum range was less than 300 m.

Information taken from the NATO Infantry Weaponry Master Plan

FMV

Swedish ballistic study on 40mm ammo

Different muzzle velocities:

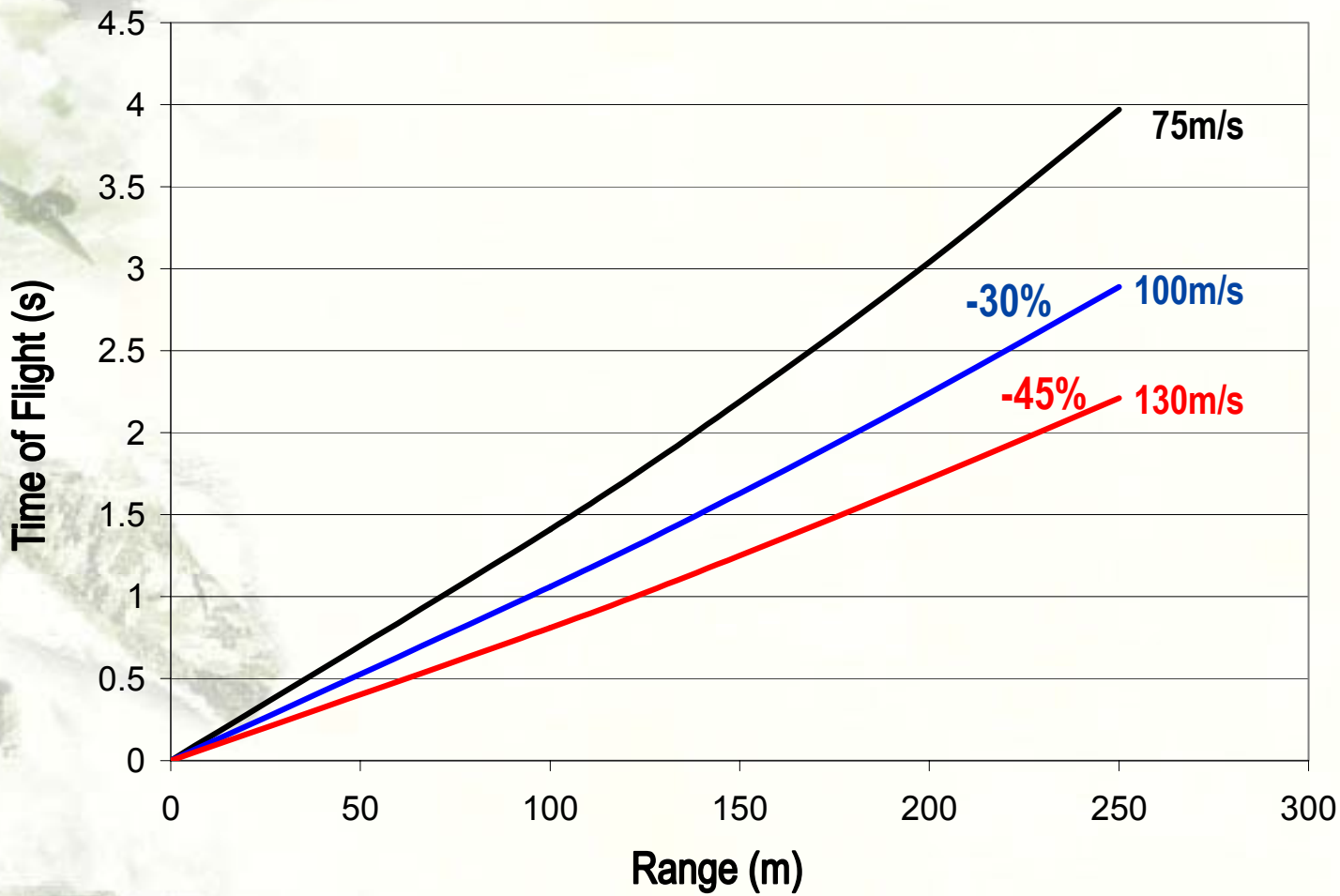
- 75-80 m/s (40 LV)
- 95-130 m/s
- 240 m/s (40 HV)

Different projectile masses:

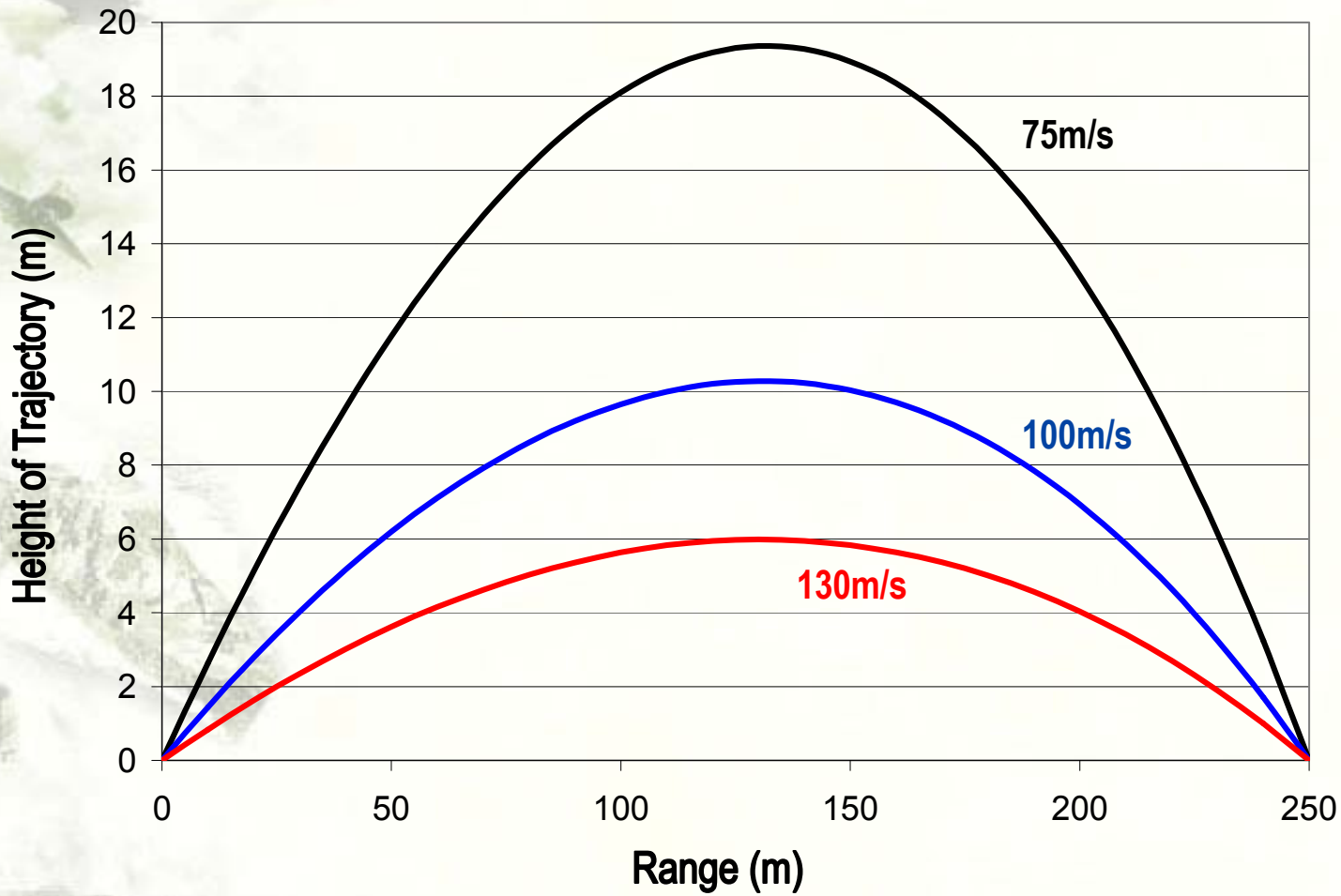
- 180-200 g (40 LV)
- 240-250 g (40 HV)

FMV

Time of flight



Trajectories



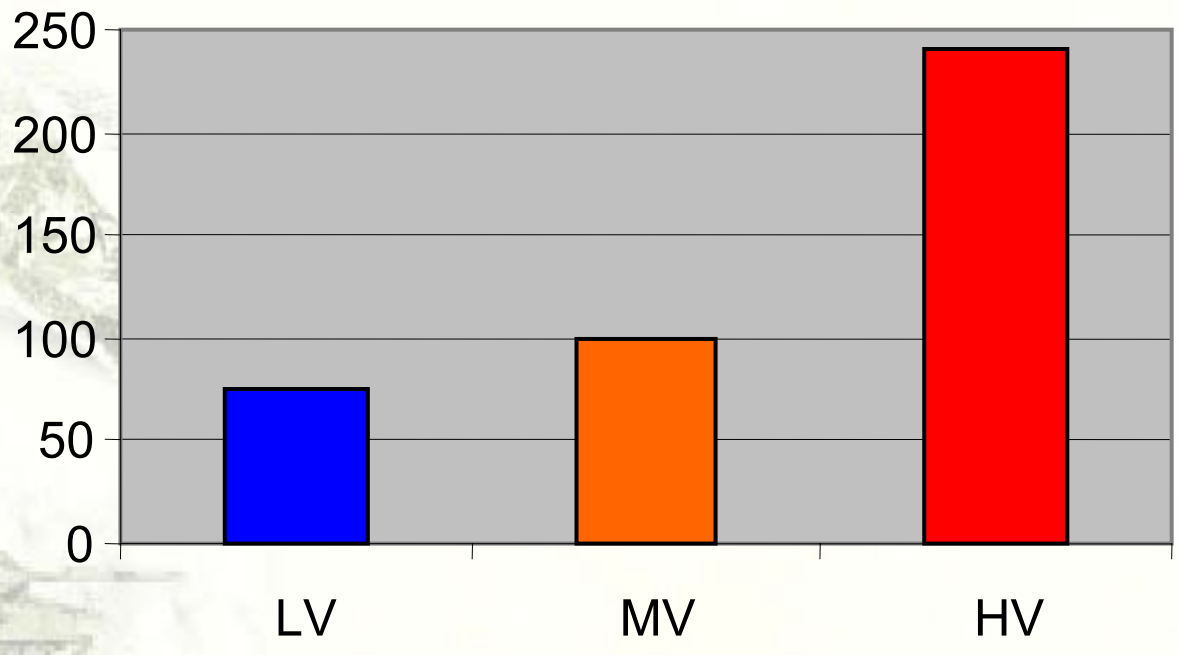
Summary

MV (m/s)	*Mass (g)*	*Range (m)*
75	180	400
75	250	430
100	180	590
100	250	660

The 40mm Medium Velocity

Benefits are:

- Shorter Time of flight
- Flatter trajectory
- Longer range



Current system (FNC/M203)

The soldier carries 12 HE rounds.

+ Simple
+ Reliable
+ Light weight add-on weapon (1.5 kg)

- Low rate of fire (>6 s)
- Low hit probability
- No night capability

FMV

Proposal from Bofors Carl Gustaf 1996

CG AGR

Carl Gustaf Air-bursting Grenade Rifle

Data

Design:	Bull pup, pump action, locked bolt.. Tubular 5-round magazine on top Case ejection downwards behind pistol grip. Short recoil with muzzle brake, side-mounted sight.
Weight:	Total max 5,5 kg. Sight max 1,0 kg. Magazine with 5 rounds max 1,5 kg.
Performance:	Distance up to 500 m. V_0 < 150 m/sec. ToF max 4 sec to 500 m.
Ammunition:	Air-bursting HEDP.
Sight:	Magnification ≥ 3x, field of view ≥ 10°. Field of elevation 0° to 25°. Laser distance measurement ± 1 m.
Ammo load:	5 rounds in weapon, 2 x 5 rounds in carried magazines.
Accessories:	Bipod, night vision device, rifle sling, magazine bag, sight cover, cleaning kit, spare parts, repair tools.

Celsius
BOFORS CARL GUSTAF

Carl Gustaf AB, Box 613, SE-631 08 ESKILSTUNA, Sweden
Telephone +46 16 16 90 00, Telefax +46 16 13 12 24

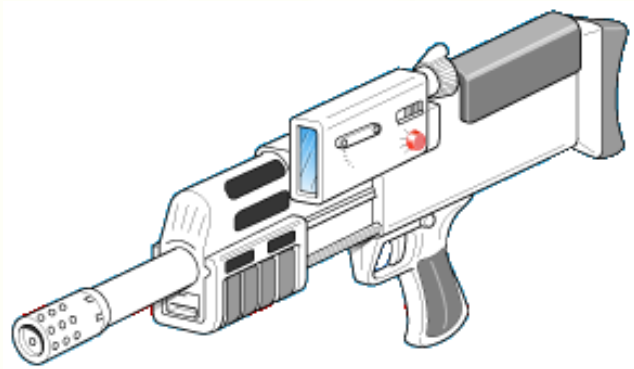
FMV

What to do at short ranges?

- MOUT will be more common in the future.
- At short ranges you should not fire HE rounds!
- An integrated PDW saves weight compared to a modular 5.56 mm rifle.

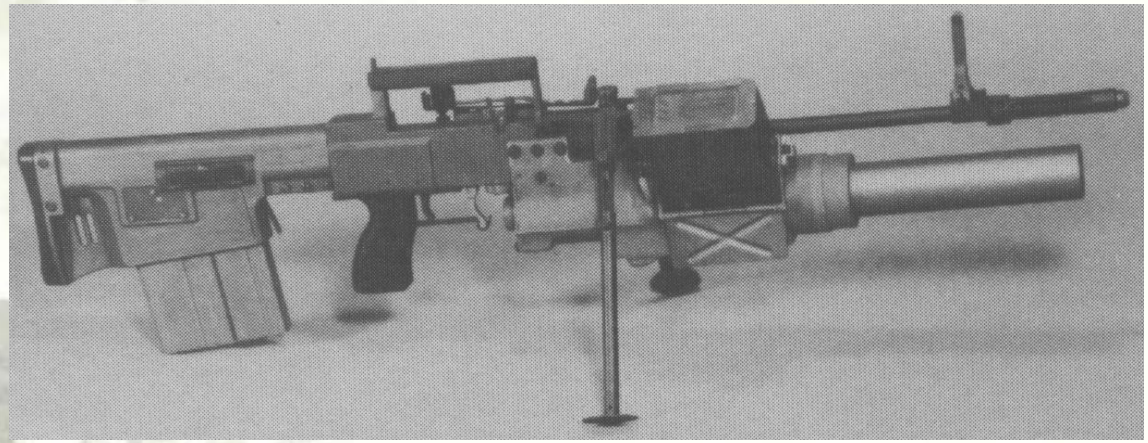
Basic requirements for the SSW

- System:
  - Weight: Less than 6 kg.
  - Range: Up to at least 400 (700) meters.
  - Easy to handle.
  - Maximum four hours of class room training.
- Weapon:
  - 40 mm semi automatic grenade launcher.
  - Integrated NATO PDW (5.7 x 28mm).
  - Magazine: Minimum 4 rounds, and being able to be ”toped up” during firing.
- Fire control system
  - Red dot aiming reticle w/o magnification.
  - Battery life should at least be 168 h (=one week).
  - Should be able to sense which type of ammo is in the chamber.
- Ammunition:
  - Programmable ammunition.
  - Reduced ToF to 250 meters.

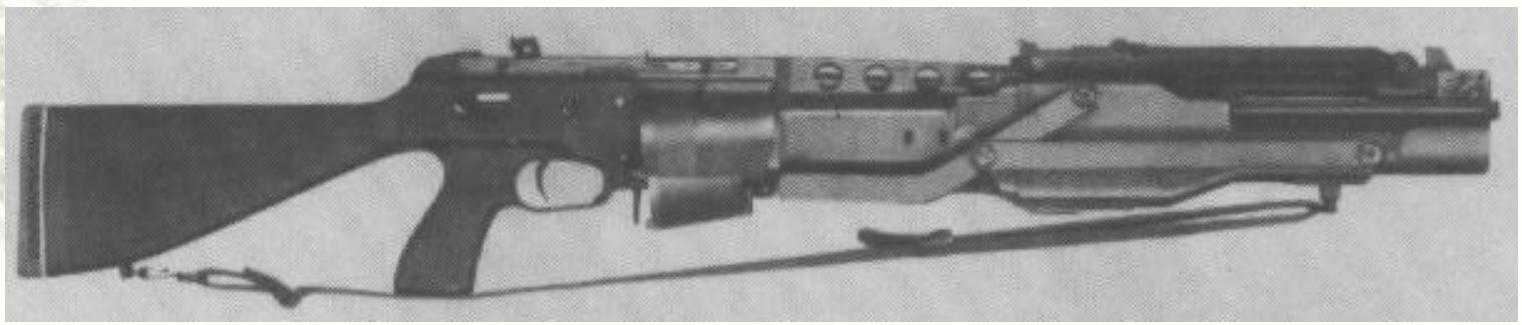


FMV

Nothing new…



US SPIW
Project 1964



Dual caliber weapon: 5.56 mm rifle and 40 mm grenade launcher.

Even we tried…

Dual caliber weapon: 5.56 mm rifle and 45 mm recoilless gun.

Weight, loaded: 5.4 kg (20 rounds of 5.56 and one 45 mm HEDP)

Industry Feasibility Study 2002-2003

- Is it possible to develop a weapon according to the technical specifications?
- Are there requirements that are especially cost driving?
- Is it possible to shorten the time of flight, flatten the trajectory and optimize the warhead lethality?
- Submit a technical solution.
- Submit a project plan for the development and delivery of test equipment and series production of systems.

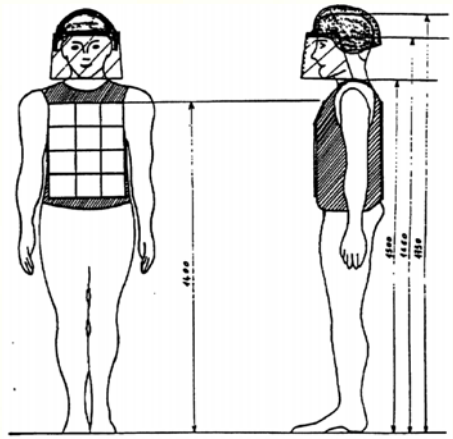
FMV

Industry Feasibility Study 2002-2003

- Four manufactures:
  - Saab Bofors Dynamics, Sweden
  - Nammo Raufoss, Norway
  - Alliant Tech Systems, USA
  - STK, Singapore
- Orders were placed with Nammo and STK.
- Deliveries by June 2003.

FMV

Lethality study



Industry has studied:

- MV=75 and 100 m/s.
- Mass=180 and 250 g.
- Steel and tungsten fragments.
- Nose and rear mounted fuzes.
- Level of protection:
  - All enemies are carrying body armor according to STANAG 4512.
  - Half of them are carrying body armor.
  - No one is carrying body armor.

FMV

Nammo

- Nammo is the system integrator for the Striker AGL and for this study.
- Sub contractors for this study are:
  - Weapon: Fabrique Nationale, Belgium
  - FCS: Noptel, Finland
  - Propulsion system: Nico, Germany
  - Analysis: SDE, United Kingdom

Nammo NORDIC AMMUNITION COMPANY

FN HERSTAL S.A.

NICO PYROTECHNIK HANNS-JÜRGEN DIEDERICHS GMBH & CO. KG

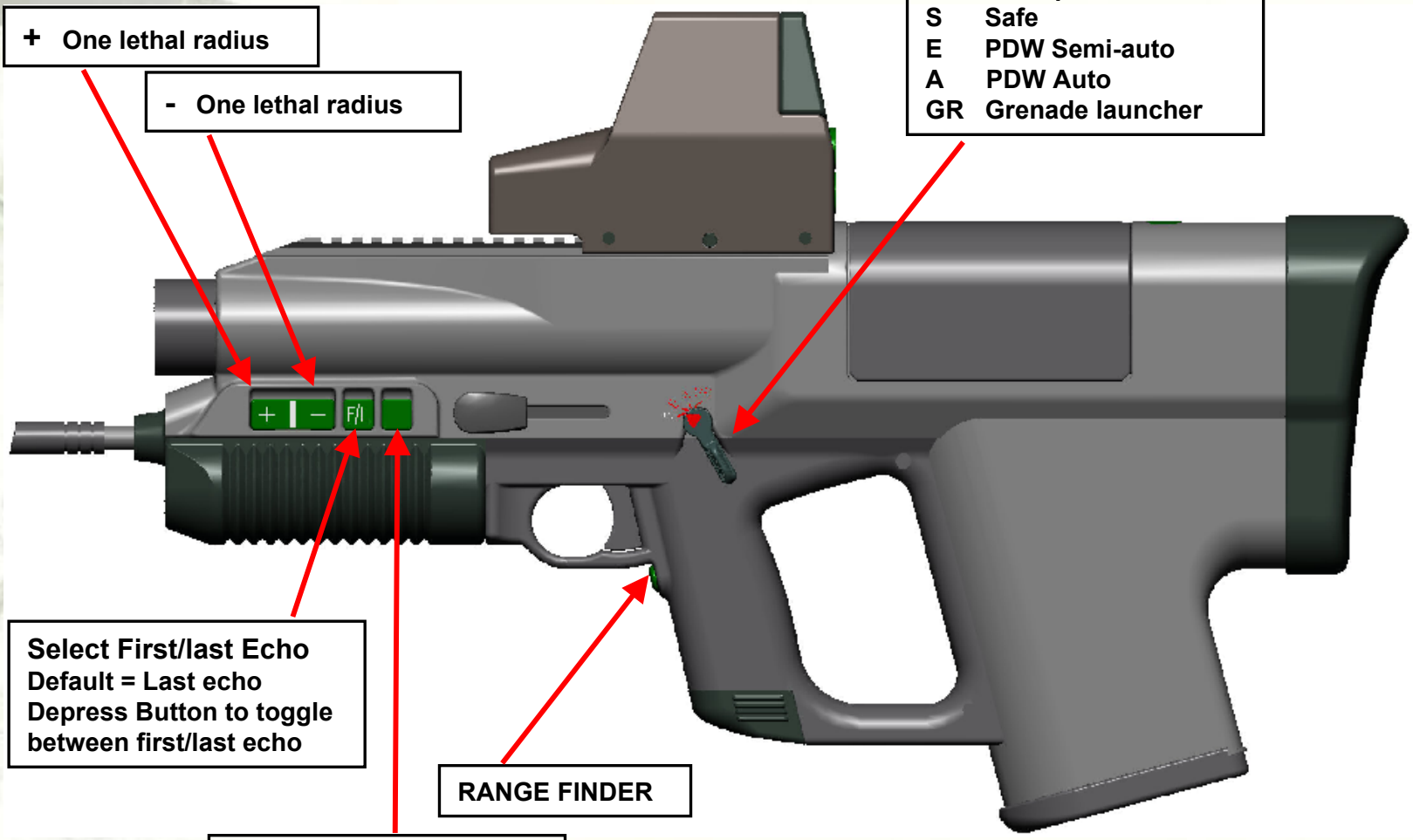
SDE

FMV

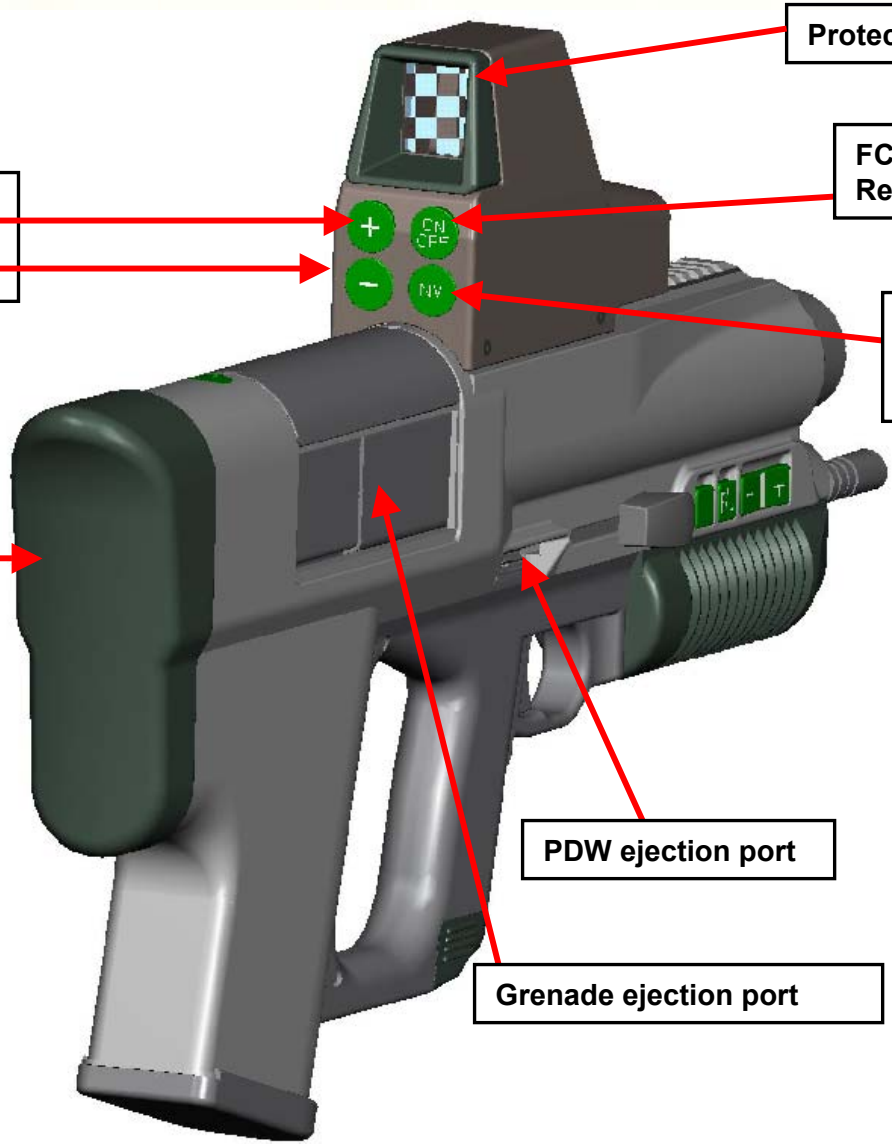
Nammo SSW

- Weapon:
  - Pump-action
  - 4 round box magazine
  - Weight: 6.3 kg (5+20)
  - Length: 690 mm
- FCS
- Ammunition

Nammo SSW features



Nammo SSW features



Protective EYEPIECE

FCS ON / ON Switch
Red dot and range finder

Red dot brightness controls
+ Increase brightness
- Decrease brightness

NIGHT VISION Switch
Toggle between Night vision / Day brightness.

DAMPING BUTTSTOCK

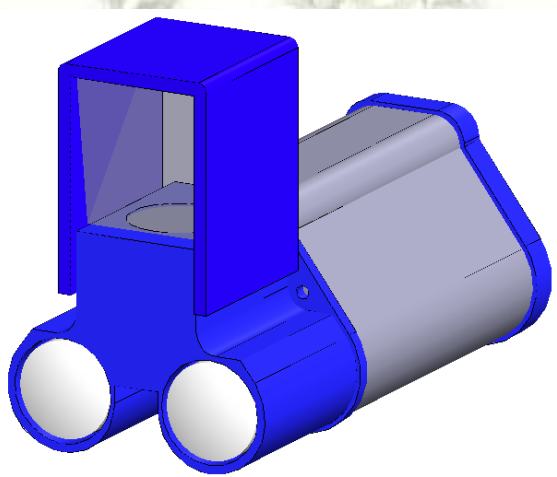
PDW ejection port

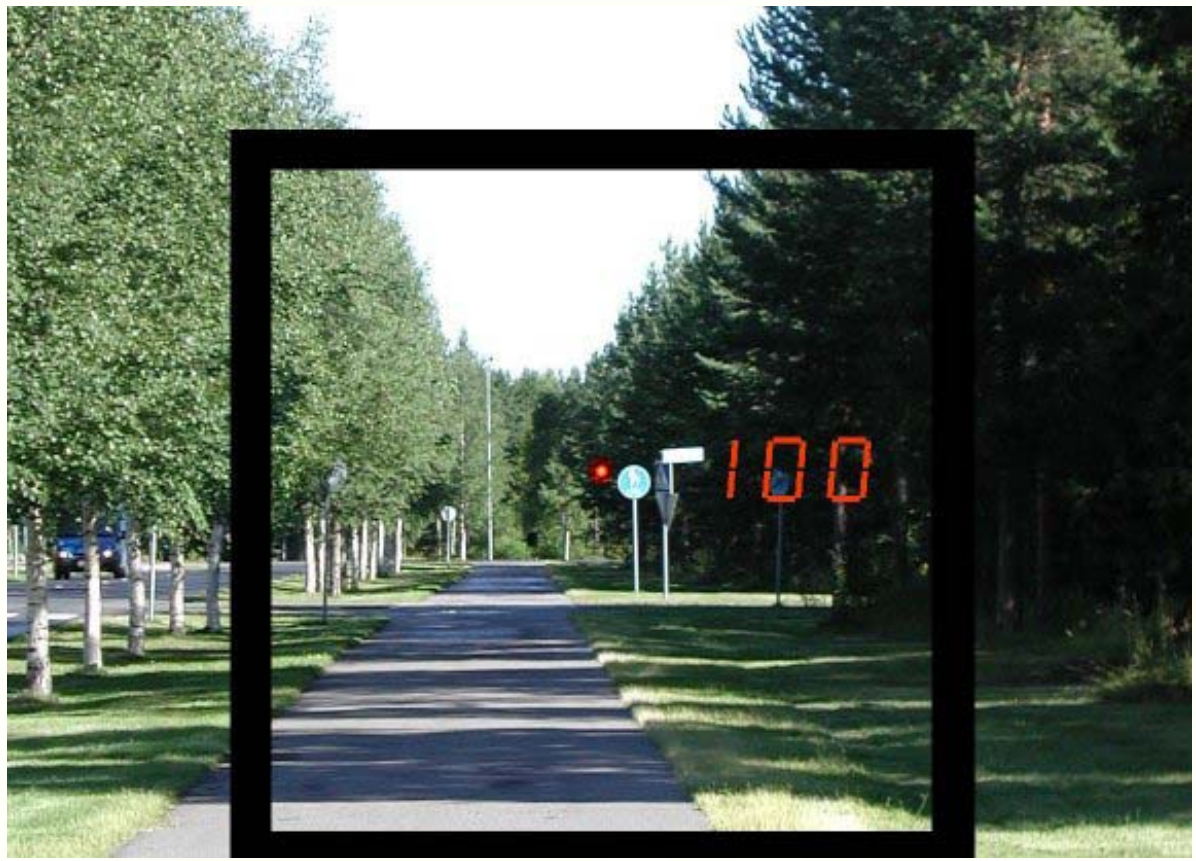
Grenade ejection port

FMV

Noptel FCS

- Movable red-dot
- No magnification
- FOV=11°
- L=134 mm
- H=90 mm
- W=67 mm
- Weight=550 g



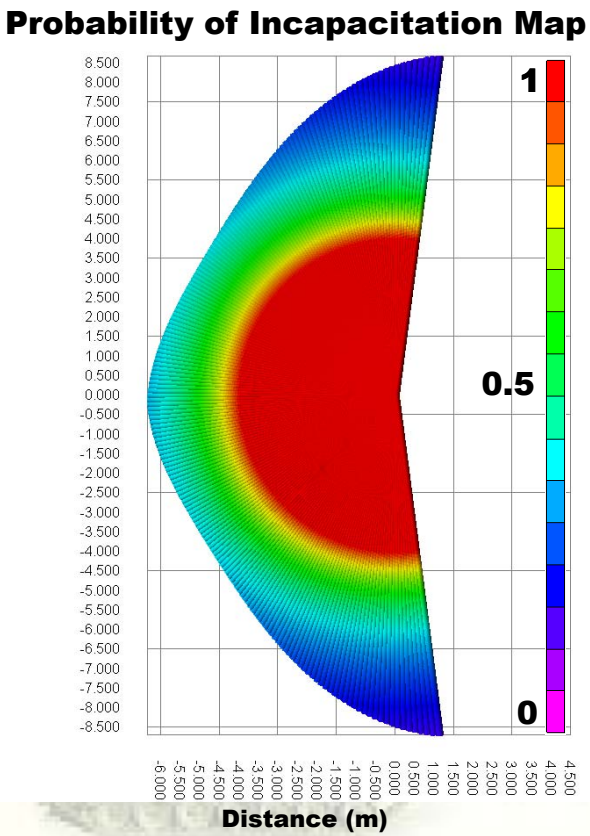


FMV

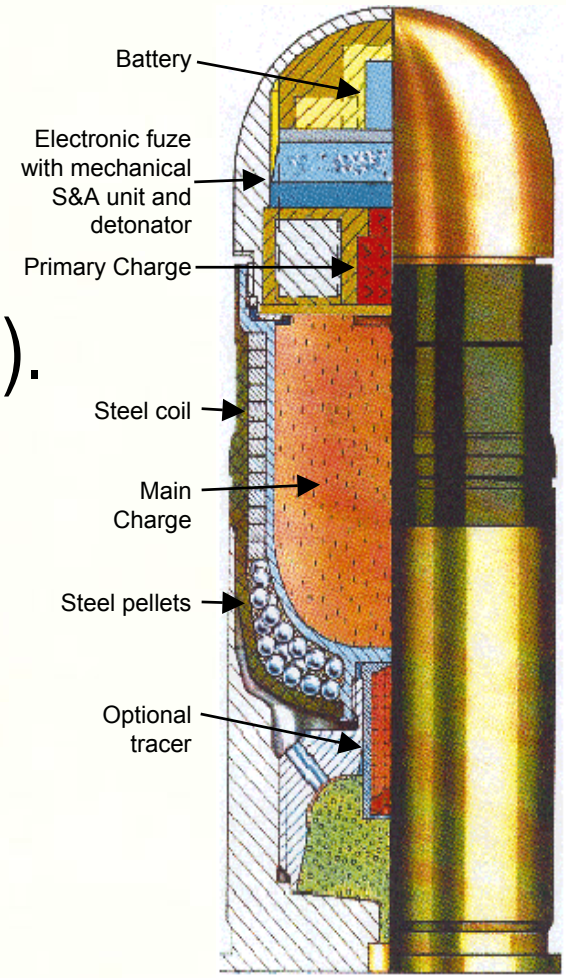
Nammo ammunition

Nammo recommends:

- MV=100 m/s.
- Mass=250 g.
- Steel fragments (1450).
- Nose mounted fuze.



Nose fuse - Steel Fragments - Unprotected – 250g



STK

- STK is the system integrator for the Tiger AGL and for this study.
- Sub contractors are:
  - Oerlikon Contraves, Switzerland

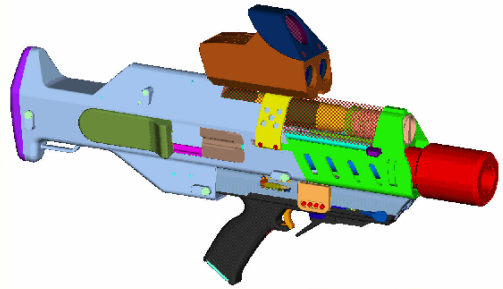
Singapore Technologies Engineering

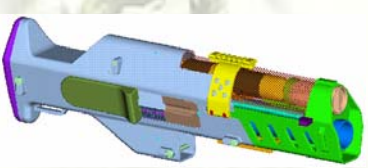
OERLIKON CONTRAVES

FMV

STK SSW

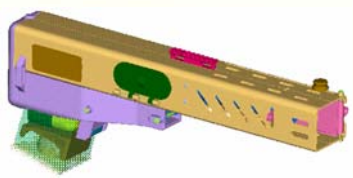
- Weapon:
  - Semi automatic
  - Three shot tube magazine
  - Weight: 6.2 kg (4+20)
  - Length: 704 mm
- FCS
- Ammunition



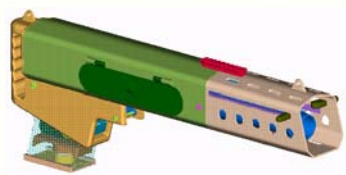


SAGL 1

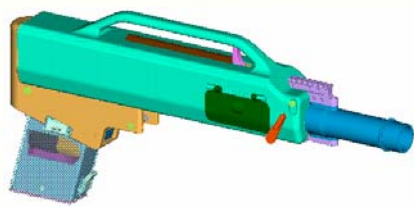
SAGL 2



SAGL 3



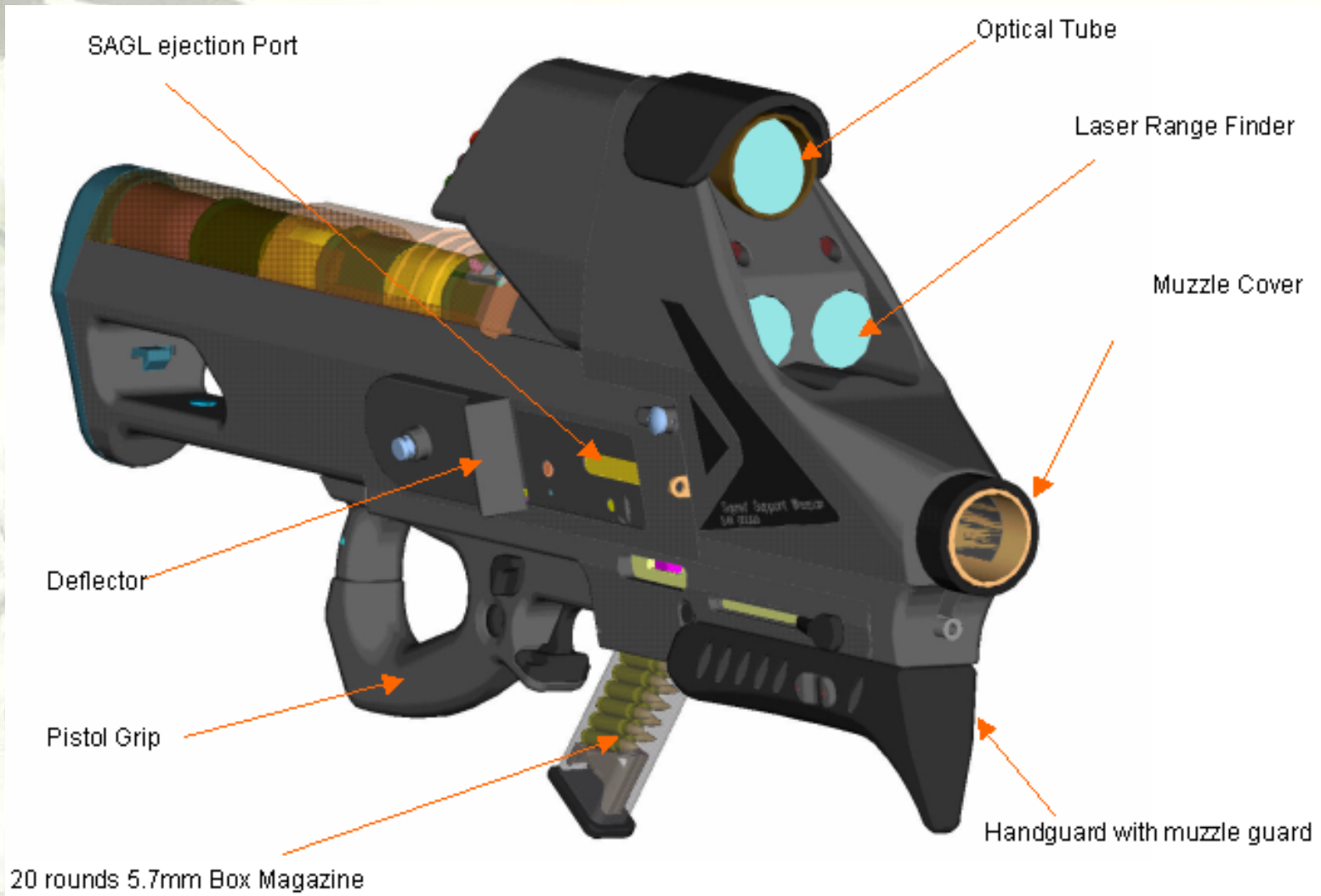
SAGL 4



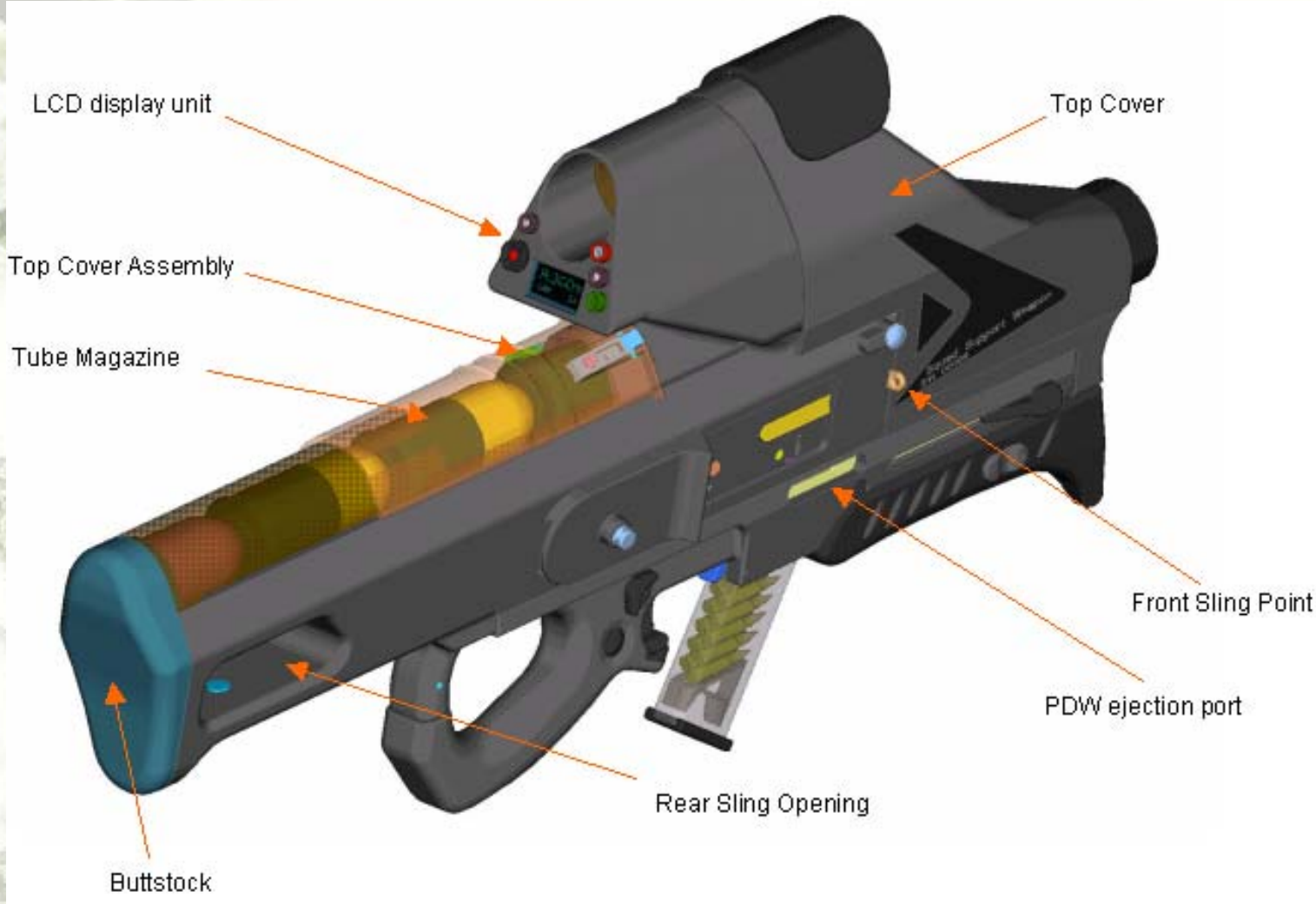
SAGL 5

FMV

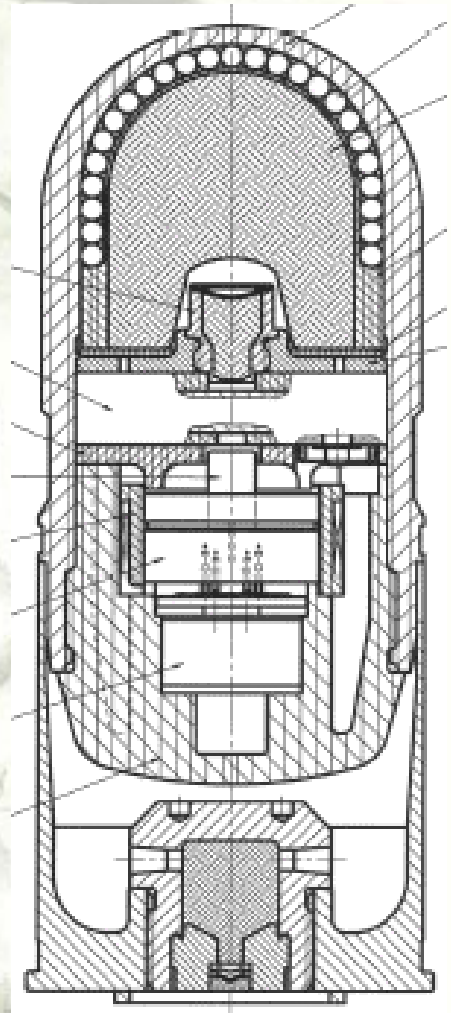
STK SSW features



STK SSW features



STK Ammunition



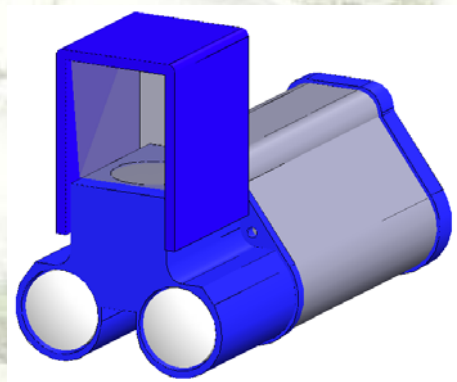
STK recommends:

- MV=100 m/s.
- Mass=185 g.
- Tungsten balls (400).
- Rear mounted fuze.

SSW project schedule

- Development 2006-2008
- Deliveries 2009-2010

Because we use standard 40mm components, the MV ammo and FCS will be COTS!



FMV

Is it possible?

- Is it possible to develop a weapon according to the technical specifications? **Yes!**
- Are there requirements that are especially cost driving? **No!**
- Is it possible to shorten the time of flight, flatten the trajectory and optimize the warhead lethality? **Yes!**
- Submit a technical solution. **Done, including mock-ups!**
- Submit a project plan for the development and delivery of test equipment and series production of systems. **Done!**

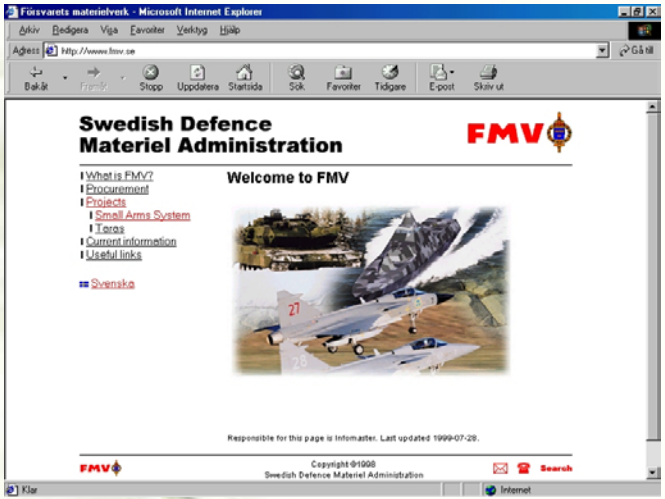
FMV

The next step

Nammo

STK

- Update SWE requirements after the study.
- Get other nations ”on board”.



Nammo

Questions?

More information will be available at www.fmv.se

STK

FMV