COMING TO GRIPS WITH EFFECTIVENESS IN RIFLES
WHY WORRY ABOUT RIFLES?

- The rifle is the most basic -- and probably the most important -- weapon of war.

- With one exception, U.S. ordnance has been making a mess of rifle ideas, rifle design, and rifle production for over a century.

- If you can't think clearly about what makes a rifle effective in a squad firefight, you can't tell a good rifle from a bad one -- and you certainly can't develop a better one.
HOW ARE RIFLES REALLY USED IN COMBAT?

- They are fired by men who are:
  - Inadequately trained
  - Overloaded
  - Stressed by fear and fatigue

- Distance to target is never known

- Most targets are never seen - just faint location cues

- Time pressure is extreme -- a second's delay in firing can get you killed

- Keeping the enemy down is nearly as good as hitting him - but must be sustained over time

- Combat permits aimed semi-auto fire less than 20% of the time (1973 Israeli Combat Data - Col. Uzi Study)

CONCLUSIONS:

- Combat shooting skills have no resemblance to marksmanship shooting skills

- Test results from known distance ranges tell you nothing about combat effectiveness
WHAT ARE COMPONENTS OF RIFLE EFFECTIVENESS IN COMBAT?

GOAL: ESTABLISH FIRE SUPERIORITY IN THE FIREFIGHT QUICKLY -- AND BE ABLE TO SUSTAIN FIRE SUPERIORITY WITH THE AMMO YOU'RE CARRYING

1. HIT AS MANY OF THE ENEMY AS POSSIBLE, AS EARLY AS POSSIBLE

2. FORCE THE ENEMY DOWN EARLY AND KEEP HIM DOWN WITH CONTINUING NEAR MISSES

3. KEEP UP EFFECTS 1) AND 2) AS LONG AS POSSIBLE, WITHIN THE RIFLEMAN'S LOAD LIMIT ASSIGNED TO RIFLE AND AMMO.
1, 2, and 3 are easy to quantify.

1. Man-minutes of enemy firing opportunity (within a 2-minute firefight)

2. Number of near misses (or rate)

3. Minutes of fire available within ammo load
What distances count in small arms combat?

Based on 2700 weapons firings:
1973 Arab-Israeli War, Col. Uzi Study.
Includes machineguns
CASE I - PROTOTYPE FOR GOOD FIELD TESTING - GDCEC SAW'S FIELD EXPERIMENT 1986
(AK-47 VS M-14 VS M-16)
- USED TRAINED & AIT TROOPS
- REALISTIC SCENARIOS - FLEETING, HARD-TO-FIND, MOVING, POP-DOWN
- FIRING TESTS IN SQUAD-SIZE UNITS
- DEGRADATION/STRESS THRU DUST, SIMULATED RETURN FIRE
- TIME URGENCY, HIGH MOTIVATION

REALISTIC EFFECTIVENESS CRITERIA:
- WEIGHT-LIMITED RIFLEMAN
- HIT-BASED FIRE REDUCTION (CET)
- SUPPRESSION (TOTAL NEAR MISSES)
- SUSTAINABILITY (% OF LOAD REMAINING)
## Principal Quantitative Results

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<th>Squad</th>
<th>Hit-based fire reduction</th>
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SIGNIFICANT UNEXPECTED RESULTS

1. TRAINING IS SIGNIFICANTLY QUICKER WITH M-16

2. AK-47 IS 3 TIMES AS RELIABLE AS M-14 WHICH IS 5 TIMES BETTER THAN M-16 (BALL PROPELLANT IS UNSUITABLE).

3. 5.56 MM IS MORE ACCURATE AT ALL RANGES; AK-47 IS POOR AT LONGER RANGES.

4. SQUADS DIFFER 30-100% IN MDE'S - EFFECTIVENESS IS DOMINATED BY SINGLE "ACES".

5. RIFLE REQ'TS BEYOND 400M AND MACHINE GUN REQ'TS BEYOND 600M ARE IRRELEVANT.