



Force Development

Fires

An Operational Perspective

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"Our Army at War -- Relevant and Ready"

CHALLENGE



- Synchronization Of Effects
 - Time and Space
- Ground Maneuver Is Event Driven
 - Multiple Echelons
- Flexibility Is Key
 - Multiple Decisions
- Persistence
- Minimize Collateral Damage

Responsiveness Is Essential



Ground Commander's Requirement for Fires

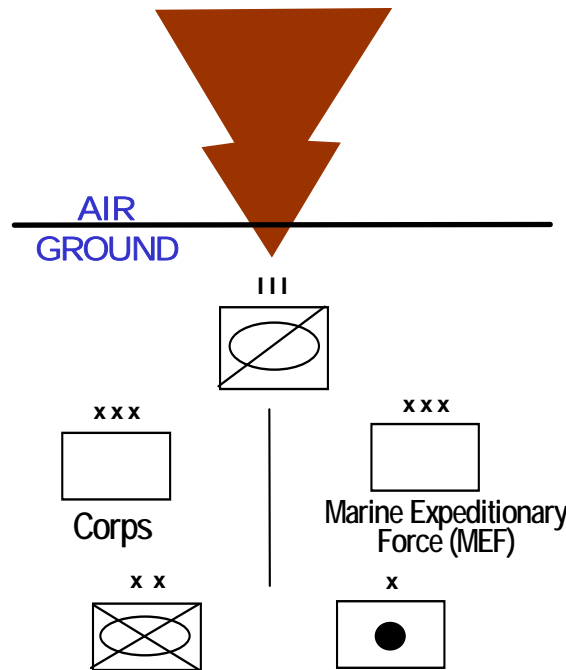




Emerging Battlespace Perspective

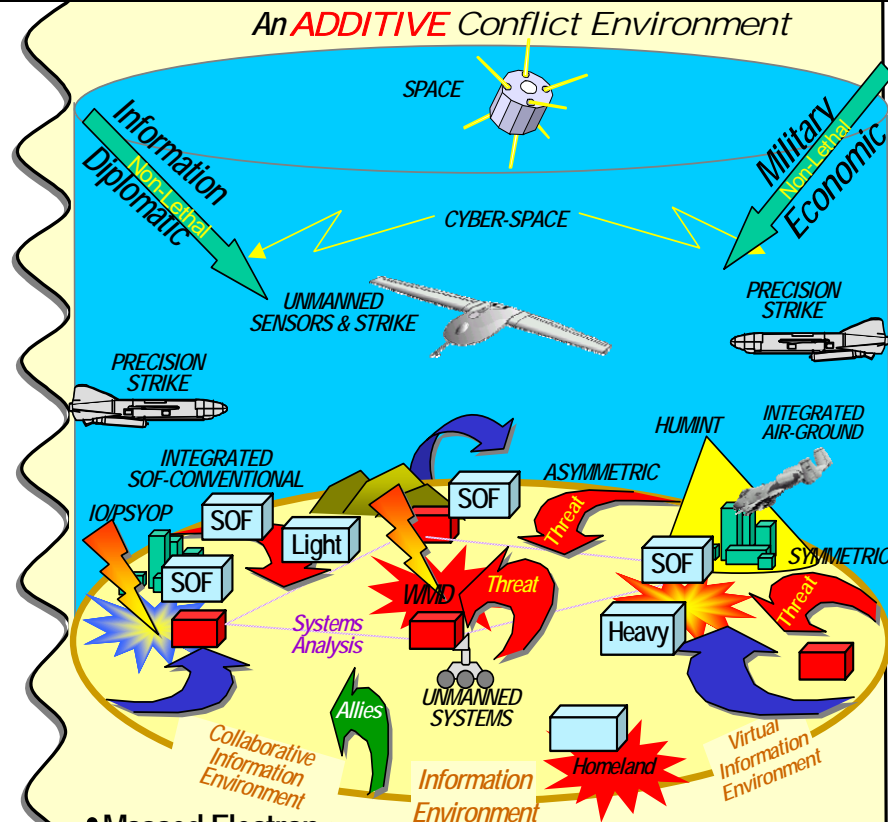
From Battlefield to Battlespace

Conventional



- Massed Forces
- More Deconflicted than Integrated
- Attrition Warfare
- Military to Military
- Symmetrical

An **ADDITIVE** Conflict Environment



- Massed Electrons
- Smaller Formations
- Lethal & Non-Lethal Fires, Forces . .
- All Elements of National Power
- Rapid & Asymmetric Action
- Simultaneous Operations
- Smaller Operations
- Effects Based Operations
- Flexible, Dynamic Command & Control Relationships
- Operational and Strategic Seams . . .

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Army Indirect Fires – The Way Ahead

Transforming Fires

From  To

- **Linked**
- **Access to Joint systems**
- **Connected to sensor outputs**
- **Less Agile / Heavy**
- **Support to Maneuver**
- **Lethal (through mass)**

- **Area effects with limited precision**
- **Large logistics burden**
- **Ability to mass fires**

- **24/7, all weather**

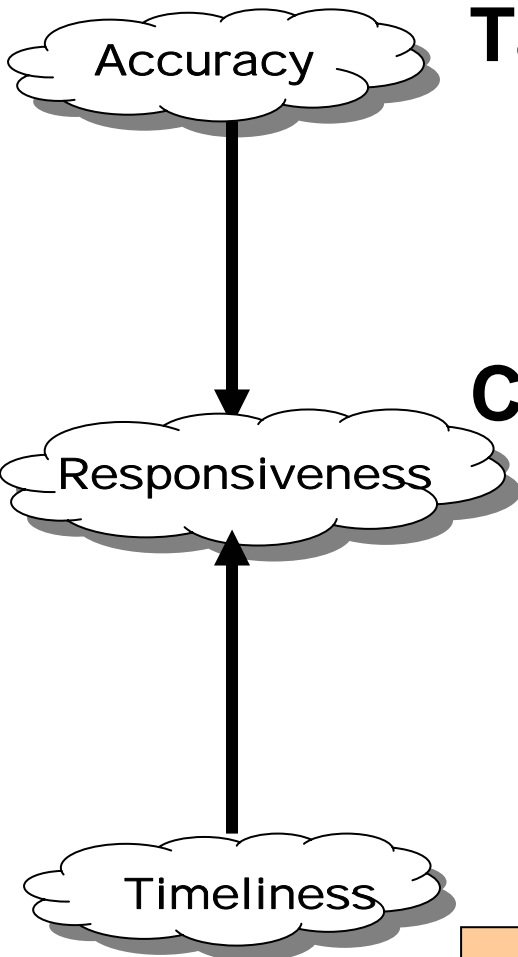


- **Networked battle command**
- **Interdependent with Joint systems**
- **Dynamic Sensor to Shooter linkages**
- **Strategic and tactical mobility**
- **Fully Integrated with maneuver**
- **Lethal (through precision and volume)**
- **Precise effects with area options**
- **Reduced logistics requirement**
- **Ability to mass effects; lethal and non-lethal**
- **24/7, all weather & all terrain**

to achieve **Destructive, Suppressive, Protective and Special Purpose Effects**



ACCURATE and TIMELY EFFECTS



Target Location Error (TLE)

+

Robust Network

+

Circle Error Probable (CEP)

+

Processing Procedures

+

Clearance

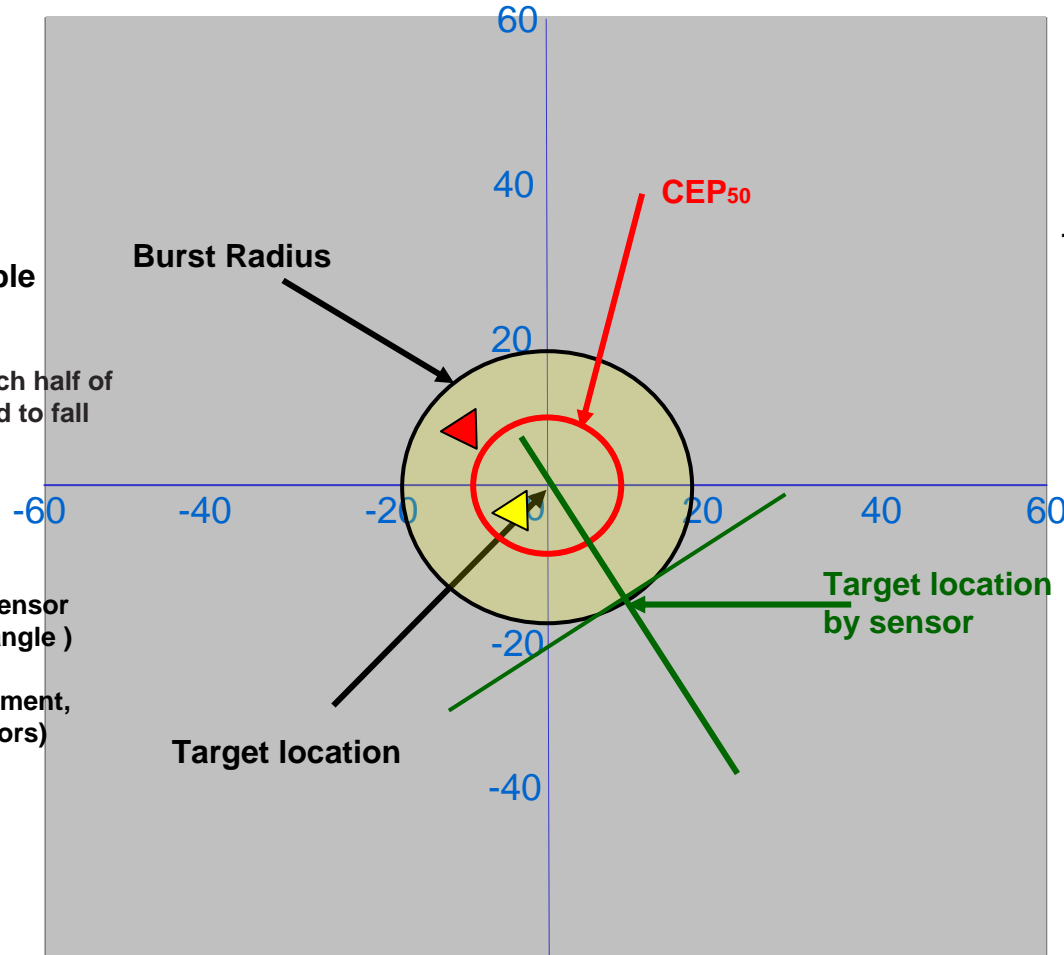
Responsiveness Is Essential



Joint Fires Application Issues

Circular Error Probable (CEP)

- Radius of circle within which half of the projectiles are expected to fall
- CEP depends on type of weapon/munition e.g.
 - Artillery/mortar (wind, range, weather)
 - Laser guided (bad designation, laser sensor errors/limitations/graze angle)
 - GPS guided (GPS errors, target movement, guidance and control errors)



Weapon Effect Burst Radius

The area within which a weapon achieves a certain level of lethality (Probability of Kill) against the intended target.

Target Location Error (TLE)

Difference between the actual and the expected location.

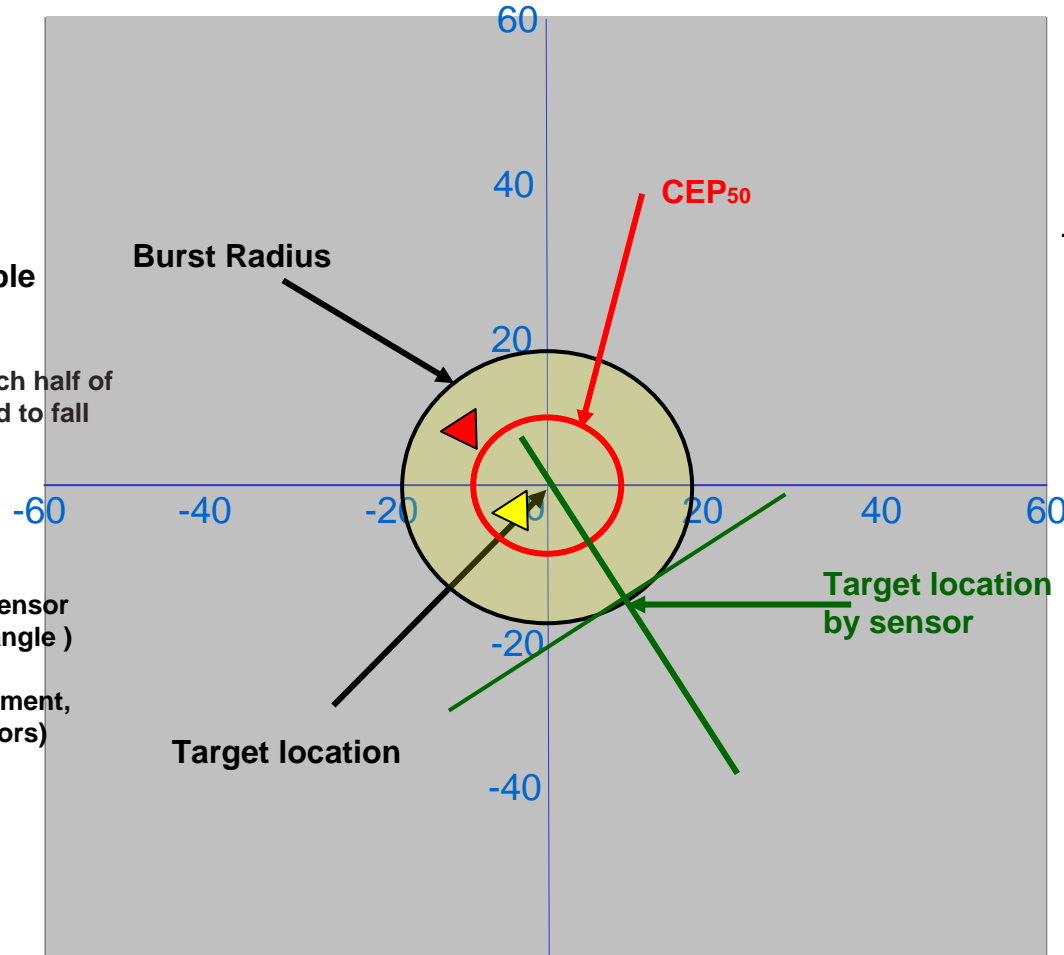
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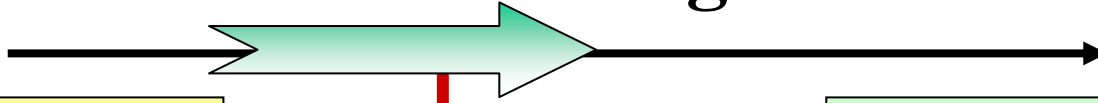
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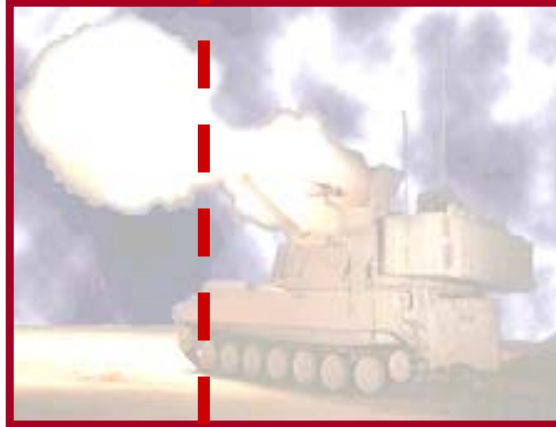


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Munitions Terminology

Precision Munitions

Capable of self locating and maneuvering to a **specific location** with an accuracy sufficient to yield a high probability of destruction within its inherent capabilities.

Smart Munitions

Self-contained capability to search, detect, acquire, and engage individual targets by **detecting** the general target characteristics in order to provide terminal guidance for the munition or submunitions.

Discriminating Munitions

Self-contained capability to search, detect, acquire, and engage individual targets by **distinguishing** specific characteristics of the target to selectively identify and engage only the desired target types.