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Future Fire Control – Beyond Line of Sight Targeting and Engagement

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Postulate

- In the future, the individual warfighter must be able to attack targets in an “indirect fire” manner – engaging without line of sight visibility by using a ballistic firing solution.

Combat Assumptions and *Current Trends*

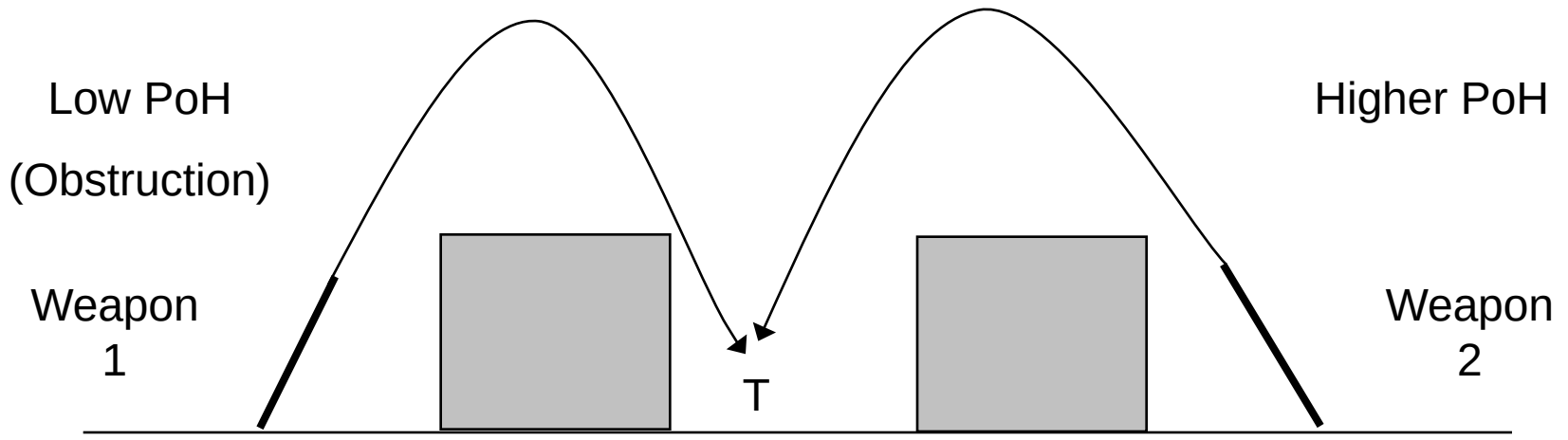
- The current trend towards a "*… **distributed battlespace**, where small units have a greater area of influence than they have had in the past, rivaling that of big units"* will continue (Mr. Solhan, ONR, JSSAP Futures Meeting, March 2008).
- Irregular warfare and the *Three Block War* will continue. Restricts the weapon size.
- Terrain will be irregular.
  - *These units will have to support each other.-*

Combat Assumptions and *Current Trends*

- Distributed units will be Beyond Line of Sight (BLOS) from each other, out of visual contact but still in effective weapon range.
- Current sights only provide *ballistic solutions for visible targets. Distributed forces may have to fire at non-visible or defilade targets.*
- Guided rounds may be available, but they need to reasonably aimed.

Combat Assumptions

- Distributed units will have to support each other with individual weapons (M203, M32) and light vehicle mounted systems (HMMWV and IFV/LAV with CROWS or other mounted systems) using a *blind ballistic firing solution*.
- The optimal firing position may be anywhere! Use the warfighter with the best PoH.



BLOS Targeting Requirements

For someone to engage a target which cannot be observed:

- A BLOS ballistic firing solution will have to be presented to the supporting warfighters.
- The firing solution requires:
  - The position of the target must be accurately known, usually relative to the observing/in-contact warfighter.
  - The position of the friendly warfighters must be accurately known.

Essentials for BLOS Targeting Where is everybody?

To calculate a ballistic firing solution:

- Need range from observer to target.
  - Range finding research is on-going.
  - Elevation is an issue.

Essentials for BLOS Targeting - Where are our forces?

Need to know where our forces are.

- Positioning possibilities:
  - GPS
    - Not 100% available.
  - Location via the local battlespace communications network
    - Possible – Uses signal time of arrival to various receivers. Assuming speed of light propagation, can get a positional radius. For multiple receivers, the radii will intersect somewhere.
    - Accuracy depends on the number of receivers and how well we know their positions.
  - Inertial navigation
    - Possible - DARPA recently funded development for shoe sized inertial guidance units.

BLOS aiming and firing

- Once the position of the target is known and the position of the friendly forces is known, a BLOS ballistic firing solution can be calculated.
- For a servo actuated (CROWS) system, the proper firing solution can be entered directly into the control system.
- For a hand held or manual tripod weapon (M32, M203, XM307), the firing solution will have to be entered into the sight. Ideally, the sight will cue the warfighter when the weapon is oriented correctly.
  - IC's for inclination and heading (Honeywell µPoint™)

BLOS targeting and engagement – Conclusion

- Much of the indirect fire/BLOS groundwork has already been implemented or is being researched.
- We just have to tie it together.
- If implemented, all available weapons can be used within a very short timeframe.
- Result - *We can overwhelm any enemy.*