FO/FDC COURSE

By Blue
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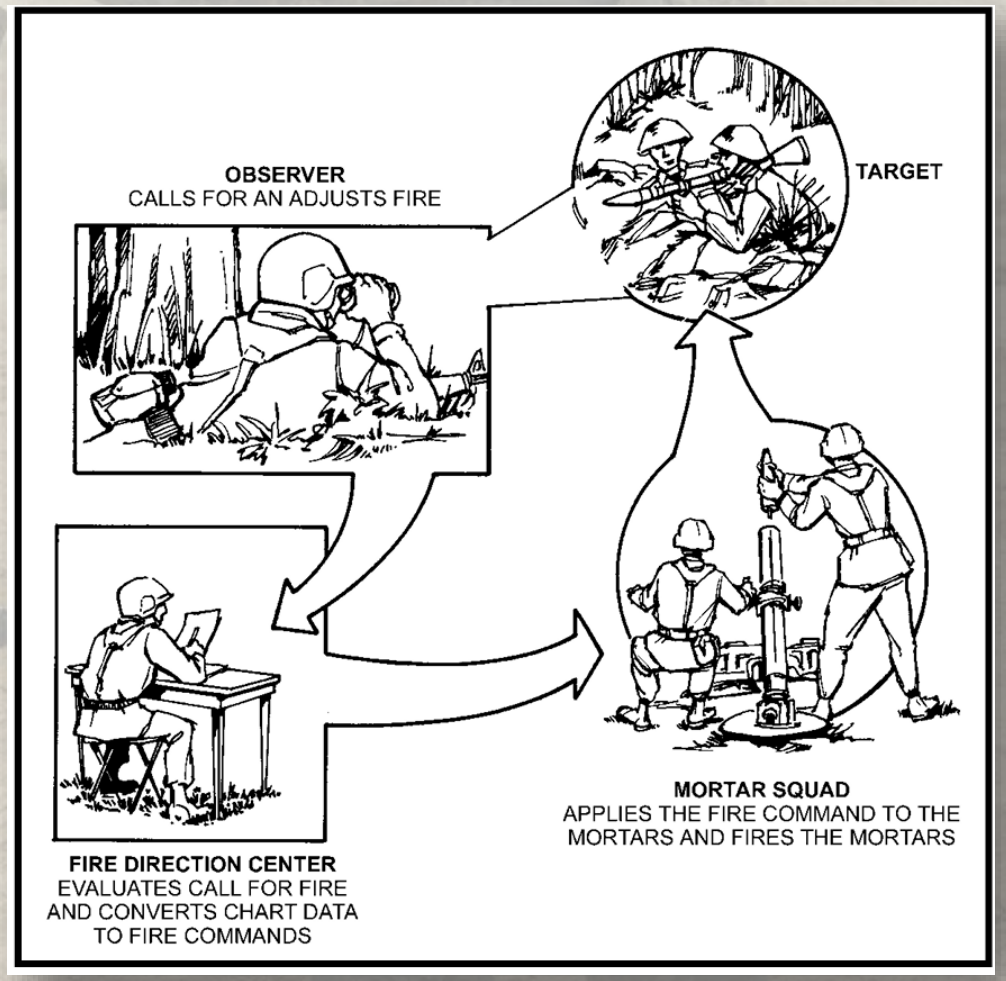
Introduction

- The Forward Observer's (FO) job is to find and report the location of targets and bring accurate artillery fire upon them through a Call for Fire (CFF).
- The Fire Direction Center (FDC) they convert data from the CFF into firing data that the firing unit can utilize.
- The Firing Unit's (Mortar Squad, Field Artillery Battery) job is to apply the data provided by the FDC and execute the mission. (The Firing Unit can conduct the FDC's tasks)



Indirect Fire Employment

1. Area Denial
2. Suppression
3. Destruction of Enemy Assets
4. Counter Battery Fire
5. Interdiction
6. Shaping the Battlefield
7. Obscuration
8. Breaking Up Attacks
9. Target Marking or Illumination

Types of Artillery

- Mortars
  - Organic to Maneuvering Elements (Responsive / More Available)
  - Short Range (3.5 km – 7.2 km)
  - High Angle
- Cannon Artillery
  - Long Range (25km ~)
  - Ideal for Long Fire Missions
  - Provides more advanced munition (DPICM, Excalibur)
- Rocket/Missile Artillery (Out of Scope)
- Naval Surface Fire Support (Out of Scope)

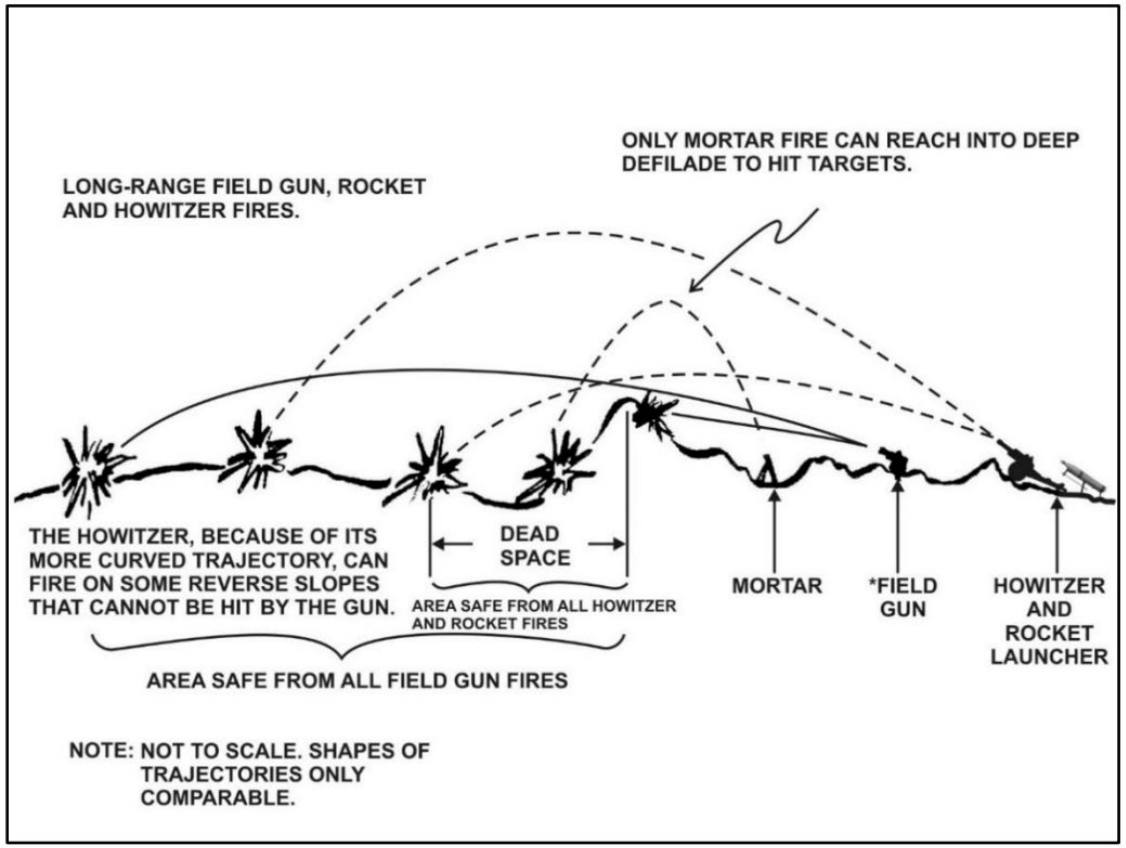
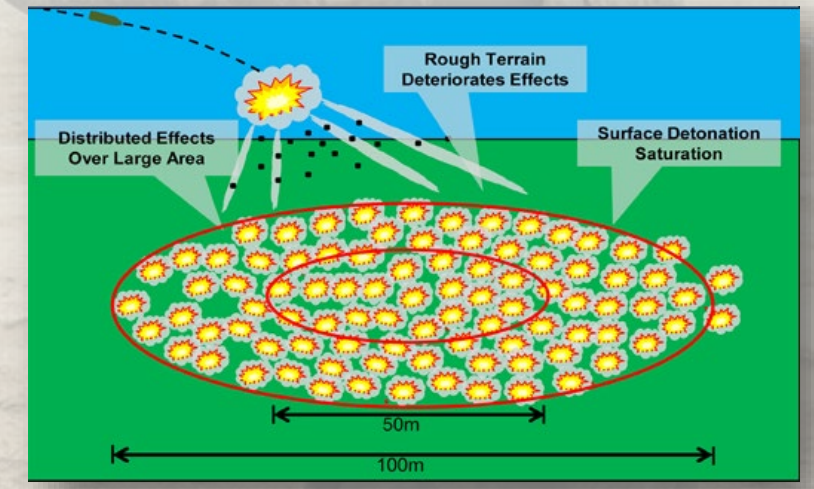
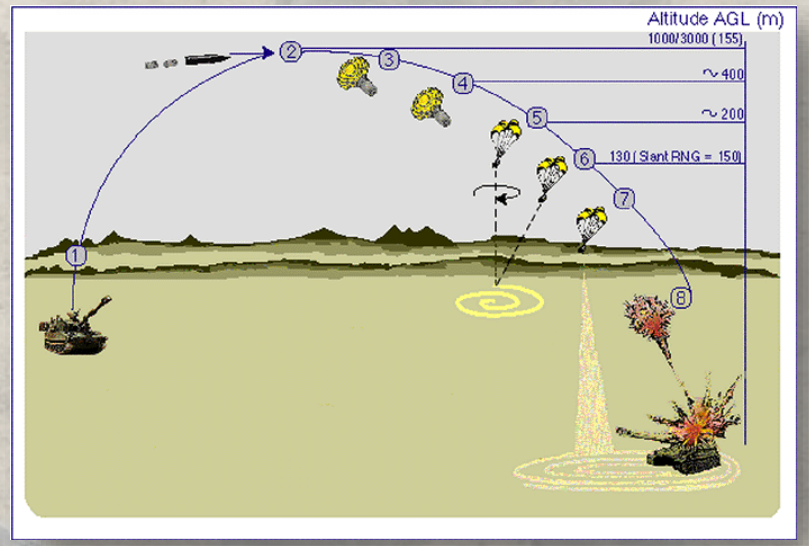


Figure 5-1. Examples of trajectories and dead space

Types of Ammunition for Cannon Artillery

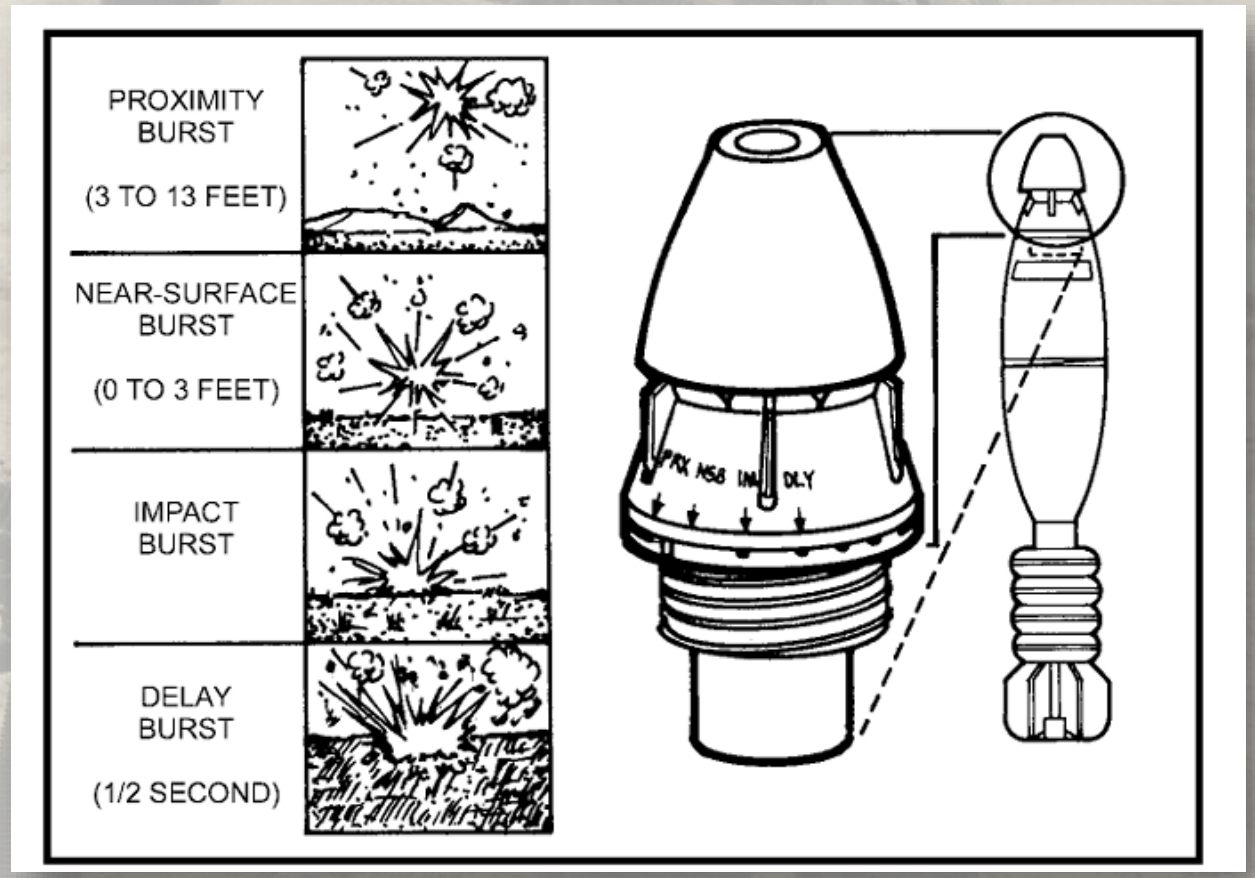
- Conventional Rounds (Mortars & Cannon)
  - High Explosive (HE)
  - Smoke Rounds or White Phosphorus Rounds (WP)
  - Illumination Rounds
- Precision Guide Rounds (Cannon Only)
  - Excalibur (GPS Guided)
  - Copper Head (Laser Guided)
- Submunition Rounds (Cannon Only)
  - DPICM – Dual Purpose Improved Conventional Munition
  - SADRAM – Sense and Destroy Armor
  - FASCAM – Family of Scatterable Mines





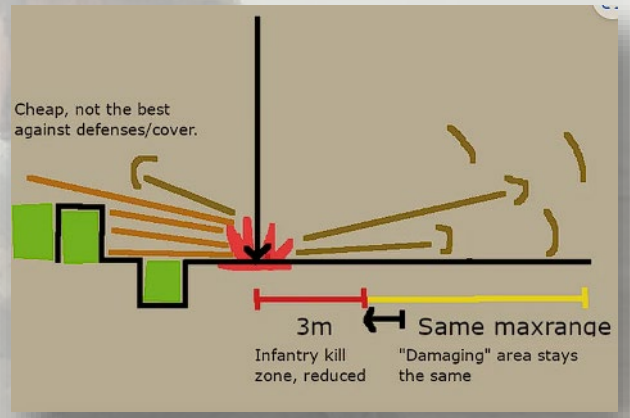
Types of Fuzes

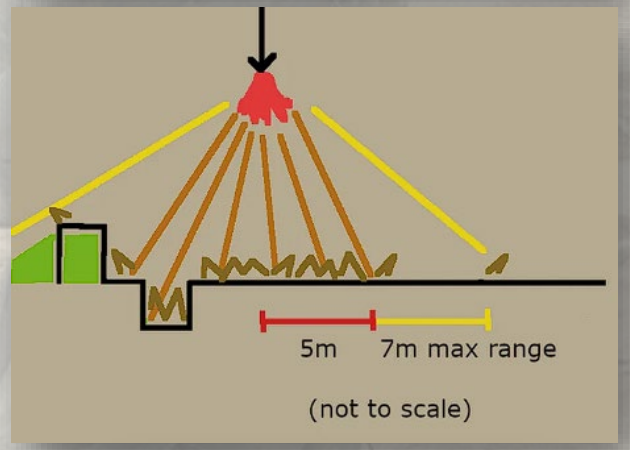
- Point Detonating (PD)
  - Variants Quick (Q) or Delay (D)
- Proximity or Variable Time (VT)
  - Achieves Detonation before ground impact (Airburst)
- Time Fuze
  - Utilized to detonate at certain time after launch (eg. Illumination missions)

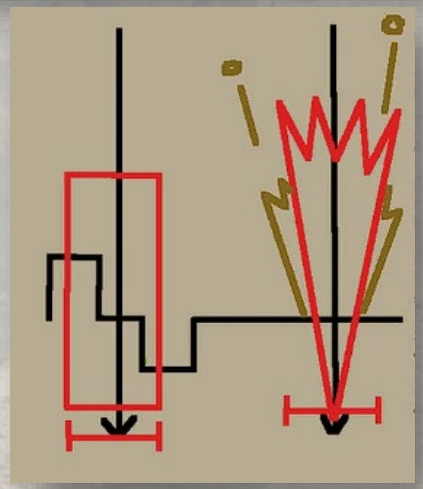


Shell-Fuze Combinations

Shell Combination	Effective Against
Shell HE , Fuze Quick	Personnel Standing Personnel prone on the ground Unarmored vehicles Light materiel
Shell HE , Fuze Delay	Personnel Covered within Thick Canopy Personnel Covered within Light Earthworks Personnel Covered within Light Earthworks
Shell HE, Fuze Time/VT/Prox	Troops in the Open Troops in Trenches Troops in Deep Foxholes Troops in Softskinned Vehicles







Common Terms

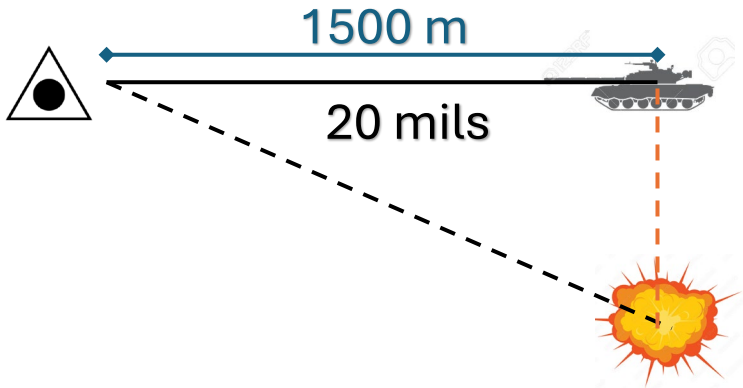
- GT Line – Gun Target Line
- OT Line – Observer Target Line
- Angle T – Angle between OT Line and GT Line.

Shift Terminology

- Add/Drop Range Shift
- Left/Right Lateral Shift
- Up/Down Vertical Shift

Lateral Shift Estimation using OT Factor

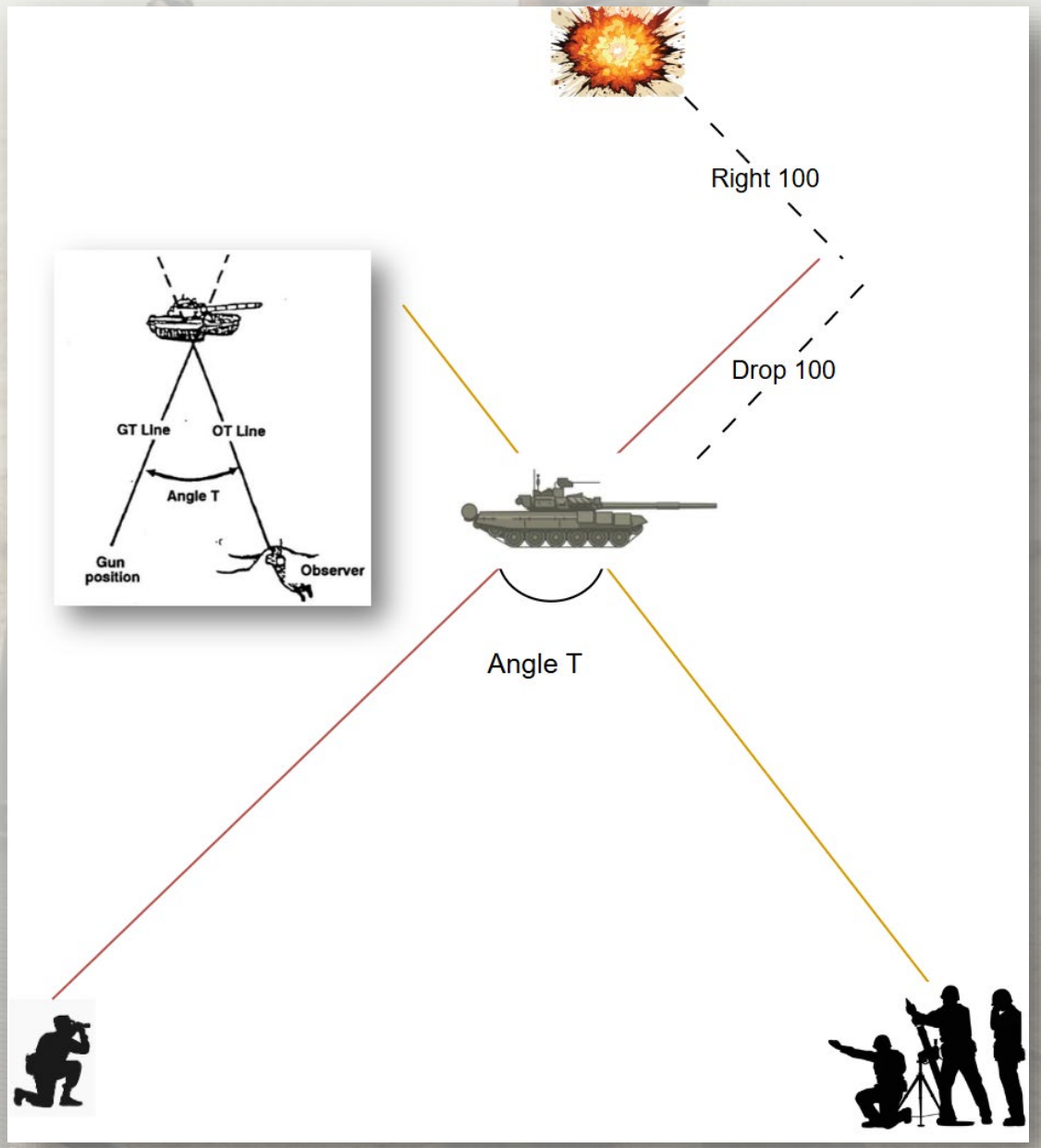
- OT Factor is the distance to target divided by 1000



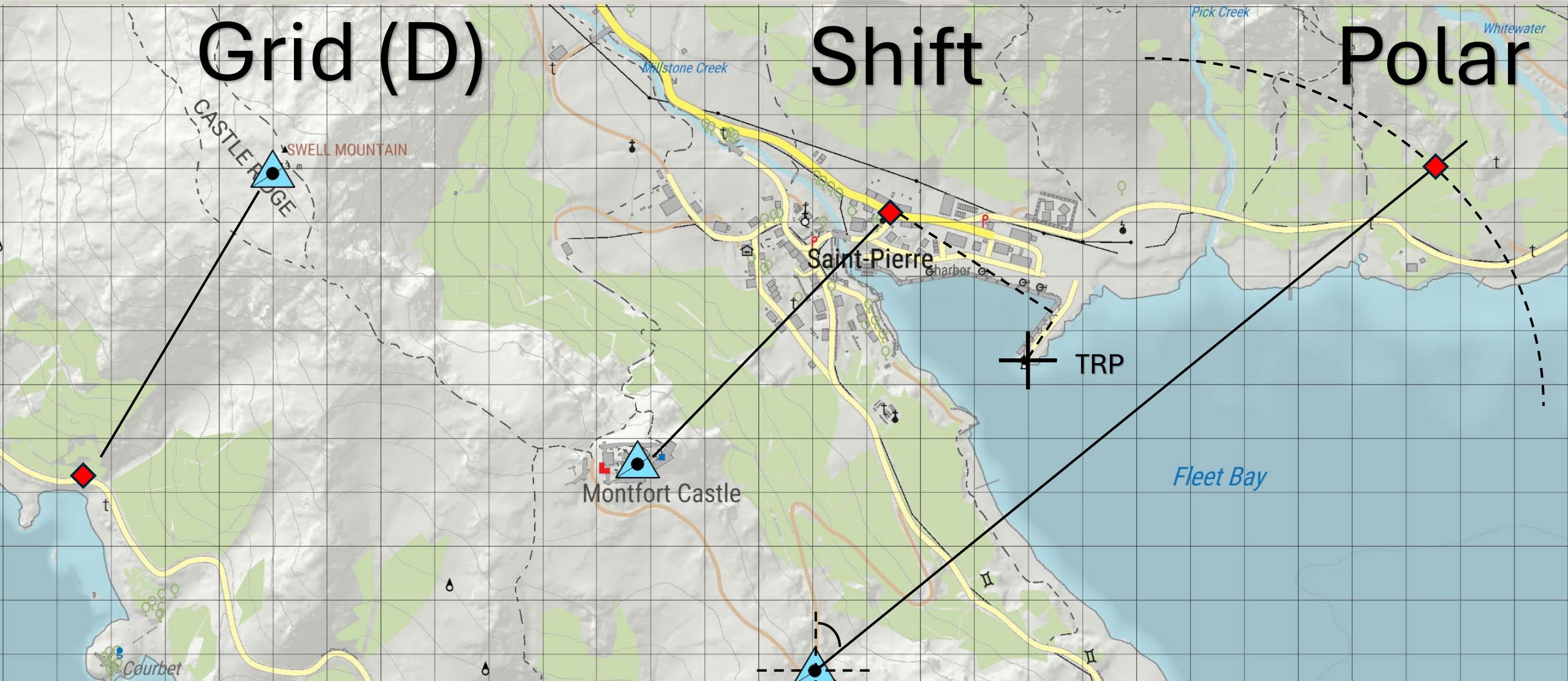
$$Lateral\ Shift = OT\ Factor \times Deviation\ in\ mills$$
$$Lateral\ Shift = 1.5 \times 20 = 30\ m$$

Angle T – Problems

- Angle T – Angle between OT Line and GT Line.
- What the FO is seeing doesn't correlate correctly!
- Must convert FO corrects to be relevant to your GT Line
- FDC must announce if Angle T is greater than 600 mills.



CFF: Target Location



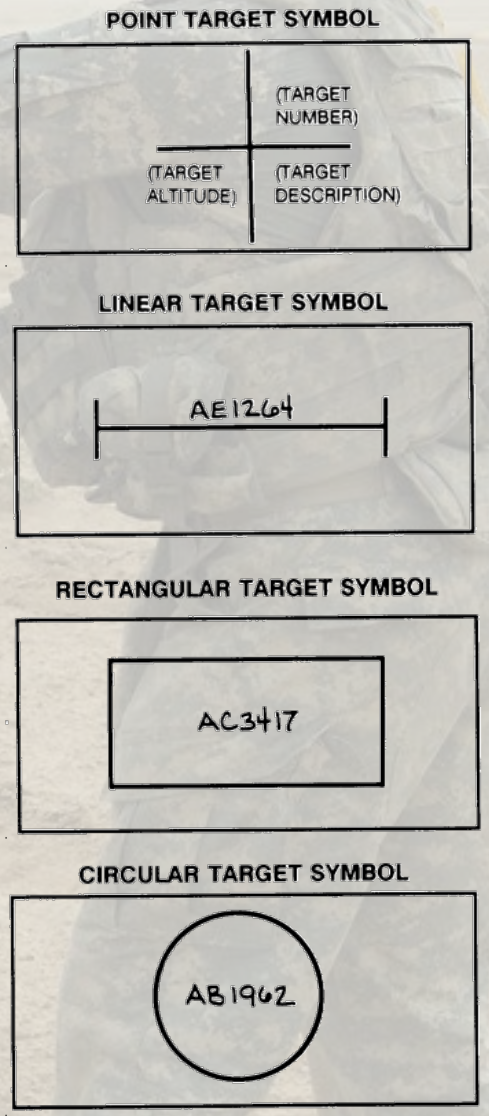
Artillery Targets

Targets

- Targets are preplanned or opportunity targets for indirect fire support. They can be used for as known points to shift from.
- Target Reference Point (TRP) used by maneuver elements for Direct Fire Targets should be use also as reference point for Indirect symbol is exactly the same a Point Target

Target shapes

- Point: Less than 200 meter wide designated by center grid.
- Linear Target: A target that is more than 200 meters but less than 600 meters long.
- Rectangular Target: A target that is more than 200 meters wide and 200 meters long.
- Circular Target: A target that is circular in nature. Designated by a center grid and a radius.



CFF: Grid

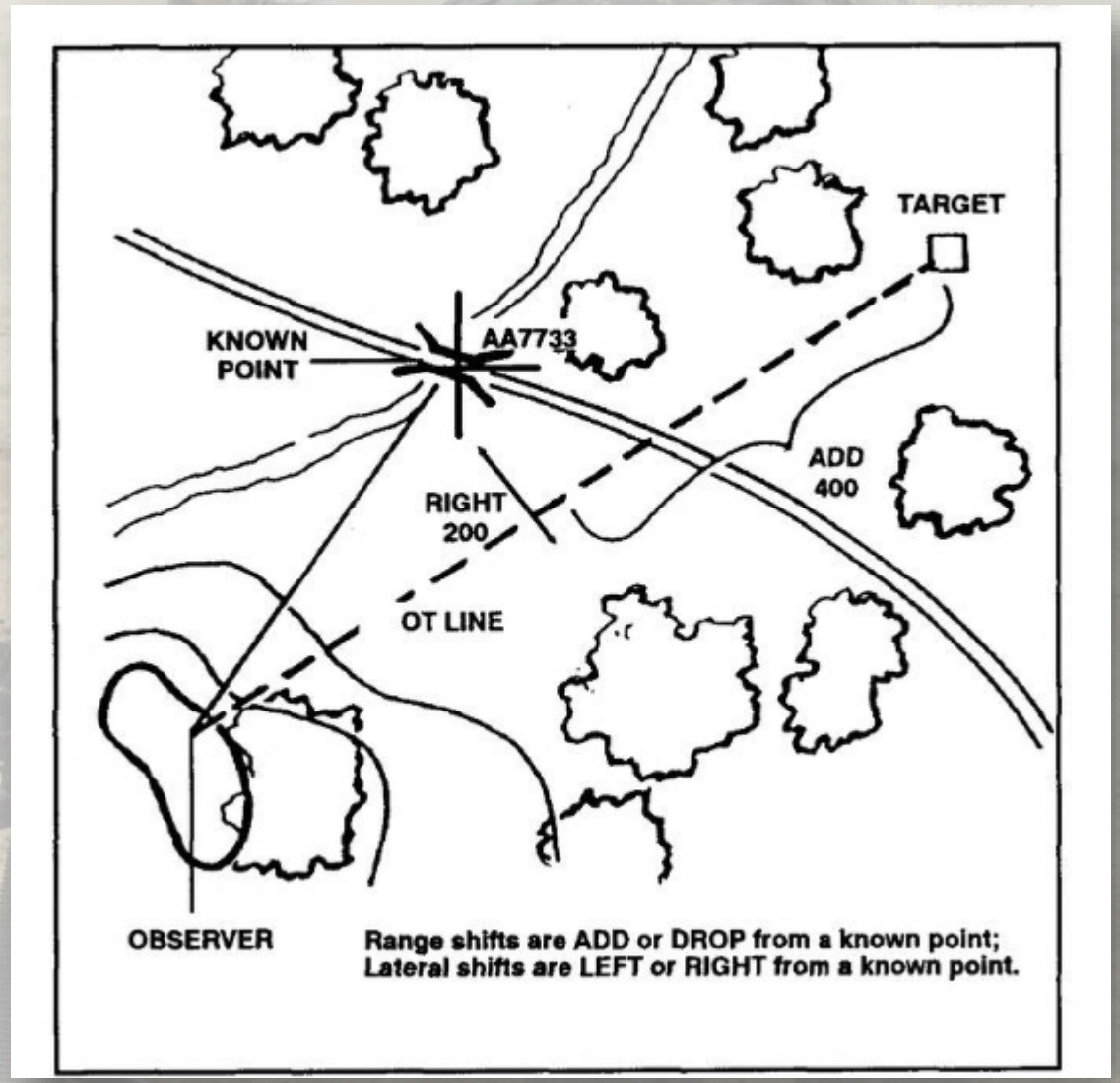
- Standard Method (No Need to Inform the FDC it's a Grid Mission
- 6 Digit Grid Minimum, 8 Digit Preferred for Point Target
- Transmitting Target Altitude is not a requirement but may improve accuracy.
- OT Direction must be transmitted before first round.

CFF: Shift

- Quick can be used without Map or Compass
- Can be inaccurate if the deviation is more than 600 mills

Steps:

1. Identify Known Point
2. Determine Lateral Shift through OT Factor
3. Determine Range Shift / Vertical Shift
4. CFF

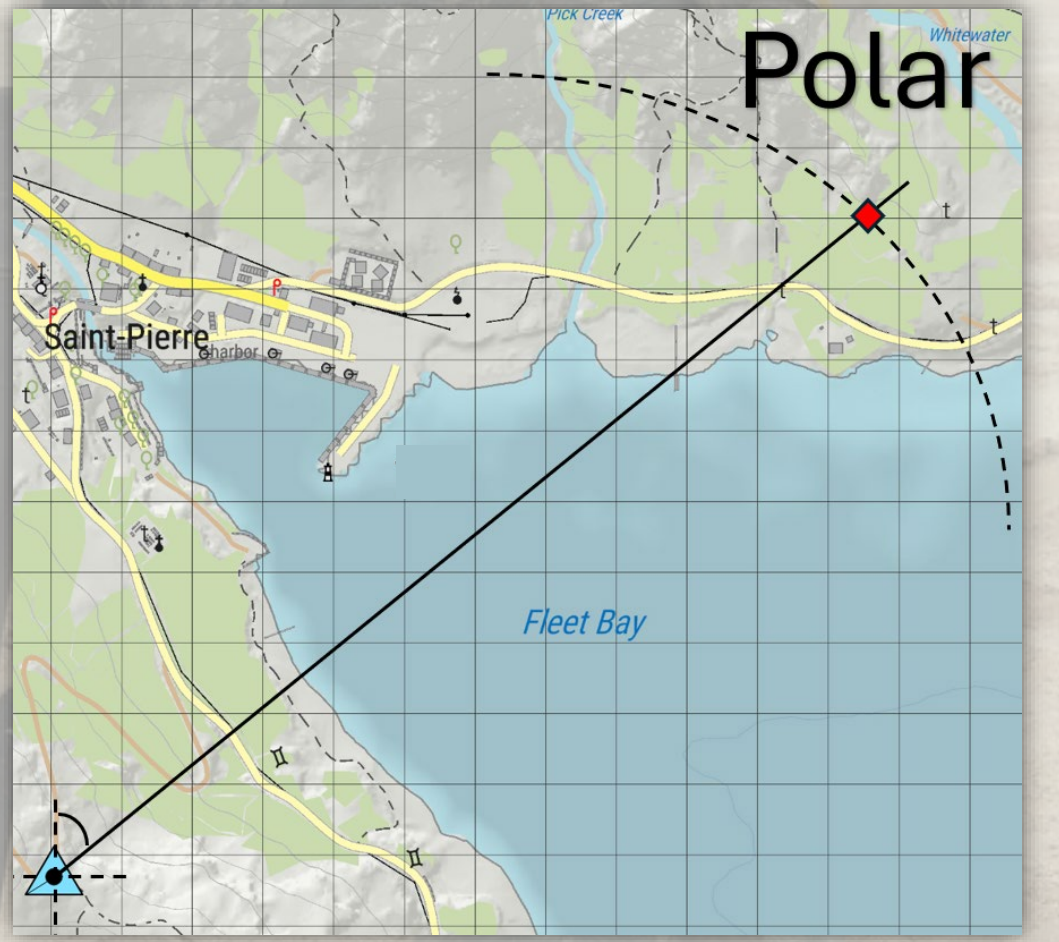


CFF: Polar

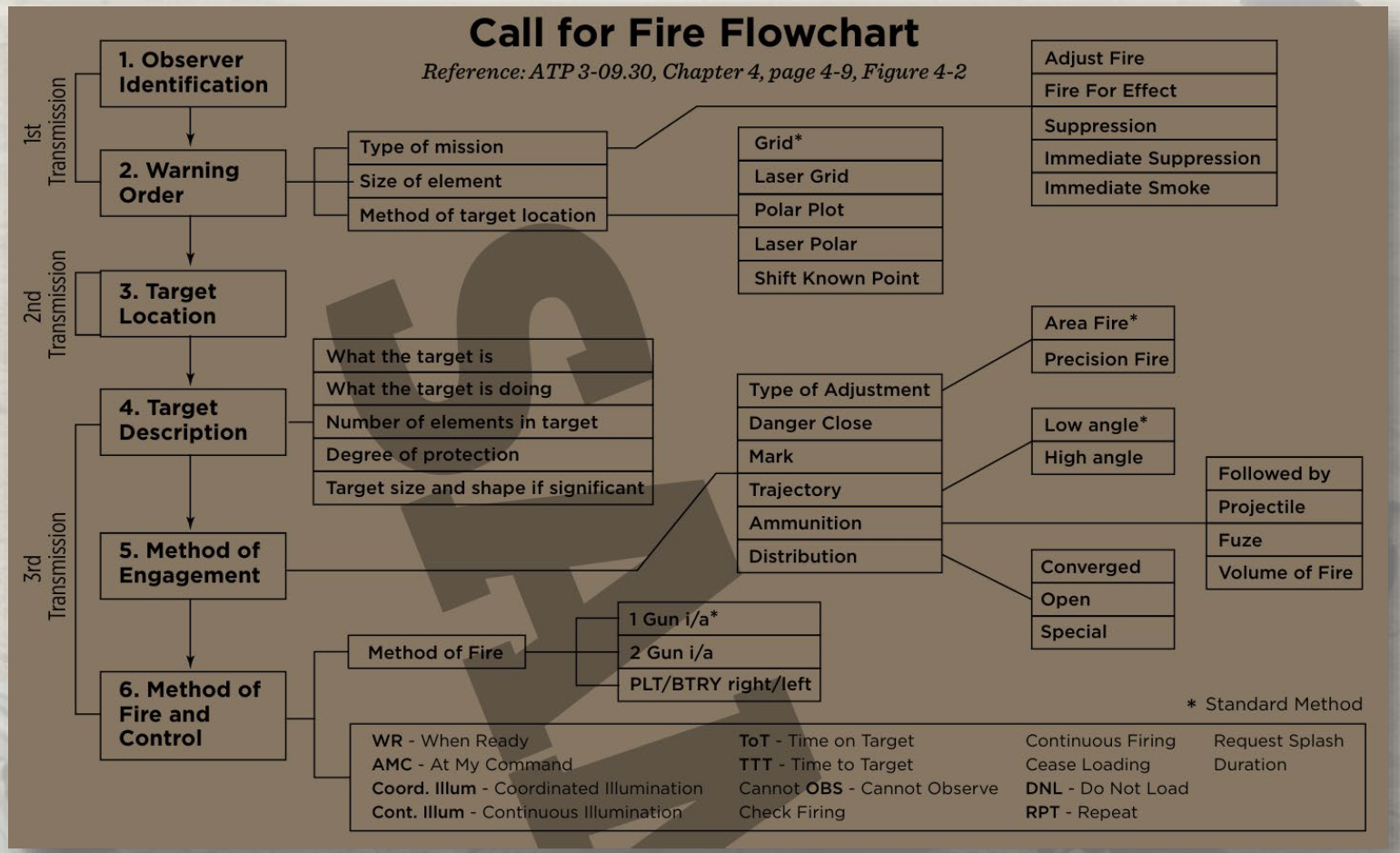
- You're on an OP known to the FDC by a POSREP Report.

Steps

1. Communicate OP (Separate from CFF!!!)
2. Determine OT Direction
3. Determine Range
4. Determine Vertical Shift
5. CFF



Call For Fire



Call For Fire Example (Grid)

1st Transmission

- **"Alpha 16 ,Bravo 21, Adjust Fire, Over."**
- **"Bravo 21, Alpha 16, Adjust Fire, Out"**

2nd Transmission

- **"Grid AB 123 456, Over"**
- **"Grid AB 123 456, Out"**

3rd Transmission

- **"Infantry Platoon in the Open, Danger Close, At my command, Over"**
- **"Infantry Platoon in the Open, Danger Close, At my command, Over"**

Message to Observer

- **"Bravo 21, Alpha 16, Message to Observer, HE Quick, 10 Rounds in Effect, TGT No AB0001, Over"**
- **"Bravo 21, Alpha 16, Message to Observer, HE Quick, 10 Rounds in Effect, TGT No AB0001, Over"**

Message to Observer (MTO)

After the FDC receives the call for fire, the FDC determines how to target will be attacked. That decision is announced to, the observer in a form of an MTO.

- Unit(s) to Fire (Can be omitted in ARMA)
- Changes to Call for Fire
- Number of Rounds
- Target Number
- Additional Information (Angle T, Time of Flight)

Message to Observer

- **“Bravo 21, Alpha 16, Message to Observer, HE Quick, 10 Rounds in Effect, TGT No AB0001, Over”**
- **“Bravo 21, Alpha 16, Message to Observer, HE Quick, 10 Rounds in Effect, TGT No AB0001, Over”**

End of Mission

Mission Completion and BDA

REPEAT
If the desired effect is not achieved, the mission is fired again with repeat.

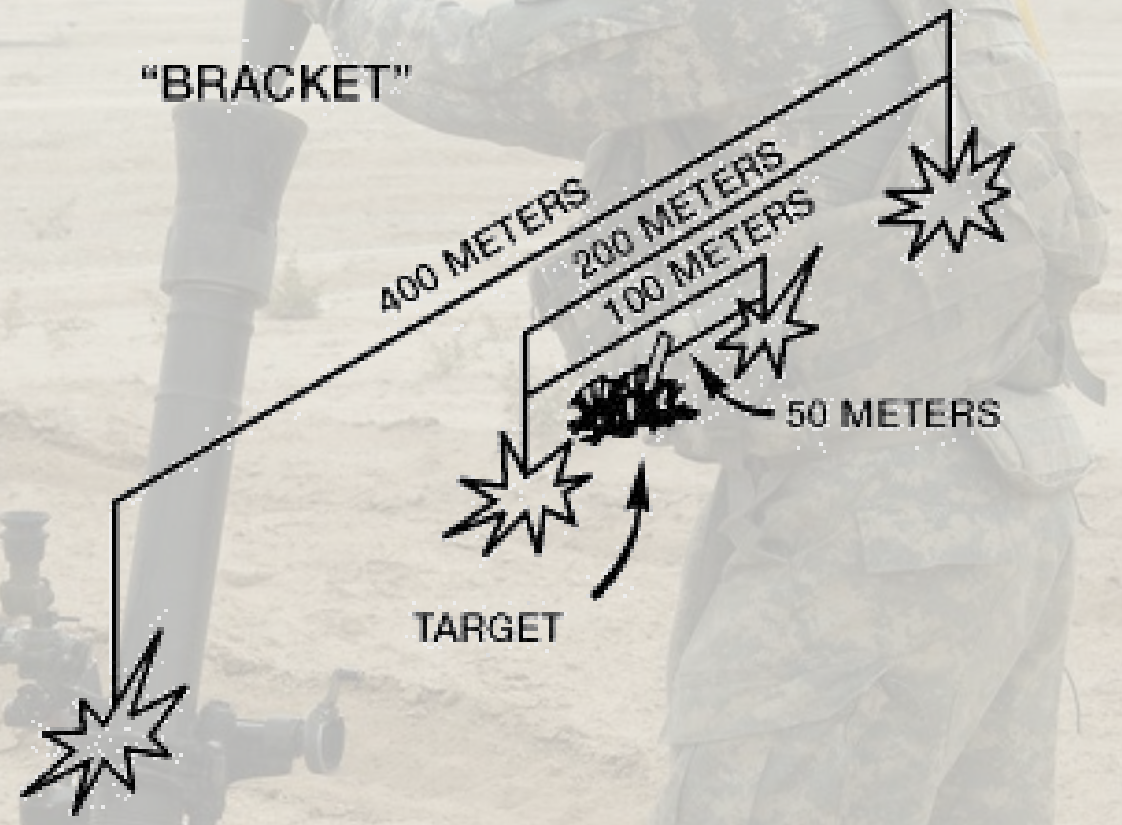
END OF MISSION
The fire mission is ended with [End of Mission]

RREMS
Refinements, Record as Target, End of Mission and Surveliance

Results of FFE	Observer's Actions	Observer's Transmission
Accurate and Sufficient	End Mission and Surveillance	End of Mission, RPG Silenced, Over
Accurate and Sufficient; Replot Desired	Request Replot, End Mission and Surveillance	Record As Target, End of Mission, BMP Neutralized, Over.
Inaccurate and Sufficient	Refinement, end mission, and Surveillance	Right 20 Add 20, End of Mission, RPG Silenced, Over
Inaccurate and Sufficient, Target Replot Desired	Correction, Request Replot, End Mission & Surveillance	Right 10, Record as Target , End of Mission, BMP Neutralized, Over.
Inaccurate and Sufficient	Refinement & Repeat or Adjust Fire	Right 10, Add 50, Repeat or Right 10, Add 50 , Adjust Fire, Over
Accurate and Insufficient	Repeat	Repeat Over

Adjusting

- One- Round Adjustment
- Successive Bracketing
- Hasty Bracketing
- Creeping Fire

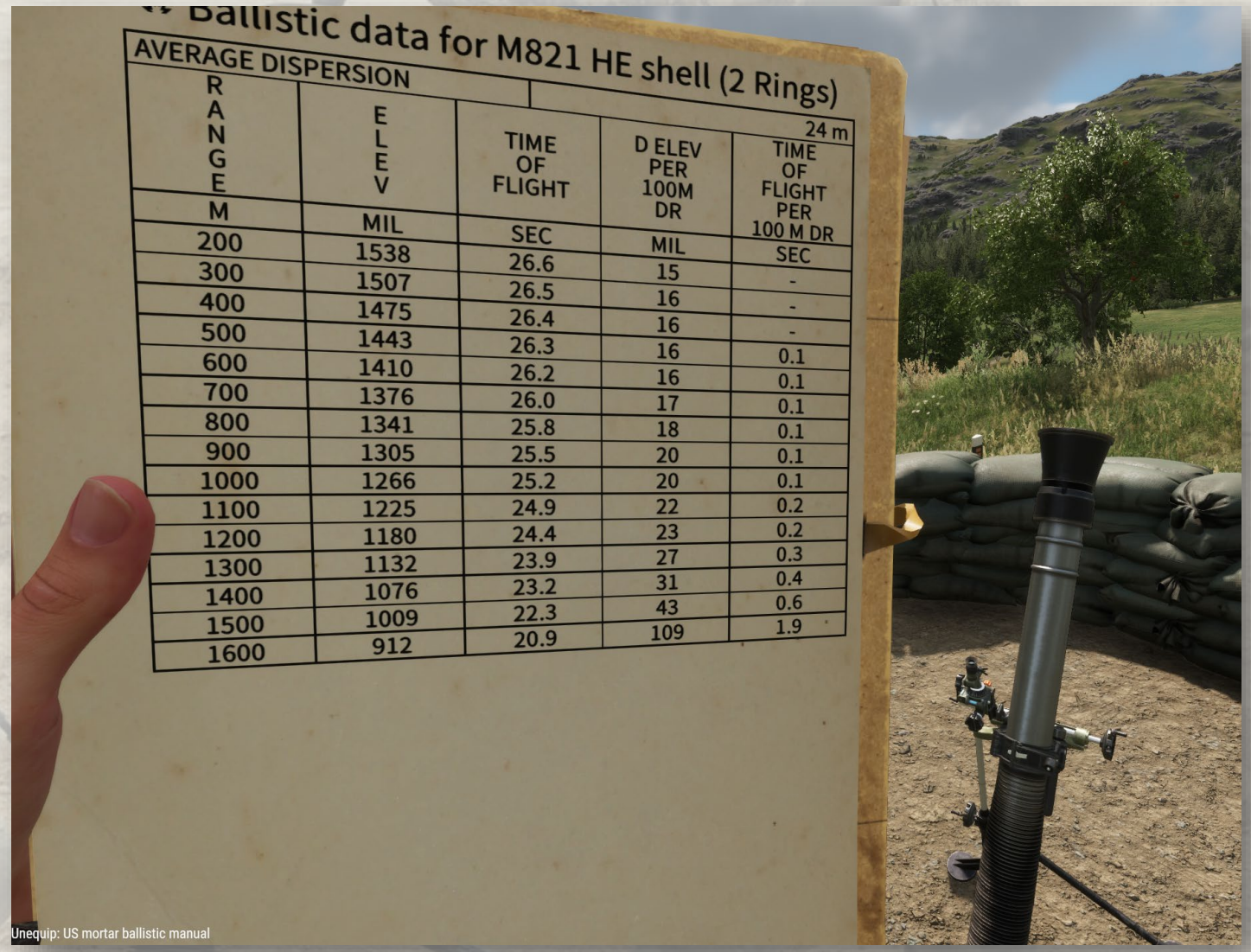


Fire Commands

SEQUENCE	EXAMPLE
Mortars to follow	Section
Shell and fuze	HE quick
Mortars to fire	Number two
Method of fire	One round
Deflection	Deflection two eight hundred
Charge	Charge eight and four eighths
Time	
Elevation	Elevation nine hundred

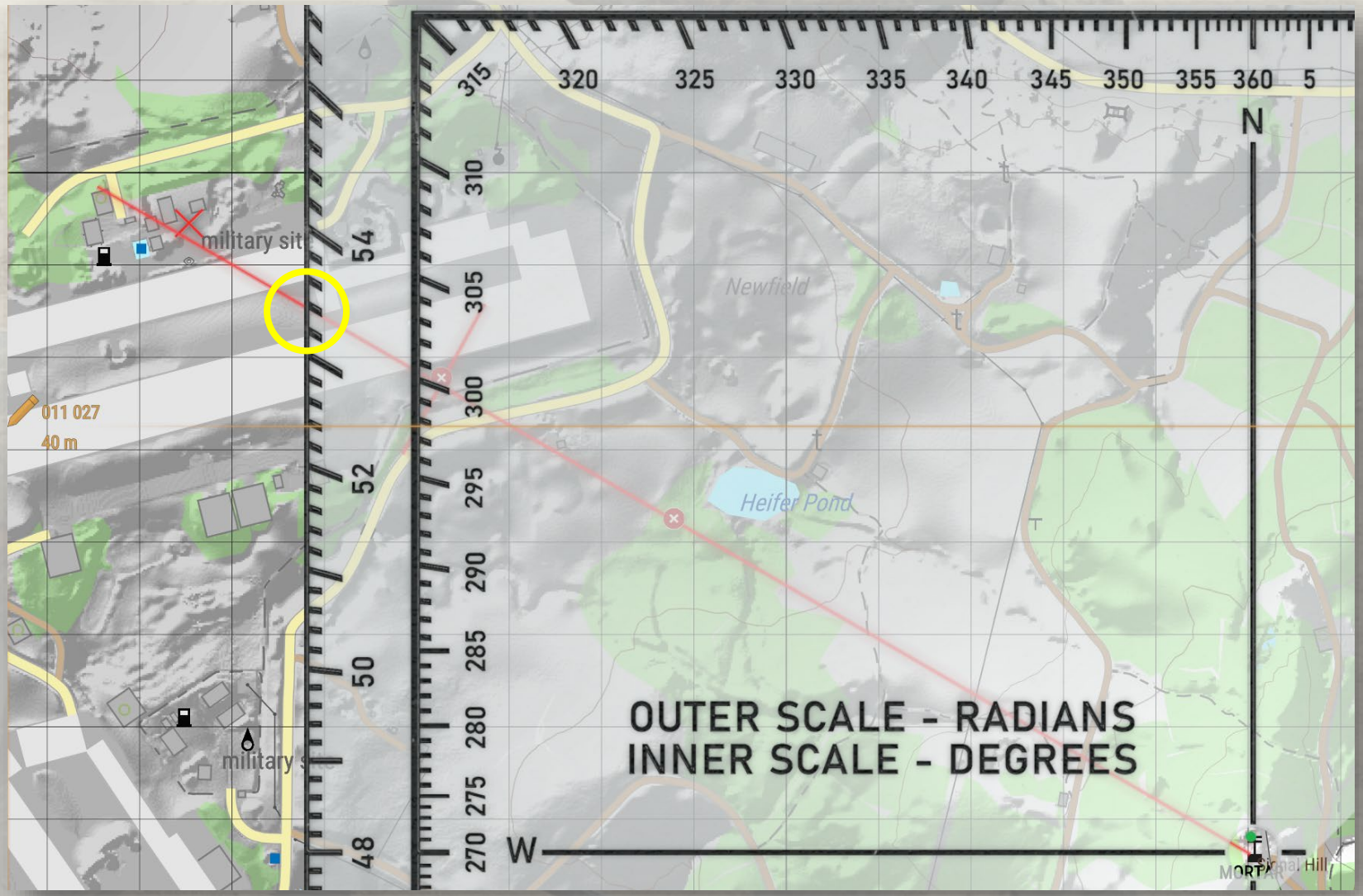
FDC Calculation

- Three Critical Information
  - Deflection to the Target gathered from the Compass
  - Distance to the target using the Map Tool
  - Difference in Elevation (Vertical Interval)



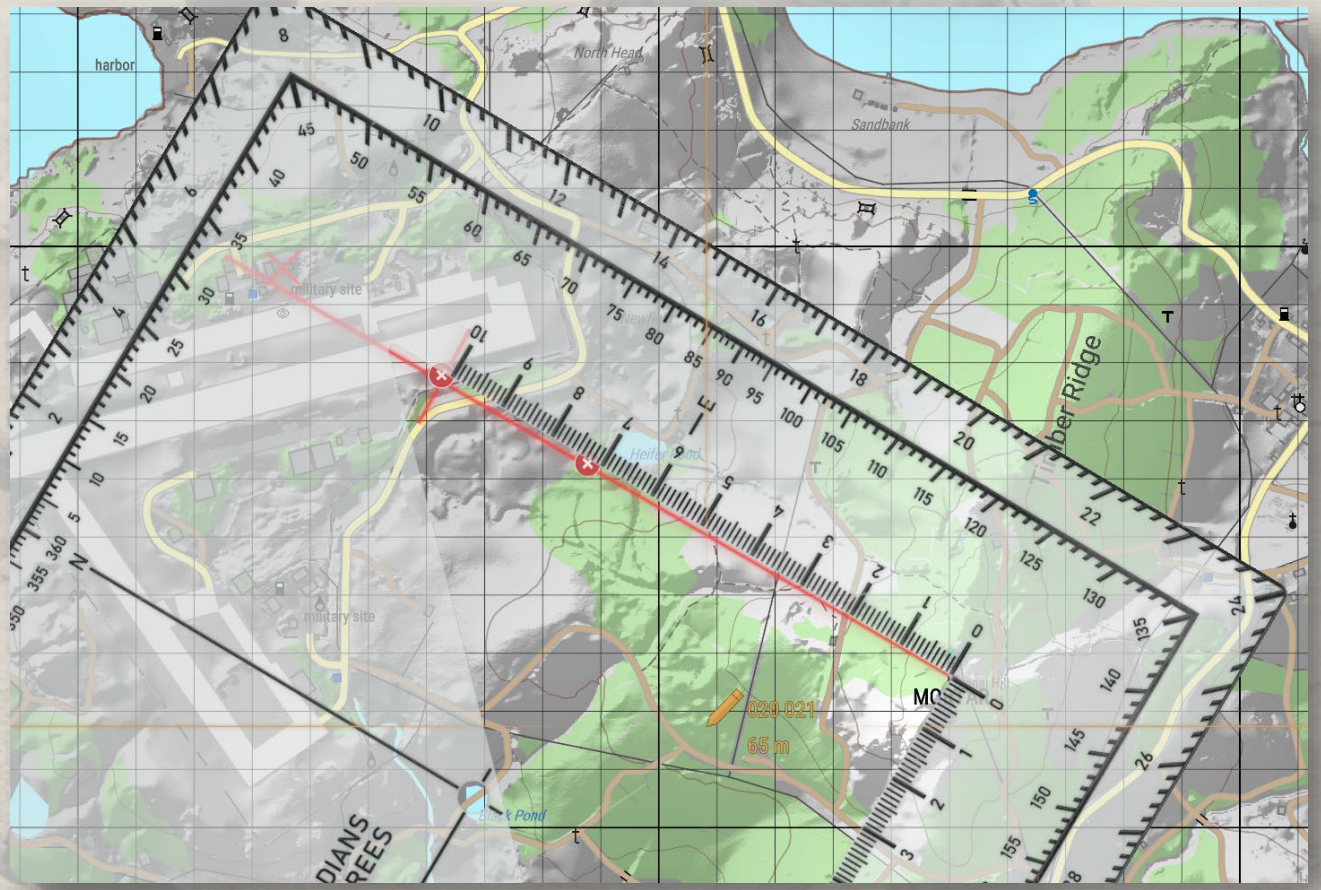
Example 1: Deflection

- Draw a Line from the Mortar Location extended past the target.
- Place the center of the Map tool oriented North onto the mortar position.
- Read the Angle in Mills where the line intersects.



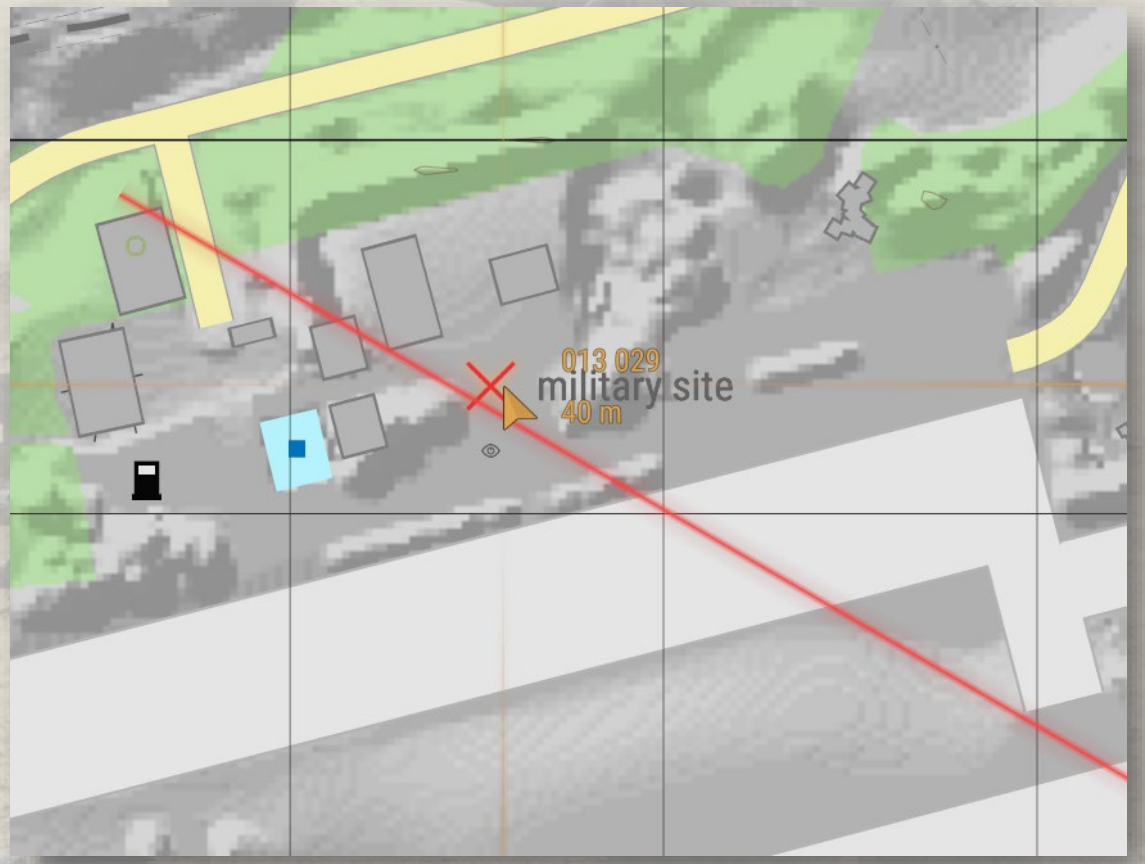
Example 1: Distance to Target

- Utilize the Ruler on the on the bottom right of the map tool. The length of the ruler is 1000m.
- Orient the Map Tool along the drawn line and utilize the line to every 1000m and remeasure until the distance is gathered.



Example 1: Vertical Interval (VI)

- Count Contour Lines from Elevation Points (Not Reliable in Reforger)
- Use map cursor elevation data.



Example 1: Calculation

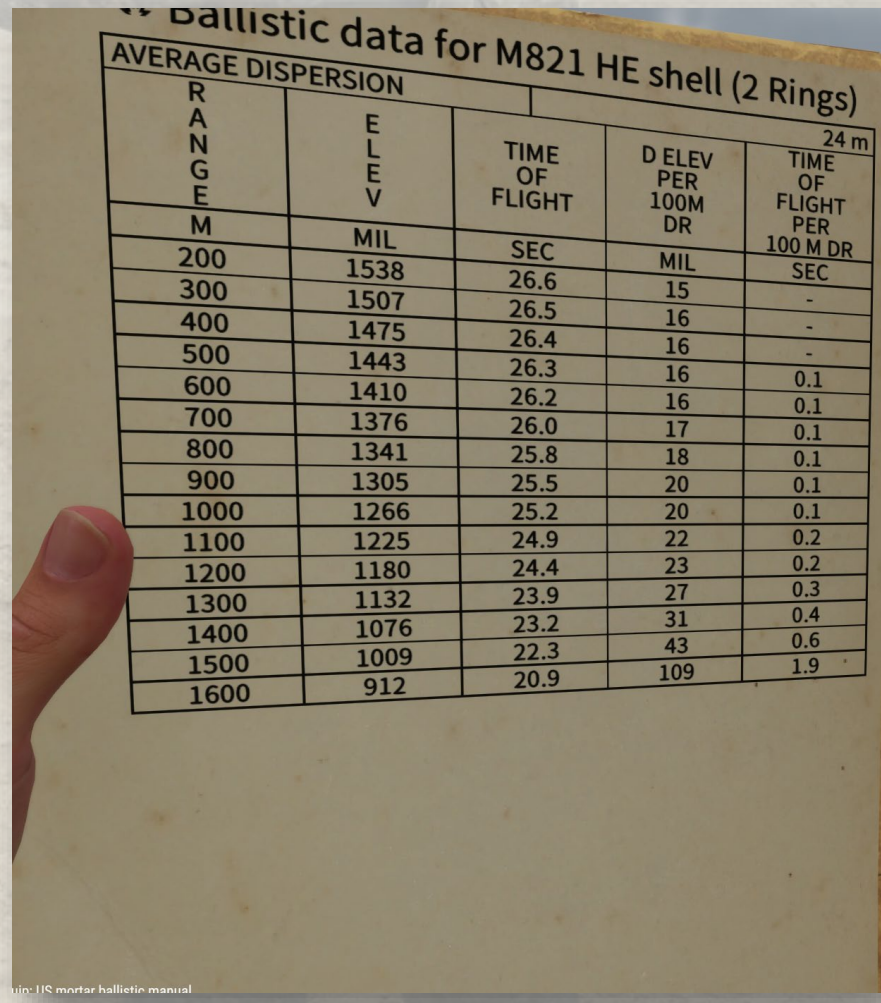
- Deflection: 5340 mils , Distance: 1320 m
  Mortar Elev: 150 m, TGT Elev: 40 m
  - ELEV at 1320 m will correspond to 1120.8 MIL

$$ELEV = (ELEV_2 - ELEV_1) \times \frac{Range}{100}$$

Where ELEV2 corresponds to the ELEVATION for the Range that is further away.

$$ELEV = (1076 - 1132) * \frac{20}{100} + 1132 = 1120.8$$

  - Similarly, to Interpolate D ELEV it will be 27.8
  - If the target Is higher than the mortars you subtract D ELEV if the target is lower you add
  - ELEV = 1120.8 + 27.8 = 1148.6



AVERAGE DISPERSION

RANGE	ELEV	TIME OF FLIGHT	D ELEV PER 100M DR	TIME OF FLIGHT PER 100 M DR (24 m)
M	MIL	SEC	MIL	SEC
200	1538	26.6	15	-
300	1507	26.5	16	-
400	1475	26.4	16	-
500	1443	26.3	16	0.1
600	1410	26.2	16	0.1
700	1376	26.0	17	0.1
800	1341	25.8	18	0.1
900	1305	25.5	20	0.1
1000	1266	25.2	20	0.1
1100	1225	24.9	22	0.2
1200	1180	24.4	23	0.2
1300	1132	23.9	27	0.3
1400	1076	23.2	31	0.4
1500	1009	22.3	43	0.6
1600	912	20.9	109	1.9

Example 1: Firing Commands

- Squad
- HE, Charge 2
- Gun 1
- 2 Rounds
- Deflection 5340
- Elevation 1148.6