

# Instructions for Mortar Fire Control Android Application

Sniper Flash Cards

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There are two Android applications: Fire Control and Forward Observer. The Fire Control application includes both direct-fire and indirect-fire applications. The direct-fire application is necessary for using a street intersection as a reference point as described in the example below. It can also be used for shooting snipers off the roofs of buildings.

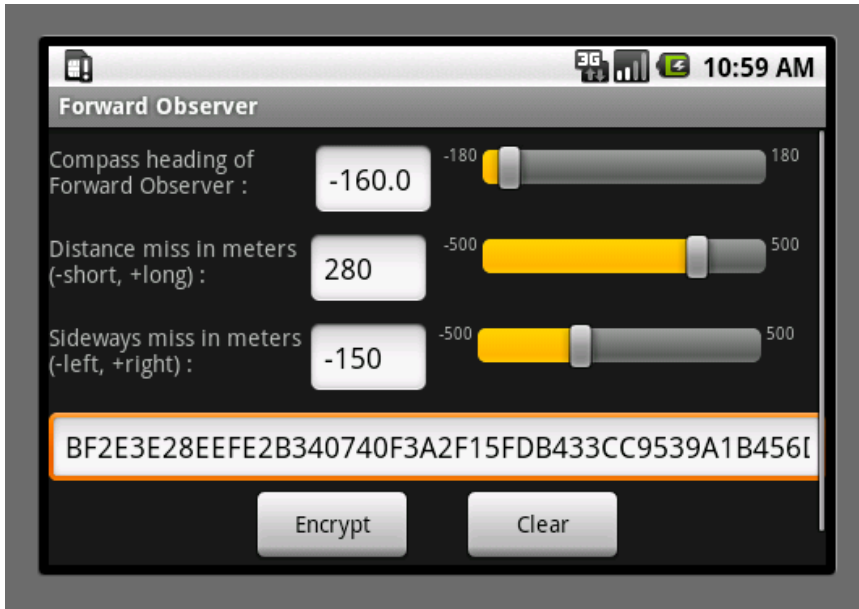
The Forward Observer application asks him to input his observations and a short text message, which it then encrypts (using AES) in preparation for texting the gunner. The gunner pastes this message into the Fire Control application and inputs his own observations. Hitting “calculate” decrypts the FO’s message, assigns that data to its variables and displays the FO’s text message along with the corrections to elevation and azimuth angle, as well as flight time.

Follow this link for an explanation of the abbreviations in the forward observer’s messages:

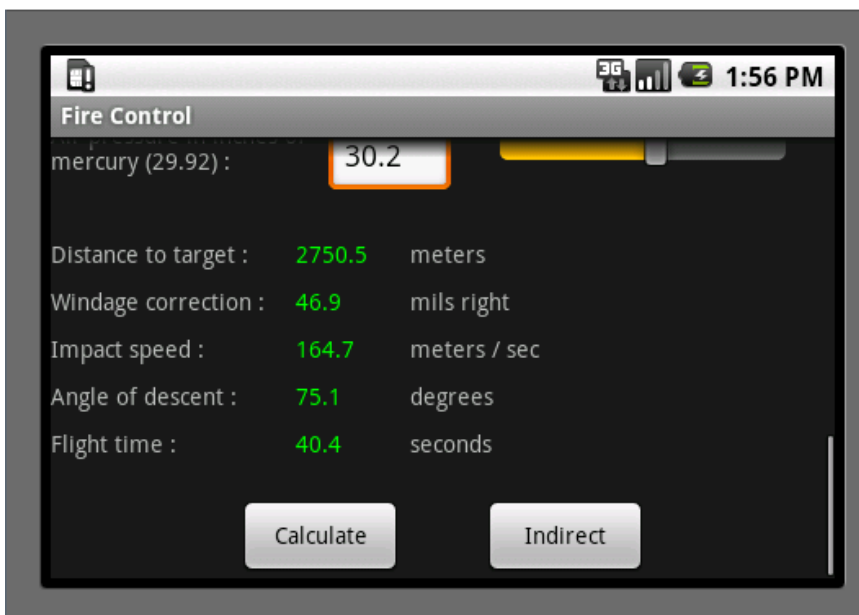
[www.sniperflashcards.com/Abbreviations for Mortar Fire Control Android Application.pdf](http://www.sniperflashcards.com/Abbreviations%20for%20Mortar%20Fire%20Control%20Android%20Application.pdf)

## Example

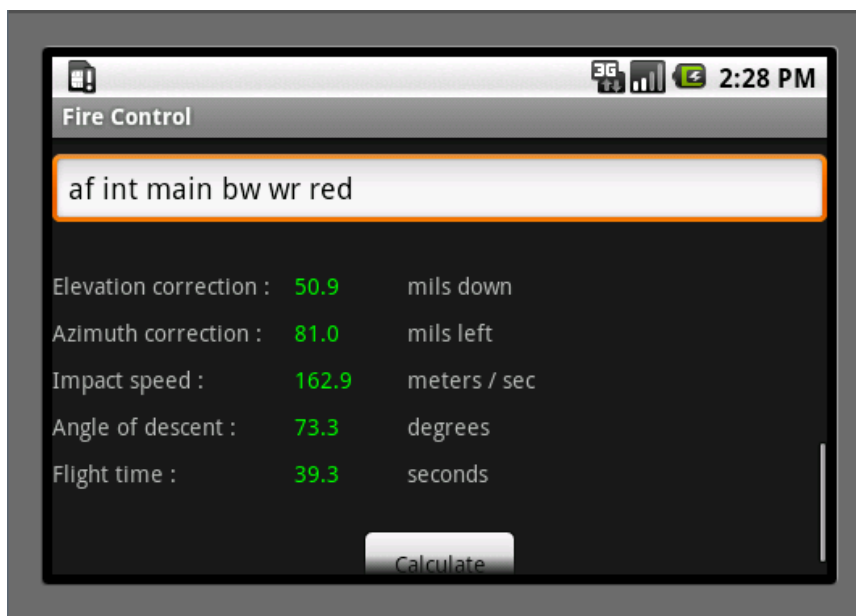
- 1) The gunner is using shells with an initial speed of 360 m/s that are ballistically equivalent to 100 mm solid steel balls. He is in a trench with his muzzle 5 m below ground and on a 5% hill climbing northward. The altitude is 350 m, the temperature is 15° C and the air pressure is 30.2” of Hg. He records this information on the direct-fire application and waits for further instructions.
- 2) Knowing that another mortar team is operating in the area and using green smoke, the forward observer (FO) chooses red smoke. He spots an enemy anti-aircraft gun in a residential neighborhood at -160° off magnetic north. It is too far away to read the street signs but he knows that the large intersection nearby is Main and Broadway. From his perspective, the intersection is 280 m past the target and 150 m left of it. He sends this data and the following text message: af int main bw wr red



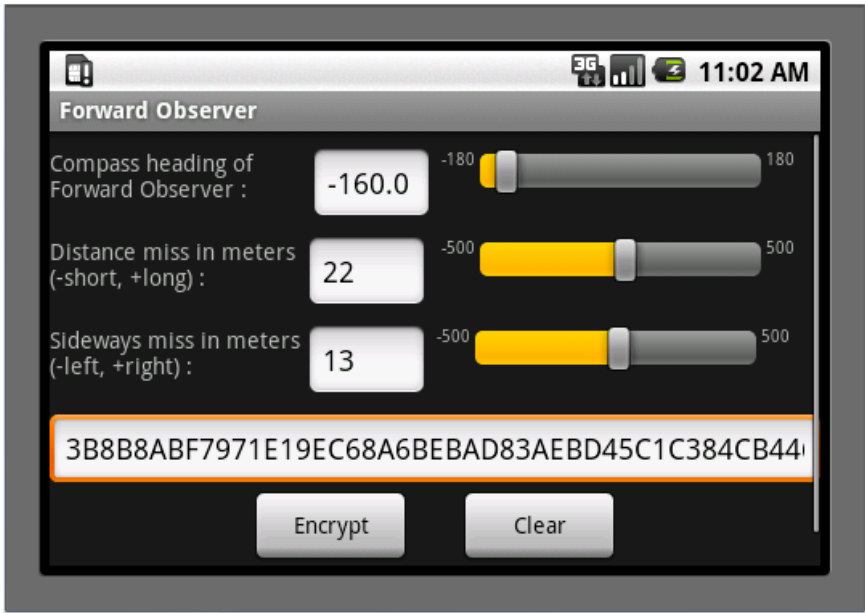
- 3) The gunner uses a ruler on a street map to determine that this intersection is 2750 m away. Because the map is oriented towards true north he must consider declination to determine that his compass reading off magnetic north is  $37^\circ$  when facing the intersection. Because he is facing  $37^\circ$  off the 5% slope, the grade is  $5\% \times \cos(37^\circ) = 4\%$  towards the intersection. When facing in this direction, there is a 7 m/s wind from the 2 o'clock direction. The gunner inputs this data into the direct-fire software and, after several trials, finds that a  $65.4^\circ$  angle of elevation and 46.9 mils right windage would hit the intersection.



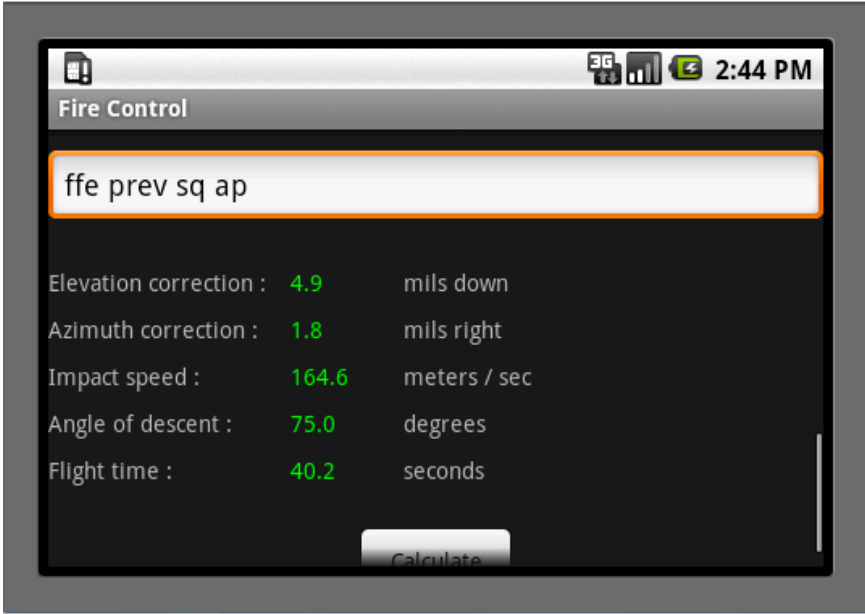
- 4) The gunner does not fire at the intersection. Hitting “calculate” on the direct-fire application automatically transfers the data to the indirect-fire application. He just adds 37° to the windage correction of 2.6° that was transferred from the direct-fire application. The input data is then what it would be if the gunner had fired and hit the intersection. He pastes in the FO’s encrypted message, hits “calculate” and the application tells him to adjust his angle of elevation 50.9 mils down and his azimuth angle 81.0 mils left. His angle of elevation and compass heading are automatically updated so the gunner will not have to re-enter the corrected data. He makes these adjustments and fires a red smoke grenade.



- 5) The FO observes red smoke 22 m past the target and 13 m to its right. The anti-aircraft gun crew has also seen the smoke and is frantically packing up their gun to move out. The FO inputs this correction data (-160°, 22 m long and 13 m right) and the following text message: ffe prev sq ap



6) The gunner pastes in the FO's message, hits "calculate" and is advised to adjust his angle of elevation 4.9 mils down and his azimuth angle 1.8 mils right. He makes these adjustments and fires anti-personnel shells set to detonate in 39.2 s as fast as he can.



7) The FO sends the following text message: eom target destroyed