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Ballistic Performance of 155mm Velocity Enhanced Long-Range Artillery Projectile

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Many types of 155mm high explosive projectiles are used by a large number of powerful armed forces in the world. Some of these projectiles are of short ranges like that one designated by M107 since its range is approximately 18km. In order to make range extension of these projectiles, the drag acting on them should be decreased. Therefore, many methods have been followed to decrease the drag during projectile flight in air. The improvement of the projectile ballistic shape and adding base bleed unit installed to its base are among the drag reduction methods. Moreover, some projectiles are supplied with small rocket motor imparting the projectile with thrust force rather than decreasing the drag acting on it.

In the current study, an analysis is performed to investigate the ballistic performance of a newly developed 155mm Velocity enhanced Long-range Artillery Projectile (VLAP) which is provided with base bleed and rocket assistant units. The internal ballistic solution is obtained using an analytical model. Then, the external ballistic solution is carried out when the function of the rocket motor and the base bleed are switched on or off. A maximum range of 41km is obtained when this projectile is fired using a barrel having a length of 39 times the caliber and a maximum range of 55km is obtained when it is fired from a barrel having a length of 52 times the caliber.