

Firing range optimization of a 155mm uni-modular charge howitzer by ETC technology

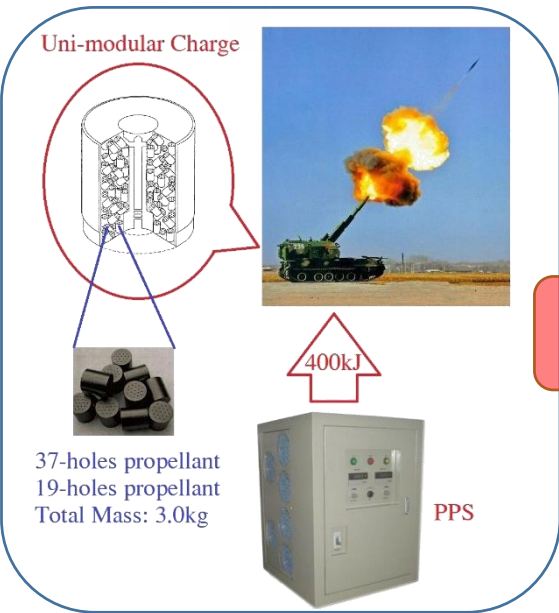


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Electrothermal-chemical (ETC) launch technology can accurately control and enhance the ignition and combustion of solid propellants to improve the consistency and accuracy of ballistics.

In this paper, a **calculation model** including the transient burning rate formula and six-degree-of-freedom rigid body trajectory equation is established to simulate both interior and exterior ballistics processes for a 155mm uni-modular charge howitzer.



The Interior Ballistics Model

Muzzle Velocity

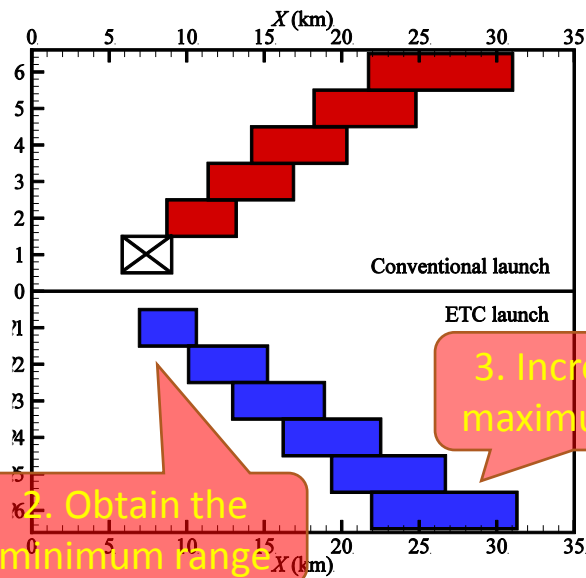
Conventional Launch
ETC Launch

1. Optimize the muzzle velocities

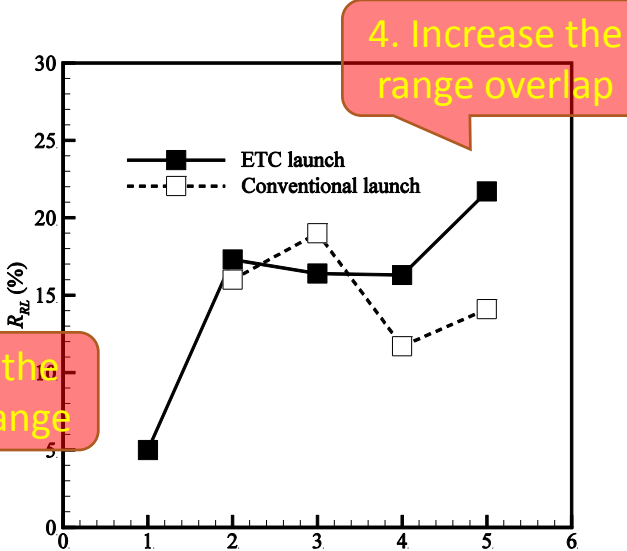


The Exterior Ballistics Model

Range



Range Overlap



The calculation results show that the muzzle velocities are optimized via the ETC technology. The average range overlap is increased from 15.2% to 17.9% via input the electrical energy 400kJ. And it also has smaller standard deviation by ETC launch. The 155mm uni-modular charge ETC howitzer can effectively obtain the minimum range, increase the range overlap and maximum range.