A quantitative method for calculating spatial release region for laser-guided bomb

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Abstract

The advantages of the laser-guided bomb (LGB) as an air-to-ground precision-guided weapon are high hit rate, great power, and simplicity of usage. LGB is guided by semi-active laser ground-seeking, therefore the impact of the atmosphere can affect how well it hits its target. LGB's spatial release region (SRR) is challenging to calculate precisely, especially with poor field of view, resulting in a lower real hit probability. To increase the hit probability of LGB in tough atmospheric situations, a novel method for calculating the SRR is proposed. This method is based on the transmittance model of the 1.06 μm laser in the atmospheric species and the laser diffuse reflection model of the target surface to determine the capture target time of the laser seeker. And then calculate the boundary ballistic space starting position by ballistic model, and get the spatial scope of the spatial release region. This method may determine the release region of laser-guided bombs based on flight test data such as instantaneous velocity, altitude, off-axis angle, and atmospheric visibility. The SRR calculation method helped us improve the 9.2% hit probability of LGB by more effectively employing aircraft release conditions, atmospheric visibility, and other factors.

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