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# DETERMINING THE ACCURACY OF LAUNCH ACCEPTABILITY REGIONS

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**ABSTRACT**
In the air-to-ground delivery of modern precision guided munitions (PGM), the launch acceptability region (LAR) is defined as the region of space where the aircraft can release the weapon and provide it sufficient energy to guide to its target. This paper presents a method to compare two LAR calculations: the LAR calculated by the aircraft and the LAR calculated internally by the weapon. The former is displayed to the pilot and the latter is transmitted to the test control room via telemetry equipment installed in the weapon. The objective is not to provide test data on how accurate the current aircraft model is but to present a new method of data analysis. Due to the sensitive nature of the actual results, artificial results following the same trends were generated using the same method. The general trends of the data were that 1) errors decreased with increasing airspeed and altitude, 2) maximum range errors were mostly optimistic, and 3) minimum range errors were mostly conservative.

Calculating and displaying an accurate representation of the LAR is of vital importance to the warfighter. If the calculated LAR is optimistic, it may overrepresent the actual capabilities of the weapon and result in weapon misses. If the LAR is conservative, it may under-represent the weapon capabilities resulting in aircraft and aircrew being unnecessarily exposed to enemy threats. Recognizing that there is no perfect truth model, the weapon LAR is the best available truth model because it reflects the guidance laws used by the weapon autopilot. In addition, both the weapon LAR and autopilot software are loaded concurrently to the weapon processor which keeps the two on the same version.