

Small Diameter Bomb (SDB)

Executive Summary

- Small Diameter Bomb (SDB) I completed testing on a new Electronic Safe Arm and Fuze (ESAF) during FY10. This was the last significant test event for the program as presently constituted. Testing met the objectives of demonstrating enhanced reliability while retaining existing system performance. Test results support the full range of fuzing options, incorporation of the redesigned/modified fuze, and the SDB I's lethality.
- SDB II finalized a new Test and Evaluation Master Plan (TEMP) and completed the source selection process by awarding the contract to Raytheon Missile Systems.
- The Integrated Test Team completed extensive work to fully examine test resource and planning requirements for developmental, live fire, and operational testing, resulting in an adequate test program as SDB II proceeds through Engineering and Manufacturing Development (EMD).



System

- SDB I combines GPS and internal inertial navigation to achieve precise guidance accuracy. The SDB I warhead is a penetrator design with additional blast and fragmentation capability. The weapon can be set to initiate on impact or a preset height above the intended target. Fuze function delays can be pre-set to either of these two options.
- SDB II combines Millimeter-Wave radar, infrared, and laser guidance sensors in a terminal seeker in addition to a GPS and inertial navigation system to achieve precise guidance accuracy in all weather.

Common Characteristics

- The SDB is a 250-pound air-launched, precision glide weapon using deployable wings to achieve standoff range. F-15E aircraft employ SDBs from the BRU-61/A four-weapon carriage assembly.
- SDB provides reduced collateral damage while achieving kills across a broad range of target sets by precise accuracy, small warhead design, and focused warhead effects.
- SDB may receive support from the Talon NAMATH system, which provides GPS differential corrections to the SDB through the F-15E data link prior to weapon release to increase SDB accuracy.

Mission

- Combatant Commanders use SDB I to attack fixed or relocatable targets that remain stationary from weapon release to impact. Units can engage both soft and hardened targets to include communications facilities, aircraft bunkers, industrial complexes, and lightly armored ground combat systems and vehicles.
- Combatant Commanders will use SDB II to attack moving targets in adverse weather at standoff ranges. SDB II can also be used against moving or stationary targets using its Normal Attack mode (radar/infrared sensors) or Semi-Active Laser mode, and fixed targets with its Coordinated Attack mode.
- SDB-equipped units can achieve an increased weapons load per aircraft compared to conventional air-to-ground munitions for employment against offensive counter-air, strategic attack, interdiction, and close air support targets in adverse weather.

Major Contractors

- SDB I: The Boeing Company, Integrated Defense Systems – St. Louis, Missouri
- SDB II: Raytheon Missile Systems – Tucson, Arizona

Activity

SDB I

- SDB I completed testing of a new fuze during FY10 in accordance with a DOT&E-approved test plan. The test items were live warhead assemblies with a redesigned/modified ESAF. Three dynamic sled tests each targeted

a 15-foot by 15-foot, one meter thick reinforced concrete block. The fourth sled test targeted a bunker cross section comprised of one meter of soil and one meter reinforced concrete block, thus engaging the most robust family of

targets in the SDB I target array. Incorporation of the redesigned/modified fuze should support the SDB I's lethality.

SDB II

- SDB II completed a new TEMP prior to passing Milestone B. The program also completed the source selection process by awarding the contract to Raytheon Missile Systems.
- The Integrated Test Team fully examined test resource and planning requirements for developmental, live fire, and operational testing resulting in an adequate test program as SDB II proceeds through EMD.

Assessment

- SDB I successfully completed the last significant test event for the program as presently constituted. ESAF testing demonstrated enhanced reliability while retaining existing weapon performance. The Program Office tested the full range of fuzing options by employing 10 weapons with the new fuze (six free-flight and four sled tests) with 10 successes, including highly stressful penetration scenarios.
- SDB II entered EMD with a properly resourced test program and no major programmatic testing problems.

- As SDB II has a small payload, a relatively modest degradation in weapon accuracy can lead to a major drop in weapon effectiveness; therefore, seeker performance and the ability to properly assess that performance are critical to the program progressing. Flying test bed seeker results will be the predominant source of data on seeker performance during the first years of EMD. Modeling and simulation will provide tools to interpret that data and evaluate weapon performance throughout program development. Both are critical aspects of the EMD program.

Recommendations

- Status of Previous Recommendations. The Air Force completed the FY09 recommendations.
- FY10 Recommendation.
 1. The SDB II Program Office should pay particular attention not only to the Critical Design Review results relating to seeker maturity and integration (including classification), but also provide a critical analysis on the progress of the modeling and simulation efforts and flying test bed seeker results. These will be crucial early indicators whether there are significant shortcomings in the weapon's performance prior to large-scale open-air testing in EMD.