

Small Diameter Bomb (SDB) Increment I

Executive Summary

- The Small Diameter Bomb (SDB) system completed its first year of operational service, including combat employment, in FY07. Overall performance was consistent with that observed in FY06 IOT&E. The system remained effective and suitable.
- BRU-61/A carriage reliability shortfalls noted in FY06 impacted operational use in FY07, but improvements were noted with the incorporation of redesigned carriage hardware. Fielded BRU-61/A inventories were modified in FY07, and the full effect of improvements on overall carriage reliability remains to be assessed in FY08.
- Correction of deficiencies in SDB Joint Munitions Effectiveness Manual Weaponing Software (JWS) was ongoing in FY07; the planned FY07 software improvements were deferred by the Air Force until FY08.
- The Air Force follow-on test plan to address shortfalls in SDB lethality data was approved by DOT&E on July 17, 2007. Testing will be conducted in early FY08.

System

- The SDB is a 250-pound air launched weapon using deployable wings to achieve standoff range.
- SDB uses a combination of Global Positioning System (GPS) and internal inertial navigation system guidance to achieve precise guidance accuracy.
- SDBs are employed from a four-weapon carriage assembly mounted on F-15E aircraft.
- The SDB warhead is a penetrator design with additional blast and fragmentation capability. Integral fuzing is initiated by warhead impact, with or without a specified function delay, or by reaching a preset height above the intended target.
- SDB provides reduced collateral damage potential while achieving kills across a broad range of target sets by precise accuracy, small warhead design, and focused warhead effects.

Activity

- Test and evaluation was conducted in accordance with the December 2004 DOT&E-approved Test and Evaluation Master Plan.
- SDB was fielded for combat use by operational F-15E at the end of FY06. Early problems with hardware component failures led the Air Force to take aggressive action to correct deficiencies and repair fielded items. SDB weapons have been employed in support of ongoing combat operations in the Southwest Asia areas of operation.
- The SDB BRU-61/A carriage assembly had not met the Air Force's mean time between failure requirements at the end of FY06. In FY07, the Air Force took action to redesign and



- SDB may be supported by the Accuracy Support Infrastructure (ASI) system, a ground-based, theater-deployable, differential GPS system, designed to increase SDB accuracy. ASI collects GPS satellite positioning error data and broadcasts target location corrections to the SDB through the F-15E data link prior to weapon release.

Mission

- Combatant commanders use SDB 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.
- SDB-equipped units can achieve an increased weapons load out 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.

- replace certain carriage components to improve reliability. At the end of FY07, the existing inventories of BRU-61/A carriages had been retrofitted with the improved configuration.
- Upon conclusion of FY06 IOT&E DOT&E determined that additional Live Fire testing was required to validate forthcoming improvements in SDB weaponing software and to provide a more robust set of empirical lethality data to better characterize SDB capabilities and limitations. In FY07, DOT&E approved the Air Force follow-on test plan, and test execution will commence in early FY08.
- Upon conclusion of FY06 IOT&E, DOT&E determined that the currently fielded version of the JWS small warhead

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lethality modeling did not adequately support SDB mission planning. An improved JWS version was expected in FY07, but efforts were not complete and an updated JWS will not be released for operational use until FY08.

- SDB evaluation in other FY06 operational test venues included Force Development Evaluation testing in Air Combat Command's Weapon System Evaluation Program in late FY07.
- Developmental and Live Fire testing of the SDB Focused Lethality Munition continued in FY07. This testing supported an OSD-sponsored Advanced Capabilities Technology Demonstration initiative investigating the utility of SDB munitions, coupled with an enhanced blast-only warhead and an enhanced bomb body composed of composite materials. Operational assessment of this SDB variant is anticipated in FY08.

Assessment

- Overall SDB performance during its first year of operational fielding, to include combat employment, was consistent with that noted in FY06 IOT&E. Operationally the system remained effective and suitable.
- BRU-61/A carriage reliability problems first noted in IOT&E impacted operational use in FY07. However, overall carriage reliability improvement was noted with the incorporation of improved hardware components. At the end of FY07, all fielded carriage assemblies had been modified. The full effect of the carriage improvements on overall BRU-61/A remains to be assessed in FY08.

- JWS improvements have yet to be realized. While progress was noted in Air Force small warhead lethality modeling, anticipated FY07 JWS updates will not be available for assessment until FY08.
- Follow-on live weapons testing to provide a more robust set of empirical lethality data to better characterize SDB capabilities and limitations remains to be accomplished. Testing in accordance with the DOT&E approved test plan is scheduled to occur in early FY08.

Recommendations

- Status of Previous Recommendations. Correction of deficiencies in JWS SDB effectiveness to facilitate accurate and effective mission planning remains to be completed. Additionally, follow-on Live Fire testing using impact-fuzed SDBs to validate JWS improvements and to provide a more robust set of empirical data to better characterize the range of SDB capabilities against ground combat system such as field artillery and lightly armored air defense systems has yet to be accomplished (FY06).
- FY07 Recommendation.
 1. The Air Force should continue to monitor BRU-61/A carriage reliability improvements in FY08 to determine overall system reliability in conjunction with hardware improvements incorporated in FY07.