

# Small Diameter Bomb Increment II

The Small Diameter Bomb (SDB) Increment II program continued integration testing on the F/A-18E/F and started early flight testing on the F-35. In FY21, the Navy executed four F/A-18E/F missions with the SDB II as part of the quick reaction assessment, but all four were unsuccessful.



## System Description

The SDB II, also known as the GBU-53/B Stormbreaker, is a 250-pound class, air-to-ground glide weapon capable of destroying moving targets in adverse weather. It uses deployable wings to increase standoff range and is also the first Network Enabled Weapon using weapon datalink, allowing post-launch tracking and control of the weapon via Inflight Target Updates (IFTUs). The new multi-mode seeker uses both a millimeter-wave radar and an infrared sensor to operate in adverse weather using the Normal Attack mode. It also has Laser Illuminated Attack and Coordinate Attack modes for maximum employment flexibility. Once launched, the SDB II guides to a designated target cue, which is updated inflight via the weapon datalink until the seeker locates, identifies (if able), and provides terminal guidance to the target. The SDB II incorporates a multi-function warhead designed to defeat armored and non-armored targets. The weapon can be set to initiate on impact, at a preset height above the intended target, or in a delayed mode to enable target penetration.

## Program

SDB II is an Acquisition Category ID program intended to deliver capabilities deferred from SDB I. DOT&E approved the SDB II Milestone C Test and Evaluation Master Plan (TEMP) in April 2015. A TEMP update containing a cybersecurity strategy for Phase II is expected in FY22. The Air Force fielded the SDB II on the F-15E in FY20 following completion of Multiservice Operational Test and Evaluation (MOT&E) Phase I. The Navy intends to complete the Quick Reaction Assessment and field the SDB II on the F/A-18E/F in FY22. The MOT&E Phase II on the F-35 is scheduled to be completed in FY24. Specifically, developmental test and OT&E of the SDB II on the F-35B is expected to take place in FY22, leading to an early operational capability declaration, while developmental test and IOT&E on the F-35C is scheduled to start in FY23, leading to an initial operational capability declaration and full-rate production decision.

## Major Contractor

Raytheon Missile Division – Tucson, Arizona.

## Test Adequacy

SDB II testing in FY21 included developmental test flight science environmental/loads testing and jettison missions on the F-35B.

The Navy performed four F/A-18E/F missions with the SDB II as part of the quick reaction assessment, but all four were unsuccessful.

Phase I cybersecurity testing conducted by the Air Force was inadequate to support SDB II survivability evaluation in a cyber-contested environment. The extensive test shortfalls from Phase I need to be addressed during planned MOT&E Phase II testing.

## Performance

### Effectiveness

The SDB II is operationally effective as employed by the F-15E.

The first three F/A-18E/F missions were unsuccessful due to configuration errors, datalink entry failures, and aircraft software deficiencies. The Navy has resolved these hardware and software deficiencies. A fourth test was also unsuccessful, and analysis of that event is ongoing.

The SDB II demonstrated the expected lethality against target surrogates for legacy main battle tank, infantry fighting vehicle, anti-aircraft gun, surface-to-air missile target-erector-launcher, rocket launcher, and small patrol boat targets.

## Suitability

SDB II is operationally suitable as employed by the F-15E. During F/A-18E/F integration the weapon has been reliable, but aircraft OFP and equipment issues have resulted in four failed tests and several cancelled missions. The complexity of cryptographic information delivery, loading, and mission planning, including exclusion zone creation processes, continues to be a problem, with only modest mission planning improvements incorporated into the Joint Mission Planning System to date. These problems were first identified during F-15E testing of the SDB II.

## Survivability

The survivability of the SDB II in a cyber-contested environment is currently unknown due to the lack of adequate test assets provided by the vendor.

## Recommendations

1. The Navy should develop and fund an adequate MOT&E Phase II cybersecurity T&E strategy to support an evaluation of SDB II survivability in a cyber-contested environment.
2. The Navy and Air Force should streamline the mission planning process to decrease the required timeline and increase reliability, particularly with regard to cryptographic data entry.
3. The DOD should continue to advocate for operationally suitable initiatives to streamline the cryptographic information delivery, loading, and verification process.