

BAE SYSTEMS

Reliable protection against advanced RF threats

AN/ALE-55 Fiber-optic towed decoy

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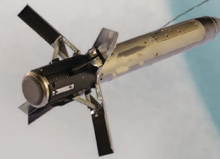
Robust RF self-protection

Today's radio frequency (RF) threats are growing, not only in number, but also in capabilities. For mission success across a range of hostile environments, self-protection is essential for all aircraft, from fighters to bombers to transports. Robust RF self-protection is available from BAE Systems' AN/ALE-55 fiber-optic towed decoy (FOTD).

Unlike traditional decoys, such as straight-through repeaters, the fiber-optic towed decoy is coherent and works synergistically with an aircraft's onboard electronic warfare (EW) equipment to defeat RF threats. It protects aircraft throughout the threat envelope, delivering three layers of defense.

- 1. Suppression** – During the tracking radar's acquisition phase, the aircraft's EW system uses the FOTD to emit jamming techniques that suppress the radar's ability to acquire and track the target.
- 2. Deception** – If the target tracking radar achieves successful target track in spite of suppression techniques, deception is the next layer of response. Once the radar emissions are analyzed, the system determines optimum jamming techniques to break aircraft track. If more than one radar threat is detected, the system can respond with simultaneous transmission of multiple jamming techniques.
- 3. Seduction** – If an RF missile is launched, the FOTD can break the missile's track of the aircraft or lure the missile away from the target aircraft by becoming the target itself.

AN/ALE-55 counters monopulse, home-on-jam, and man-in-the-loop advanced threats



Seduction

Decoy radiates jammer techniques. As a last resort, decoy becomes preferred target.

Deception

Introduce tracking errors into interception solution

Suppression

Deny, delay, degrade radar track to reduce surface-to-air missile and/or airborne interceptor engagement range

Features and benefits

- High-powered coherent jamming across a broad frequency range to defeat advanced RF threats ensures superior protection.
- Unlike centrifugal braking, the AN/ALE 55 state-of-the-art active braking system maximizes system response time to meet the demanding requirements for defeating advanced RF threats. This active braking system allows for extremely fast and precise decoy deployment, allowing a second FOTD to be quickly deployed if necessary.
- In addition to the standard fast, deploy, expendable decoy, a reel out/reel in deployment system is available. This option allows decoys to be used multiple times, lowering the system's lifecycle operational costs.
- Dual, high-powered traveling wave tubes generate enough power to protect a variety of platforms – from fighters to large airlift aircraft.
- Efficient, broad-beam antennas optimize the jamming signal. The antennas employ integral linearization, using detectors built into the antennas to assure the FOTD operates at optimum power level.
- Variable drag fins that open and close in response to air pressure and speed ensure stable flight under wide altitude and speed variation, producing highly reliable jamming performance.
- Fighter versions of the AN/ALE-55 include a highly robust signal and towline that has been tested on multiple aircraft to meet the required deployment and tow envelope.
- With its ability to configure to multiple interfaces, the AN/ALE-55 advanced subsystem reduces complexity.

Delivering protection against current and future RF missile threats

AN/ALE-55 components

The AN/ALE-55 subsystem consists of an on-board signal-conditioning assembly and the FOTD. The signal-conditioning assembly converts RF frequencies to light for transfer through the fiber-optic line. The system has two modes. In the primary mode, the onboard EW system detects and analyzes a threat, determines the appropriate response, and then sends that response down the line to the FOTD for transmission. An alternative, back-up mode is an independent repeater, where the threat signal is detected, modulated, and then sent down the line to the FOTD. The system can interface with any onboard techniques generator, and can convert any technique. This broad capability enables the system to be installed on a variety of aircraft and to handle today's range of techniques and any developed to defeat future threats.



Ready now

The AN/ALE-55 has been extensively flight-tested on a variety of aircraft, demonstrating robust aerodynamic performance and its ability to jam threats.