Integrated Electronic Warfare Self-Protection Solutions for all Types of Aircraft
ALQ-213, the World’s Most Widely Used EW Control and Integration System

The AN/ALQ-213(V) Electronic Warfare Management System dates back to 1981, when the first version was installed in the Danish F-16s to better control onboard EW self-protection systems and to reduce the pilot’s workload. Since then, it has been continually improved and upgraded. Today, it has become the most versatile system of its kind, being operational on over 2,000 fighters, transport aircraft, and helicopters worldwide. Over the years, it has proved its value in actual combat such as Bosnia, Iraq, Afghanistan, and Libya.

This versatility is achieved through a comprehensive set of system components that can be combined and programmed to meet the requirements of any type of mission or type and size of aircraft.

### ALQ-213 COMPONENTS

- **EW Management Unit (EWMU)**
- **Tactical Data Unit (TDU)**
- **Defensive Aids Controller (DAC)**
- **Remote Control Panel (RCP)**
- **Light Aircraft Survivability Equipment**
- **Advanced Threat Display**

### EIGHT GOOD REASONS TO SELECT THE TERMA SOLUTION

- Terma has over 20 years of experience as a leading integrator of EW systems. Terma’s AN/ALQ-213(V) Electronic Warfare Management System is operational and combat proven on more than 2,000 fighters, helicopters, and transport aircraft worldwide.
- The ALQ-213 has achieved a position as the only system in the market that is independent of platform or subsystems suppliers and is able to control and integrate any combination of sensors and countermeasures systems on any type of aircraft and make these work as one system.
- Terma is the only integrator that includes the structural packaging in the total solution, typically in the form of Terma designed pods, pylons, or other fixtures that allow rotation of systems within the fleet. This approach reduces the cost of aircraft modifications and allows for fewer systems overall.
- Terma provides combat proven, automatic threat response through Electronic Combat Adaptive Processing and offers multinationally tested Embedded Training so pilots can truthfully say “We train as we fight.”
- Pilot-Vehicle-Interface is the most advanced in the market with separate, full color threat display or glass cockpit integration, 3D-Audio Warning of attack, Active Noise Reduction, and radio channel separation.
- Terma has a proven record of developing, qualifying, and delivering complete custom-tailored self-protection installations within 3-6 months utilizing our fast responding organization and unique modular product portfolio.
- All EW suites are offered with advanced Mission Support tools and full organic and logistics support. Mission Support tools can be operated stand-alone or integrated with common mission programming and debriefing system tools for multi-player training.
- Terma’s EW controller is the only solution offering commonality and common software across the aircraft fleet.

### A UNIQUE SYSTEM OF ITS KIND

Compared to similar systems, the ALQ-213 is unique in the following ways:

- It is the only system that is independently based on open architecture and provides a firewall between the sensor system and the aircraft avionics system. This allows for addition of subsystems and sensor updates that are transparent to the aircraft, are less certification intense, and less costly.
- Unlike many other systems, the ALQ-213 is not locked to a specific platform or EW subsystem.
- The ALQ-213 is the only system that provides flexible integration of multiple combinations of sensors and countermeasures: UV, IR, LASER, Acoustic, RF, Chaff/Flare, DIRCM, Towed Decoy, and Jammers.

### LIGHT AIRCRAFT SURVIVABILITY EQUIPMENT

For very light aircraft and helicopters, where weight is a special concern, a LASE controller is under development. This controller is a derivative of the Advanced Threat Display, and it will be able to control a subset of threat sensors and automatically dispense countermeasures payloads.

### ADVANCED THREAT DISPLAY

Full color, multifunction display that gives the pilot complete information about the threat and the status of onboard EW systems. In glass cockpit aircraft, this information can be presented on existing displays.

### EW MANAGEMENT UNIT

The combination of the EW Management Unit, EWMU, and the Tactical Data Unit, TDU, is the most widely used configuration. The EWMU is the cockpit control unit which feeds data to the threat display and the 3D-Audio system and facilitates loading/unloading and recording of mission data through a dual PCM cartridge.

### TACTICAL DATA UNIT

Located in the electronics bay, it requires a remote control Panel RCP or cockpit control, recording, and loading/unloading of mission data. A smaller version, “Mini DAC”, is under development in order to meet the requirement for smaller and medium-sized aircraft without the need for blanking and other kinds of expansion.
The quality of sound in the cockpit, be it from radios, intercom, warning signals, or other sources, has been a much neglected area for many years. The following systems, developed and introduced by Terma, can truthfully be described as a revolution in cockpit sound quality:

- **3D-Audio Warning** which gives the pilot real-time audio warnings from the exact direction of attack. The result is a considerable reduction in reaction time and enhanced situational awareness.

- **Active Noise Reduction** and **Electrical Noise Reduction**, which reduce pilot stress and fatigue considerably.

- **Radio channel separation**, which improves intelligibility and overall safety because important messages are not lost in simultaneous transmissions.

- **Directional intercom**, which improves communication, mutual understanding, and awareness among crew members.

The improvement of sound quality is largely due to introduction of a digital stereo intercom system supported by an Enhanced Intercom Amplifier, EIA. The systems can be installed as stand-alone or as an integral part of the AN/ALQ-213 system on all types and sizes of aircraft.

**Revolution in Cockpit Sound Quality and Pilot Situational Awareness**

**Matured Decision Support and High Fidelity Embedded Training as Part of the AN/ALQ-213(V) System**

**ELECTRONIC COMBAT ADAPTIVE PROCESSING, ECAP**

For the EW Management Unit, EWMU, to provide meaningful semi-automatic and automatic operation, any automation needs to match very carefully tactics applicable to the specific type of aircraft. Since 2004, Terma, together with EW national specialists, has been creating a decision support solution called Electronic Combat Adaptive Processing, ECAP, as part of the ALQ-213 system. Within the same time frame, new EW sensor/countermeasures technology has also supported the need for enhanced coordination between sensors and countermeasures. Focus of the capability circles around optimized aircrew awareness of threat picture, optimized operation across the EW suite throughout all mission phases, and reduced pilot workload.

**EMBEDDED TRAINING, ET**

With the new decision support and improved EW subsystems capabilities, enabling end users to familiarize themselves with how to operate and get the best out of the EW suite in the context of “war”, it was clear that this could not be achieved through traditional methods. For example, in-flight engagements against real threats (airborne missiles and full weapon systems) while training, are neither practicable nor possible. Therefore, Terma can provide “full EW subsystem simulation” for uninstalled EW subsystems and provide “virtual weapons systems” against which weapon tactics can be trained. This capability combination is known as Embedded Training, ET. The in-cockpit experience realism and the ability to gather lessons learned experience from the in-flight instrumentation during post mission training debrief have been the lead features for full acceptance by the pilot community.

Although ECAP and ET testing was carried out within the F-16 community, results are equally applicable to other types of aircraft equipped with the ALQ-213. In fact, the capabilities have been designed with core processing and mission data strategies, which means that tailoring and re-integration to other aircraft platforms are minimized. Transfer of these capabilities onto other platform types within the ALQ-213 user community has already been initiated.

**Extensive Testing in Different Environments**

ECAP and ET development has been an international project with the European F-16 users as partners, and multi-national evaluation testing has taken place at Leeuwarden, The Netherlands; Ørlandet, Norway; and Edwards Air Force Base, USA. The end result is a new set of in-flight tools that ensures that pilots will now be able to use the motto “We train as we fight”, and that in case of attacks during real conflicts, they will have the best decision support possible.

**Post Mission Pilot Debrief with EW Multi-Player “Big Picture” Integration of Threats and EW Information into Common PC Training Tool**

**Cockpit Installation: The Advanced Threat Display Merge All Real EW Information with ECAP’s Decision Support Information Along with Embedded Training’s Virtual Threats and Simulated Subsystems**
Aircraft Equipped with Terma EW Self-Protection Systems

**REFERENCE LIST**
- CH-47D, CH-47F
- AS-532
- HH-60G
- EH-101
- AH-64D
- AS-550
- Mi-17, Mi-24
- NH-90

**EW Subsystems Currently Controlled by ALQ-213**

**REFERENCE LIST**
- F-16A/B, F-16C/D
- F-16 MLU, F-16 Bk 60
- A-10 Thunderbolt
- Tornado
- Harrier
- F-111C/G

**REFERENCE LIST**
- C-160, Transall
- C-130H-30, C-130H, C-130J
- Fokker 27
- Fokker 60
- P-8A Poseidon
- Nimrod
- E-737AEW

**EW Subsystems**
- Laser Warning Sensors
- Towed Decoy
- Radar Warning Receivers
- RF Jammer
- Directed Infrared Countermeasures
- Chaff/Flare Dispensers
- Hostile Fire Indicator
Aircraft Equipped with Terma EW Self-Protection Systems

Installation of Sensors and Countermeasures Systems

Chir-47D Chinook

Chir-47D/E Chinook Self-Protection Equipment, CHASE

Two pods, one on each side of the fuselage, are each equipped with one UV missile warning sensor and one DIRCM unit. This provides 360 deg spherical coverage against incoming IR missiles. Mounting of sensors and DIRCM in the same pod ensures accurate launch and eliminates torques caused by fuselage movement during maneuvers.

F-16 Pylon Integrated Dispensing System (PIDS+)

Each pylon contains three UV missile warning sensors and two chaff/flare magazines. Full weapons carrying capability is retained.

On the C-160 Transall, sensors are installed in the fuselage. The chaff/flare capacity has been increased to a total of 36 magazines. Two underwing modular countermeasures Pods, mcP-10 each contains ten magazines and two ‘scab-on’ mounted units each containing four magazines. The original eight fuselage mounted dispense magazines are retained.

Apache Modular Aircraft Survivability Equipment, AMASE

Each helicopter has two pods mounted on the stub wings. Each pod contains three UV missile warning sensors and two chaff/flare magazines, plus provisions for RWR, LWS, and hFI.
Operating in the aerospace, defense, and security sector, Terma supports customers and partners all over the world. With more than 1,100 committed employees globally, we develop and manufacture mission-critical products and solutions that meet exacting customer requirements.

At Terma, we believe in the premise that creating customer value is not just about strong engineering and manufacturing skills. It is also about being able to apply these skills in the context of our customers’ specific needs. Only through close collaboration and dialog, can we deliver a level of partnership and integration unmatched in the industry.

Our business activities, products, and systems include: command and control systems; radar systems; self-protection systems for ships and aircraft; space technology; and advanced aerostructures for the aircraft industry.

Headquartered in Aarhus, Denmark, Terma has subsidiaries and operations in The Netherlands, Germany, Singapore as well as a wholly-owned U.S. subsidiary, Terma North America Inc. Terma North America Inc. is headquartered in Arlington in the Washington D.C. area, with other offices in Georgia, Texas, Alabama, and Virginia.