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UPDATE

JULY 2012

The F-35 conducts its first flight with External Stores



Lockheed Martin Corporation

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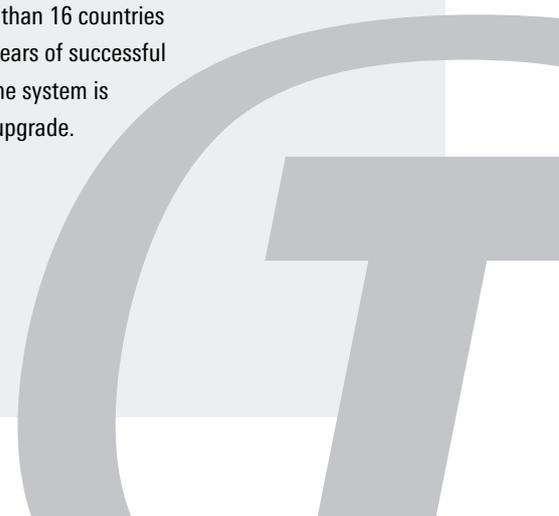
The U.S. Air National Guard (ANG) plans to conduct an Operation Utility Evaluation of the Terma 3D-Audio/Active Noise Reduction systems integrated into an ANG F-16 aircraft. The capabilities requested by ANG are already installed on the Danish Air Force F-16 fleet and have been operationally proven in international missions.

Terma has a long record of integrating electronic warfare self-protection systems on various versions of the C-130H using the AN/ALQ-213(V) Electronic Warfare Management System. Terma has now been contracted to integrate EW defensive systems on the C-130J for an international customer.

Composite structures allow commercial and military aircraft to become lighter and thus more fuel efficient. Terma

provides a wide range of high-performance small to medium-sized advanced aerospace composite structures.

The Electronic Warfare Management System, AN ALQ-213(V), first introduced in 1992, has been installed in a large number of aircraft including fighters, transport aircraft, and helicopters in no less than 16 countries worldwide. After 20 years of successful operational service, the system is now due for a major upgrade.



Terma Defensive Systems Integration on the C-130J



Terma has been contracted by Lockheed Martin Aeronautics, Marietta, to integrate EW defensive systems on the C-130J for an international customer.

Terma has a long record of integrating electronic warfare self-protection systems on various versions of the C-130H using the AN/ALQ-213(V) Electronic Warfare Management System. As for other platforms, the ALQ-213(A) gives the advantage of the single point control and display, and it adds capabilities like sensor correlation, threat response algorithms, embedded training, and data recording. All our C-130H integrations have been based on a federated integration, using a dedicated graphical display for both threat/status display and subsystem control. This has proven to be an operational effective solution in a cockpit environment with multiple displays and control panels.

In 2004, the Royal Danish Air Force (RDAF) received the first of four C-130Js. The aircraft had the Terma ALQ-213(V) EW Management System as integrating controller for an RDAF specified EW suite. The RDAF has a concept of EW commonality across the fleet, using the same Radar Warning Receiver, RF Jammer, Dispenser System, and Missile Warning System across different platforms.

The C-130J avionics architecture and cockpit layout are significantly different from the legacy C-130H. It is a fully integrated glass cockpit, in which the cockpit and operational philosophy do not allow for federated displays. This required the ALQ-213(V) to be based on integration using existing control panels and displays (both head-down and

head-up displays) for subsystem control and threat display. This was the first non-standard defensive systems configuration on a C-130J. With this program, Terma engineers demonstrated their capabilities to Lockheed Martin, Marietta, and it was the start of a long lasting relationship.

Several international C-130J operators have requested defensive systems configuration different from the baseline version. But due to high integration and certification costs, this has been difficult to implement. Recently, however, the increased number of international C-130J operators made a common solution more affordable, and a long discussion on an international defensive systems configuration resulted in the first contract with Lockheed Martin using Terma's controller from the ALQ-213 family and Terma's integration SW to integrate a special defensive systems configuration for an international operator. The program will be using one of Terma's latest developed EW controllers, the ALQ-213A Defensive Aids Controller (DAC).

Based on the long lasting relationship with Lockheed Martin Aeronautics, Terma expects this to be the first of several international C-130J integration programs. With the increased focus on ITAR issues in complex aircraft systems and in commonality across the fleet, operators are expected to prefer EW integration with more flexibility and less impact on aircraft systems. This is clearly demonstrated by Lockheed Martin selecting Terma as a partner for integrating EW defensive systems on the C-130J.

U.S. Air National Guard evaluates Terma's 3D-Audio and Active Noise Reduction

Based on the U.S. Air National Guard (ANG) key principle of "Fly before we buy", the ANG informed Terma in March this year that they would conduct an Operation Utility Evaluation (OUE) of the Terma 3D-Audio/Active Noise Reduction (ANR) system integrated into an ANG F-16 aircraft.

The capabilities requested by ANG are already installed on the Royal Danish Air Force F-16 fleet and have been operationally proven nationally as well as in international missions. The equipment (hardware and software) to be used for the ANG OUE was therefore readily available to be installed in an ANG F-16 (Block 32) aircraft with relative ease.

Focus on Communication

The working environment in the cockpit of an operational aircraft is constantly requiring enhancements, to support the pilots who are challenged with more and more data to manage. New cockpit concepts emerge in the design of new aircraft, but also existing aircraft need improvements. Communication is one of the focus areas, and reliable voice communication is dependent on the pilot's ability to separate and discern the multiple sources. Technologies like 3D-Audio and ANR are obvious candidates for providing the required improvements.

Critical Capabilities List

In the 2012 ANG Weapons Modernization Book, ANG has stated requirements on the F-16 Critical Capabilities List for the addition of directional audio/radio separation to support the introduction of a 3rd radio, as well as requirements for noise cancelling and 3D-Audio/Directional Threat Cues.

The actual installation of the 3D-Audio system on the aircraft was performed during a dedicated time-window, in conjunction with the 3rd radio installation. This meant that the aircraft was in the shop with the canopy off and seat out when the 3D-Audio installation began. The complete task, including dismantling the legacy Intercom Systems (ICS), minor group A changes, installation of the 3D-Audio hardware, and checkout of all affected interfaces, was accomplished in two working days.

Most F-16 configurations apply the same legacy intercom system; the only configurations not using it are the very latest

non-U.S. versions. And since the Terma system is developed as a form-fit replacement for the legacy system in the Danish fleet, the very same configuration supports all U.S. (and many other) F-16 configurations, with only minor adaptations.

Radio Channel Separation

After an additional period of scheduled maintenance and final assembly/checkout of the aircraft, ground test of the 3D-Audio system and ANR was successfully completed in mid-May and immediately followed by a series of flight tests which are ongoing as this goes to press.

Following the initial OUE flight tests, Major Evans "Maestro" Boeve, the ANG/AATC 3D-Audio/ANR lead and OUE test pilot, reflected on the installation and OUE flight tests as follows:

"Spatial separation of multiple communication channels helps pilots mentally process time-critical radio transmissions much better than the legacy audio configuration. Especially in a 3-radio configuration, 3D-Audio enhances pilots' situational awareness in all of the varied mission sets the F-16 performs. We look forward to follow-on testing to incorporate our threat warning audio and helmet-mounted cueing."

The OUE testing is planned in phases to allow installation of and integration with additional subsystems such as the Gentex Scorpion (Helmet Mounted Integrated Targeting system or HMIT). The ongoing first phase focusses on noise reduction and radio separation. A planned second phase will focus on 3D-Audio through integration with head tracker system and electronic warfare subsystems such as the Radar Warning Receiver.



Terma Aerostructures: Design and Production of Advanced Composite Structures

In a world where the need for speed and agility dominates, the development of strong and light-weight materials has become increasingly important. Composite structures are an example of a new technology that allows commercial and military aircraft to become lighter and thus more fuel efficient.

Terma has more than 25 years of experience in working with aerospace composites and composite-to-metal bonded assemblies and provides a wide range of high-performance small to medium-sized advanced aerospace composite structures. We pride ourselves in delivering a quality product that has been tested to the highest standards.

We have a varied experience producing a wide range of products from radomes for jammers to drive floor panels for

the EH-101 helicopter. Terma specializes in complex composite structures with sharp corners, such as the F-35 Gun Pod, and we have developed specific technologies for molding acute angles with small radii in composites, while retaining structural integrity.

This also applies to thick laminates (up to 3/4 inch (19.75 mm)). Within this area, the company has many years of experience employing honeycomb and foam to create sandwich structures for both radomes and structural components.

Design and Documentation

A dedicated team of highly qualified aerospace engineers covers design of aircraft structures, static and dynamic stress



Raw Materials/Receiving

- All materials are tested prior to release for production
- Material is stored in 160 m2 freezer at -22°C ±1°C



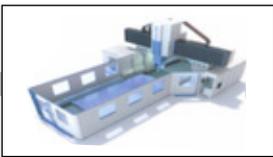
Nesting and Cutting

- Data is processed via Fibersim
- All piles are then nested
- Ply profiler cut material



Layup

- Approx. 800 m2 temperature- and humidity-controlled clean room
- Most parts are laid up using the Virtek ply projection system
- 10 laser heads. Each capable of projecting into 2 tools



Machining

- DST FOG – 5-axis CNC gantry machining center. x,y,z: 189" x 138" x 59"
- DST TFM – 5-axis CNC portal Machining center. x,y,z: 110" x 110" x 59"
- Flow water jet cutter – 5-axis. x,y,z: 142" x 94" x 24"



NDT

- C-scan – 10 scanning axis, 5 fixture axis. x,y,z: 197" x 79" x 118"
- C-scan – 2-axis. x,y,z: 225" x 65"
- Digital X-ray – Real-time viewing system. 118" x 157" x 40"



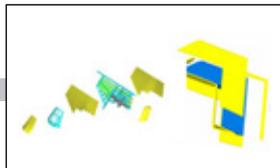
Cure and Post Cure

- 2 autoclaves 12 x 35 feet. 1 autoclave 5 x 15 feet
- 1 post cure oven 10 x 20 feet
- Autoclaves are calibrated to 200°C
- Oven is calibrated to 250°C



CMM

- Zeiss MMZ-G. x,y,z: 98" x 157" x 78"



Assembly

- Bonded assembly
- Conventional assembly



Surface treatment

- Priming and painting

Overview of Terma's composite center



F-35 with Gun Pod

calculations, systems engineering, requirements management, thermal and CFD engineering, and not to forget ILS engineering. The design team works hand in hand with production engineering to deliver cost-efficient quality products. Further, the team is highly experienced with the integration of Electronic Warfare (EW) and Intelligence, Surveillance, and Reconnaissance (ISR) systems on airborne platforms.

One-Stop Shop Advanced Production

Terma is a one-stop shop with the capabilities of machining, surface treatment, special-processes, design, and engineering with the know-how to combine composites, bonding, and metallic products, while integrating wiring and electronics to form ready-to-install subassemblies.

Terma has a fully integrated composites center located in Denmark. This enables us to produce high quality composite parts to the exacting standards required by the aerospace industry.

The facility also includes a world-class manufacturing center. The composites center is built around a fully integrated composites manufacturing facility, where 3-D composite data, such as Fibresim, is nested and transferred digitally to the cutting machine, allowing individually labeled and controlled ply kits to be made. The 3-D data is also used to perform draping analysis on the parts, and ply projection files are sent to the Virtek laser projectors, which are used by Terma to ensure the composite parts are consistently manufactured to high accuracy, while maintaining a cost-effective approach.

Composite parts are cured in one of three digitally controlled autoclaves and, if required, post-cured in specialized ovens. Subsequent machining is performed in our DST (Dörries Scharmann Technologie) machining center, comprising two 5-axis milling machines and integrated CMM, to provide

fully automated machining and control of the finished part within tolerances of 0,001". This enables Terma to be at the forefront of composite manufacturing as we head up an aggressive continuous development strategy in order to be at the forefront of composites manufacturing technology.

Extensive Experience from Production for the F-35

In addition to the F-35 Gun Pod, Terma is in rate production with several advanced composite panels, doors, and conventional edges for the F-35. This has given extensive experience with running in and maintaining a competitive rate production of high-precision composite parts.

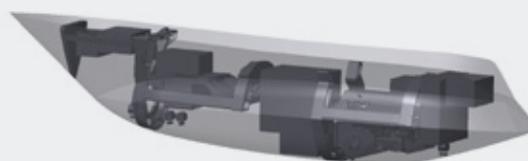
During the years with the F-35, the Terma Aerostructures organization has matured and grown into a highly efficient production facility with capabilities to cope with similar future programs.

The F-35 Multi Mission Pod (MPP)

In 2004, Terma won the contract to design, develop, qualify, and produce F-35 Gun Pods for General Dynamics.

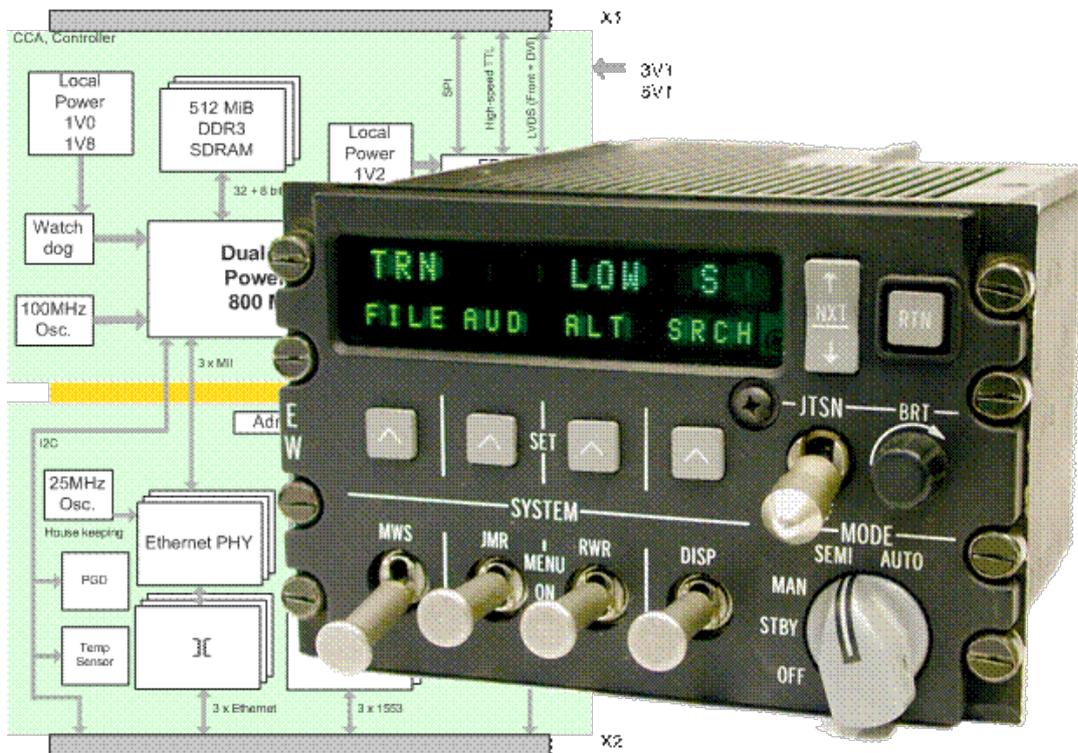
The F-35 Gun Pod is a full monocoque composite structure in carbon fiber. It has passed engineering test and qualification and has flown on the F-35 in February 2012. The pod is currently in the LRIP production phase.

The F-35 Multi Mission Pod is partly based on the OML of the F-35 Gun Pod and will provide real estate on the F-35, which can be used to expand the F-35 Special Mission functionality, by allowing the F-35 to fly Next Generation EW and ISR systems, such as jammers and EO sensors.



F-35 Pod Enclosure concept study

Major Upgrade of the Ubiquitous ALQ-213



It should come as no surprise; after 20 years of successful operational service, Terma's Electronic Warfare Management System (EWMS), AN/ALQ-213(V), is due for a major upgrade.

It was introduced in the Royal Danish Air Force F-16s in 1992, and since then, it has been installed in a large number of aircraft including fighters, transport aircraft, and helicopters in no less than 16 countries worldwide. Obviously, the 213 has had improvements over the years, the three significant ones being a new multifunction Threat Display, 3D-Audio Warning, and Automatic Threat Response, also called Electronic Combat Adaptive Processing, ECAP. However, the basic technology used in the ALQ-213 has not changed all that much over the past 20 years. Thus, there are now processors and other vital components available with performance surpassing those used in the legacy versions of the 213.

By the way, the term 'Ubiquitous' is a quote from an issue of Shephard's 'Defence Helicopter' magazine about a decade ago, describing a Dutch helicopter upgrade program. The term goes to show that already at that time, the ALQ-213

was in widespread use on many types of aircraft. The ALQ-213 in its present form is still functioning well, as proven in hundreds of aircraft that are taking part in actual combat operations in Afghanistan and other conflict areas. So why give the system a major upgrade now?

The simple, and correct answer, is that new technologies offer improved performance and reliability, easier maintenance, and all at a lower overall cost. This technology upgrade also addresses the 213 component obsolescence.

Reliability, Maintainability, Performance (RMP) Upgrade

The aim of the RMP program is first and foremost to use the latest technology to bring significant improvements within the three areas: Reliability, Maintainability, Performance. At the same time, the following criteria are also considered essential:

- Reduced overall weight
- Reduction in number of Shop Replaceable Units (SRU) from 9 to 5.

The program includes a large number of specific changes, notably the following:

- All functional cards and motherboard replaced
- New CPU board
- New interconnection board
- New I/O board.

Transition from Legacy ALQ-213 to RMP ALQ-213

The RMP will be ready for production and market introduction by October 2013 with options to suit the various aircraft types and roles.

New ALQ-213 users:

Only the RMP version will be offered, the legacy version would simply not be attractive for performance and cost reasons.

Current ALQ-213 users:

Upgrade can take place as required by the user in coordination with operational requirements and other planned aircraft upgrade programs. Terma will maintain the capability to support the legacy ALQ-213 for another 15-20 years.

Program Status

Development of the RMP program is going very well indeed; it is now in the test phase, with a good assurance that it will be ready as planned by October 2013.

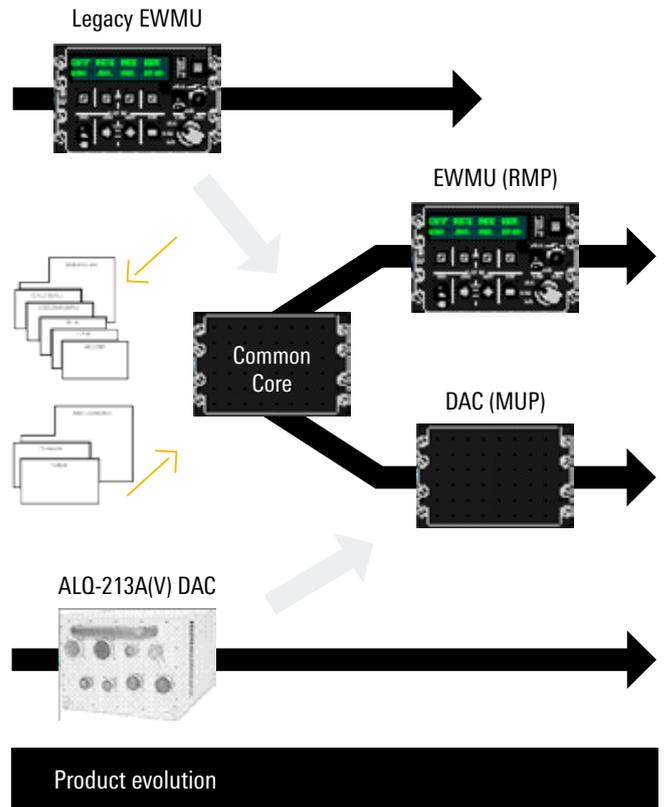
Technical Description

RMP Kit Upgrade

The Electronic Warfare Management Unit (EWMU) "RMP" is available as a kit upgrade to allow capability upgrade of existing legacy Countermeasures Signal Processor (CMSP) versions.

Defensive Aids Controller – a Sister Product

The development of the RMP is realized in a common effort, where Terma is also performing a Miniaturization Update Program (MUP) of the AN/ALQ-213A(V) Defensive Aids Controller (DAC) to provide a small form-factor version, yet still powerful EW controller for avionics bay installations. The DAC (MUP) is in fact sharing circuit cards with the EWMU (RMP), but provides for different mounting and connector provisions, and it has a blank front panel. Thus, control and display will be through the aircraft multifunction display or the Terma Advanced Threat Display (ATD).



Parameter	EWMU (RMP)	Legacy EWMU
Processor	Power PC, Dual Core, 800 MHz, 1920 DMIPS (per core)	HOST: M68k, 16 MHz ACMDS: i8751, 16 MHz ECAP: i960, 24 MHz
FPGA	Spartan 6 74,637 logic cells 19.6 Mb Memory	None
Cache, Level 1 / Level 2	2x32 KB / 256 KB	HOST: 0 B ACMDS: 0 B ECAP: 512 B
RAM	512 Mb DDR3	HOST: 256 KB ACMDS: 2 KB ECAP: 2 Mb
Flash / EEPROM	1 GB NAND Flash 128 Mb NOR Flash 128 KB NVRAM	HOST: 384 KB EEPROM ACMDS: 32 KB EEPROM ECAP: 2 Mb Flash
Encryption key storage mem.	AES-256 Supported (non-volatile)	Not supported
MIL-STD-1553B	3 ea.	2 ea.
100 Mb Ethernet	1 ea.	0 ea.
1 GB Ethernet	1 ea.	0 ea.
ARINC-429	2 ea. input	0 ea.
Audio	Analog 1 ch.	0 ea.

ALQ-213(V) EWMU (RMP) version vs. legacy – comparison

Financial Highlights

USD million	2011/12	2010/11	2009/10	2008/09	2007/08
Revenue	248	250	210	203	195
Equity Capital, year-end	78	68	62	72	83
Assets, total	280	281	276	258	215
Order intake	190	246	165	230	270
Order book, year-end	240	283	308	359	325
Number of full-time employees – Average for the year	1,133	1,200	1,261	1,183	1,020

FLVF01

Terma in Brief

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.

TERMA UPDATE . JULY 2012

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