SAAB

ADVANCED **RADAR** **WARNING** SYSTEM

EXCELLENT PERFORMANCE AND MODULAR DESIGN

The BOW family of Advanced Electronic Support Measures, ESM, and Radar Warning Receivers, RWR, is a high performance system with respect to detection range, selectivity and processing power. Excellent performance in combination with a modular design and very good growth potential make the BOW one of the most powerful ESM and RWR systems presently available.

BOW is highly modular with growth potential for long service life

(For a diagram of the system see last page.)

The BOW family is of a highly modular design where growth potential and scalability are the keywords to a long service life and adaptation to changing requirements. Receivers, the Pulse Processor and the Radar Warning Computer are combined to form a system that copes with signal environment in the battlefield scenarios of today and tomorrow.

Configurations from basic RWR to high performance ESM and ELINT system applications can be defined from the same basic architecture. Sensor-coverage, system functions and data interfaces are adapted to match the requirements of the particular application.

For the basic configuration, the receiver sub-system is Wideband giving good threat warning capabilities. It can be complemented with a Narrowband Receiver in order to obtain better detection range for weak signals (LPI), better selectivity in signal dense environments and increased measurement performance for more demanding applications. The receiver sub-systems for the BOW family's high end configurations also include a Digital Receiver and interferometer antenna arrays, resulting in long detection range, detailed analysis and fingerprinting of complex signals and high performance emitter location. That creates excellent performance and ESM/ELINT capabilities. All receiver sub-systems cover basic frequency ranges and have 360° DF-coverage. They can be complemented with extended frequency ranges, increased spatial coverage and dual polarisation.

The general-purpose Pulse Processor is the back-bone of all applications, handling the task of real-time sorting of all intercepted radar pulses and keeping track of all signals detected, even in the most dense scenarios. The Pulse Processor operates according to ESM processing principles, where every single pulse or CW signal is processed, which is necessary in order to obtain situational awareness and to cover all possible threats. It also features the performance regarding excellent selectivity and short reaction time required for the RWR application.

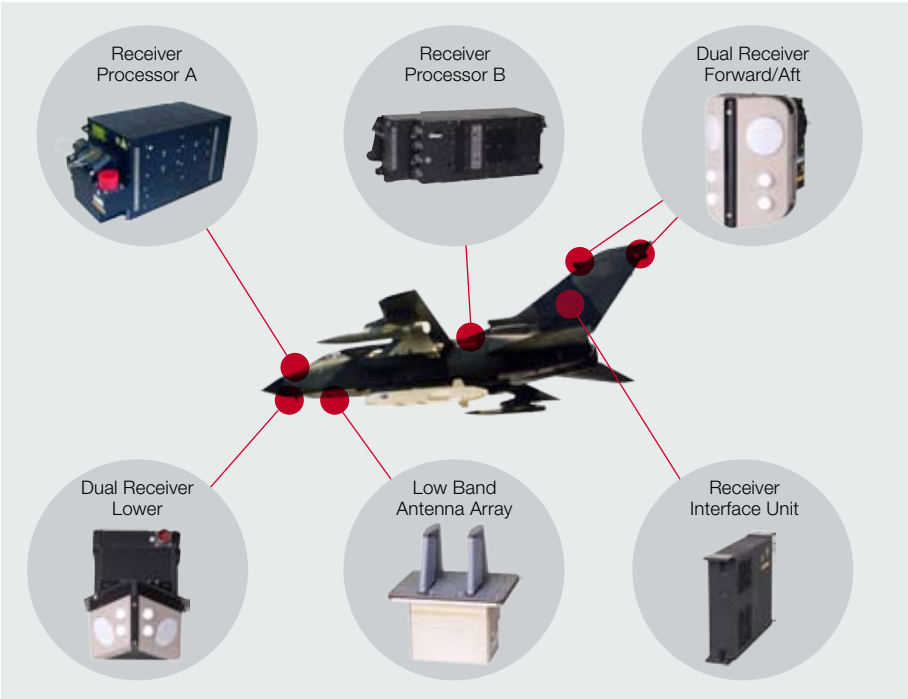
The Radar Warning Computer includes software functions giving good pre-requisites for situational awareness, threat avoidance and threat warning. The optional Defensive Aids Computer serves as a platform for the Defensive Aids Sub System, DASS, application software including basic services and interfaces to other subsystems like Chaff/Flare dispensers, Jammer, Emitter locating system and other avionics sub-systems.

High sensitivity and selectivity and 100% POI

A radar warning system designed for today's and tomorrow's scenarios has to cope with extremely signal dense environments, long-range weapons and all types of radars. Together with the ever-present requirement for short reaction times, this calls for a combination of high sensitivity, high selectivity and 100% probability of intercept (POI). The BOW family therefore employs a wideband IFM based receiver in combination with a narrowband superheterodyne receiver system.

The wideband receiver comprises a four-channel amplitude monopulse design with high dynamic range and a high-resolution digital frequency discriminator (DFD). Switchable filters are used to cope with interoperability effects and the presence of very high duty-cycle signals.

The narrow-band receiver also covers four antennas with full monopulse capability. The local oscillator permits optimised search based on both library information and intercepts from the wideband receiver in the current scenario.



Tornado Radar Warning Equipment.

Both receivers have their own video processors, to independently characterise every single pulse. Good direction-finding accuracy is achieved by in-flight calibration of the RF chains. The narrowband receiver is continuously searching but can also be cued by the wideband receiver or by external requests.

The basic system has a four antenna configuration and toroidal coverage. To obtain increased spatial coverage the number of antennas and receiver channels, wideband as well as narrowband, can be increased to six.

The basic configuration includes E-J band coverage.

The fully equipped system includes receiver functions for three frequency bands: C/D band, E-J band and K/L band.

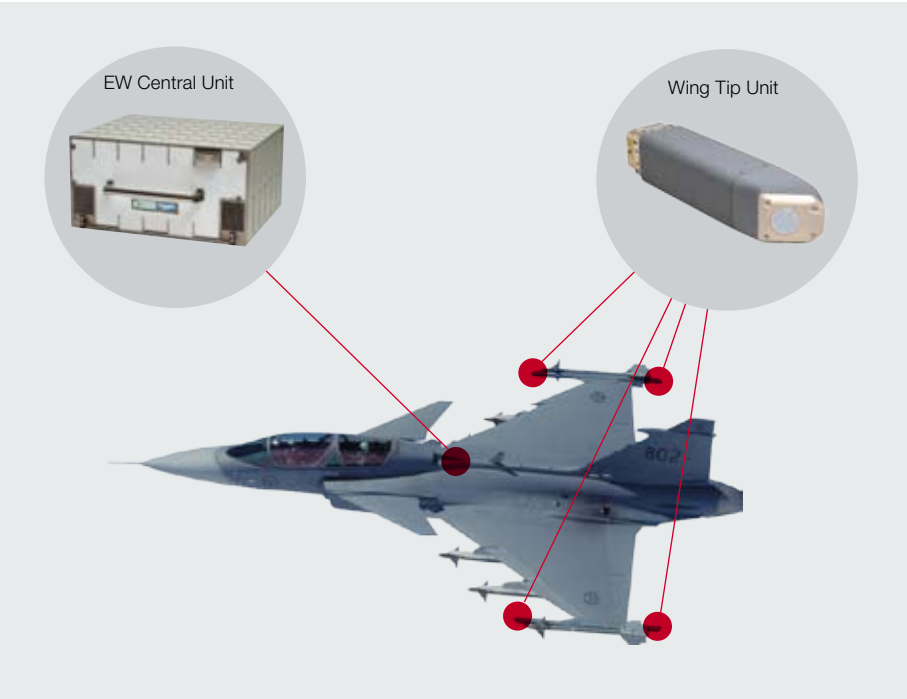
Options include interferometric antenna arrays for increased direction-finding accuracy and digital receivers, which significantly increase the performance, in particular with respect to sensitivity, detailed signal analysis and selectivity.

The pulse processor is unique and proven

The Pulse Processor is of a unique and proven design where all processing is performed in real time on a pulse-to-pulse basis (as opposed to batch wise de-interleaving) to ensure a rapid response and that all intercepted signals are processed and classified. The Pulse Processor handles scanning, tracking and single illumination emitters and all primary and derived parameters are used together with receiver status information during the process. Finally, it is composing a detailed track report that is sent off to the Radar Warning Computer for continued processing.

The primary functions of the Radar Warning Computer are signal characterisation, identification to emitter and system, passive ranging and position estimation, cluster analysis, (i.e. associating active emitter tracks to platforms and weapon systems) and threat reporting including audio warning.

Secondary functions are Built-In-Test control, loading and distribution of Mission Data Files, data recording control and emitter simulation for training purposes.



Gripen Electronic Warfare Core System, RWR part.

The system is designed for sophisticated processing algorithms e.g. Maximum likelihood correlation, selective decoding of PRI and scan patterns and triangulation. Detection of doppler shift in TOA and TDOA between platforms (utilising fast reliable data links) can be used to further improve emitter location performance.

Examples of system configurations and installation

The BOW Advanced Radar Warning System implemented in two different configurations is described below: the Tornado and the Gripen.

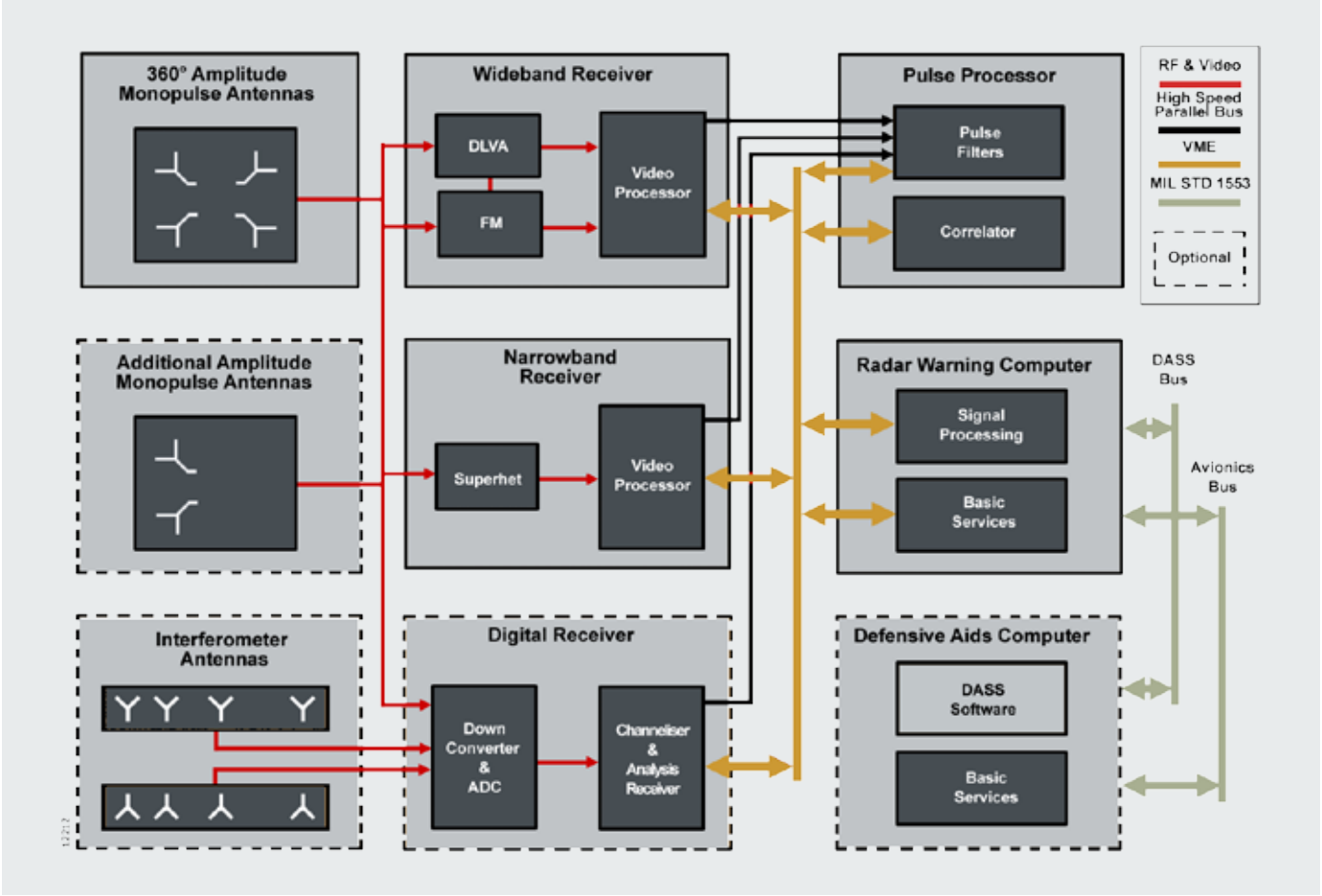
TORNADO RWE

- Dual Receivers Forward, Aft and Lower (DRF, DRA, DRL) – Antennas and receiver front-ends for the E-J Band and the K/L Band.
- Receiver Interface Unit (RIU) – provides power and control interfaces between the receiver front-ends in the fin (DRF, DRA) and the RPB.
- Receiver Processor B (RPB) – the wideband and narrowband receivers for the E-J Band and the K/L Band and the optional digital receiver.
- Receiver Processor A (RPA) – The RPA contains the C/D band receiver, the Pulse Processor and the Radar Warning Computer. The embedded Defensive Aids Computer is also located in the RPA.
- Low Band Antenna Array (LBAA) – The LBAA receives RF energy in the C/D Band.

GRIPEN EWCS

On the Gripen, the BOW Advanced Radar Warning System is integrated with a high performance RF-Jammer to form the Gripen Electronic Warfare Core System, EWCS. The system is developed for the Gripen to fill the operational requirements of a true swing role aircraft. The EWCU has spare capacity for growth potential to meet the requirements of the future.

- Wing Tip Unit (WTU) – Antennas and receiver front-end for the E-J band and the K/L bands
- Electronic Warfare Central Unit (EWCU) – contains the wideband and narrowband receivers for the E-J Band, the Pulse Processor, the Radar Warning/Electronic Warfare Computer and aircraft interfaces



TECHNICAL DATA

Performance depends on actual configuration and platform installation.

FREQUENCY RANGE

Basic system	E-J band
Optional	C/D band, K/L band
Azimuth coverage	360°

ELEVATION COVERAGE

Basic system	+/- 45° (-5 dB)
Optional	+/- 90°

DF ACCURACY

Basic system	7° RMS
Optional (interferometers)	1° RMS

RF ACCURACY

Wideband	5 MHz
Narrowband	1 MHz
Dynamic range	75 dB
Pulse density	2 Mpulse/second
Tracked emitters	1.000
Emitter library	8.000 emitter modes

INTERFACES

MIL-STD 1553B, Ethernet, Hot-link and RS422
Special purpose recording, Analogue audio, Discrete Signals incl real time blanking, external test equipment.

Specifications subject to change without notice

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