# HES-21 **ESM**, ELINT AND SELF PROTECTION SYSTEM

# COMBINING SAAB
# **EW CAPABILITIES**

HES-21 Electronic Warfare System, EWS, consists of an Electronic Support Measures system, ESM, with ELINT capability combined with a Self Protection System, SPS, and is supported by two separate Human Machine Interfaces (HMI).

The ESM system has a digital receiver, a narrow band receiver, and a wide band receiver that together with the antenna system give close to 100 % Probability Of Intercept (POI). The digital receiver with its interferometer antenna arrays gives outstanding ESM performance.

The SPS comprises radar warning, laser warning, missile approach warning and chaff and flare dispenser systems.

A powerful ground support system, EGSS, is also provided. It handles mission data to the EWS system and has the tools for analysing recorded data from the EWS

## Electronic Support Measures system, ESM

The ESM obtains the Electronic Order of Battle (EOB). It monitors the environment, intercepts, characterizes and identifies signals, geo-locates, generates and displays warnings.

The system can be run autonomously and information is automatically transferred to other onboard systems like C2, radio data link-controller, etc. It also allows for an ESM operator in the loop onboard the aircraft with access to the ESM HMI including high level displays and also detailed real time analysis functions. ESM data is recorded during mission for post mission tactical and technical analysis.

## Radar frequency coverage

Several different receivers are combined, covering 0.7 - 2 GHz (Low band option), 2 - 18 GHz (Mid band, basic configuration) and 28 - 40 GHz (High band, option).

## RF receivers

The digital receiver with its interferometer front end enables signal detection with very high sensitivity, selectivity and Direction Finding (DF) accuracy. The precision measurement of detected signals utilizes Fast Fourier Transforms, FFT, and channellization techniques.

In order to obtain close to 100% POI and short reaction time, a wide-open wide band receiver and a 360 degrees coverage antenna system is included in the ESM system. This receiver measures every pulse that exceeds its thresholds including frequency and direction of arrival.

Against certain types of threats, especially pulse doppler and CW signals, the narrow band receiver system with the 360 degrees coverage antenna system gives close to 100 % POI, with high sensitivity and selectivity also in dense signal environments.

**EW OPERATOR'S WORKSTATION**

**CONTROL UNIT**

**ETHERNET SWITCH**

**DISPLAY**

**OPERATOR'S COMPUTER**

**DATA TRANSFER UNIT**

**LOW BAND ANTENNA**

**BOL COUNTERMEASURES DISPENSER**

**SAFETY PIN**

**LWS LASER WARNING SENSOR**

**MAW MISSILE APPROACH WARNING SENSOR**

**BOP-L COUNTERMEASURES DISPENSER**

**RWR/ESM RECEIVERS INTERFEROMETER ANTENNA ARRAY**

### Emitter location

Position is estimated for every ground based track by the emitter location function which utilises the high accuracy DF from the interferometer.

### ELINT capabilities

The ESM system includes basic ELINT capabilities where the operator can take full control over the digital receiver. Pulse and intrapulse data from intercepted signals can be displayed on real time displays and captured by the recording function as formatted Pulse Descriptor Words, PDW, and Intrapulse Descriptor Words, IDW, for off line analysis.

### Human Machine Interface, HMI

The HMI for the ESM system consists of control function, emitter display function, detailed data views for analysis and Audio function which enables the operator to monitor the signal environment by listening to synthetic waveforms.

### Self Protection System, SPS

The Defensive Aids Control Function, DAC, performs the high-level management and control of the Countermeasures system.

SPS provides the selection and initiation in AUTO modes of chaff /flare countermeasures sequences based on the weapon system data from the threat library.

### Radar warning function, RWR

An instantaneous 360 degrees radar threat warning capability is provided. The RWR utilises the combination of wide band receiver and narrow band receiver to achieve high performance with respect to sensitivity, selectivity and probability of intercept.

### Laser warning, LWS, functions (optional)

The LWS provides warning against laser emissions utilized directly as weapons (dazzlers) or indirectly as guidance, control and range finders for weapon systems. The LWS comprises six sensors, three on each side, to provide for spatial and spectral coverage.
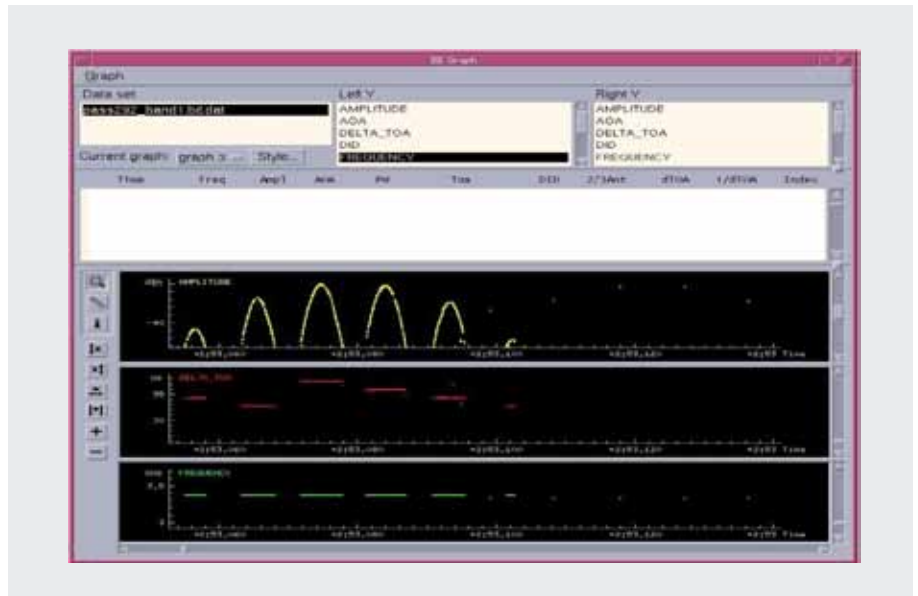


*EWTech pulse descriptor analysis window.*

### Missile approach warning, MAW, functions (optional)

The MAW provides warning from the UV emitted by launched missiles. The MAW subsystem has four sensors, two on each side, to provide spatial coverage. The MAW can handle up to eight threats simultaneously.

### Dispenser function

The Chaff and Flare Dispensing System, CFDS, has a Dispenser Control Unit, CFDC, two BOL electro-mechanical dispensers and six BOP pyrotechnical dispensers.

### Dispenser control

The CFDC monitors and controls the dispensers. Higher level Threat Response Processing, TRP, is carried out in the Defensive Aids Controller.

Dispensing modes are "Stand-by", "Backup", "Manual", "Semi-Automatic" and "Automatic", chosen on the Chaff and Flare Dispenser Control Panel, CFDCP.

Dispensing with the BOPs, BOLs or both is selected via a control switch on the CFDCP.

Each dispenser monitors status information, displayed on the TDCU.

### The BOL dispenser

The BOL is a high capacity (160 cartridges) electro mechanical chaff dispenser with unmatched chaff blooming characteristics, thanks to its vortex generators, which also give the chaff cloud a doppler response.

### The BOP dispenser

BOP is a pyrotechnical dispenser carrying NATO standard rectangular cartridges. Different magazines can accommodate up to 39 1"x1" or 19 1"x2" cartridges. The dispenser is capable of dispensing sequences with different ammunition types concurrently.

The BOP dispensers are to be contained in housing on each side of the fuselage, mounted in such a way that the trajectories of the flares ejected are optimized with respect to hot parts of the aircraft.

### TDCU and SPS control panel

The Threat Display and Control Unit, TDCU, provides an integrated HMI for the SPS. The TDCU is mounted in the cockpit.

The Chaff and Flare Dispensing Control Panel, CFDCP, contains switches and buttons to control the CFDS. The CFDCP is mounted in the cockpit.

**Electronic warfare support system, BOSS**

BOSS has been developed to meet the demanding needs of EW organisations performing analysis of Electronic Warfare data and reprogramming of Threat and Countermeasures Libraries.

BOSS efficiently supports the work flow within the EW Tactical Loop and significantly reduces the time needed for reprogramming of Threat Libraries and Analysis of recorded EW data hence enhancing crew survivability and probability of mission success.

BOSS modular design makes it highly adaptable to also handle other third party integrated Electronic Warfare Systems, RWR, ESM and Jammer systems. This allows EW organisations to use one support tool for Library generation, Analysis and data Management of multiple EW target systems.

BOSS consists of two main applications, EWLib and EWTech.

EWLib manages EOBs, Threats, Countermeasures and supports the production of libraries to EW systems (mainly threat warning and countermeasures).

EWTech is a tool for advanced technical analysis of EW data recorded during missions, flight tests and mission simulations. Information from several sources, including intelligence information regarding known threat locations, emitter parameters, satellite imagery etc., can be incorporated to support and enhance analysis and reprogramming of EW related data.

The ELINT analysis within EWTech facilitates library, EOB and intelligence updates.
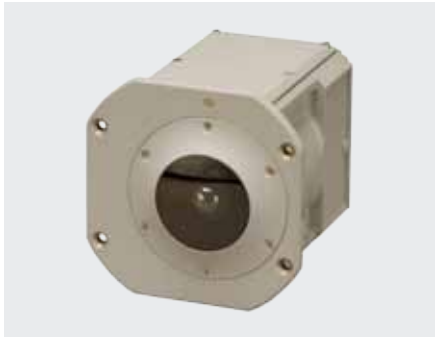

*MAW-300 Sensor*


*Threat Display and Control Unit, TDCU*


*BOP Dispensers installed*


*LWS-300 Sensor*


*Radar Warning Sensors and Interferometer Antenna Array with BOL dispenser mounted below*

Specifications subject to change without notice