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## COLLABORATIVE DEVELOPMENT **GRIPEN NG AESA RADAR**



## SAAB AND SELEX GALILEO IN COLLABORATIVE DEVELOPMENT

Saab and SELEX Galileo are to enter collaborative development of an Active Electronically Scanned Array (AESA) Radar for the Gripen Next Generation (NG) programme. The wide radar experience from both SELEX Galileo and the Saab Business Unit; Saab Microwave Systems will be combined in the joint radar development program. The AESA radar will be based on the SELEX Galileo Vixen AESA radar using functionality from the Vixen program, PS-05/A and other programs from both companies.

Gripen NG is a considerably enhanced version of the already proven and in-service Gripen C/D multi-role fighter. Designed for combat in the 21st Century Net-centric Warfare environment Gripen's flexible and modular design makes continuous development and enhancement both low risk and cost effective. The Gripen NG programme covers development of all major sen-

sors and avionics including data communication, self-protection systems, weapons integration, as well as airframe and propulsion enhancements. The cooperation between Saab and SELEX Galileo will secure the way for Gripen NG to take full advantage of the latest AESA technology

Compared to a conventional mechanically scanned antenna, an AESA offers greatly increased beam agility allowing AESA radars to function faster and respond more rapidly. AESA radars can accurately track many targets while still maintaining watch for new targets at long range. They provide better discrimination of multiple targets and are less likely to be defeated by target manoeuvres. AESA radars are also more effective against small, low radar cross-section targets which typically pose a challenge to previous generation radars.

The Gripen NG radar will include the innovative swashplate feature which significantly increases the radar performance at high angles off aircraft boresight. This will improve situational awareness through a wider coverage area and gives better quality SAR images at wider angles. In BVR combat the wide field of regard also enables tactics to be optimised.

Since the AESA antenna is built up from a large number of active transmit/receive modules, the failure of some of these modules has no noticeable effect on the system's overall performance and reliability. Consequently, a radar with an AESA requires less maintenance than a conventional mechanically scanned radar system. This significantly increases the aircraft availability and reduces in-service costs.

## ADVANCED MISSION CAPABILITIES PROVIDED WITH THE **GRIPEN NG AESA RADAR**

### IMPROVED TARGET TRACKING

With the inherent beam agility, target tracking can be more adaptive and time efficient. This will increase the radar tracking performance in a dense target environment. This facilitates the ability to choose the right target for weapon engagement, and to prepare the weapon with more accurate data i.e. enhance the fire control capability.

The beam agility will also increase the capability to perform search for new targets within a larger search volume while retaining the target track updates for current tracks. This will increase the pilot's situation awareness.

### WIDE FIELD OF REGARD

With the swashplate solution the Gripen NG AESA radar has the ability to cover a scan angle up to  $\pm 100^\circ$ . This will increase situation awareness and be used to increase the quality of SAR images. In BVR combat, wide angle scan also allows the aircraft to maintain track on the target

whilst executing a  $90^\circ$  manoeuvre. This minimises closure rate with the target, places one's own aircraft in the enemy's clutter return and still allows full guidance of BVR missiles.

### MODE FLEXIBILITY

With the beam agility it is possible to interleave different modes. This capability further increases the situation awareness for the pilot. For example, the pilot can use Air-to-Ground modes in parallel to Air-to-Air search and track.

### LOW PROBABILITY OF INTERCEPT

The AESA radar has qualities that makes the aircraft more difficult to detect by an enemy and thereby increases the aircraft's survivability. These qualities include lower radar cross section, ability to operate with reduced output power levels and side-lobe levels, and the agile beam used for random search and track patterns.

### INCREASED DETECTION RANGE

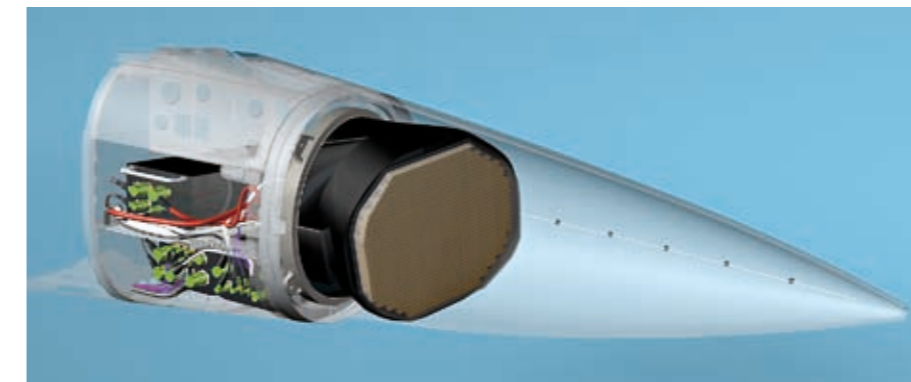
Flexible beam and waveform control makes it possible to optimize modes for long and short range target acquisition. The AESA system is also able to be cued by other onboard sensors, eg Infra-Red Search and Track (IRST) or by data from off-board resources such as Erieye. This will increase the pilot's situation awareness and make it possible to take action earlier.

### IMPROVED ELECTRONIC COUNTER-COUNTER MEASURES

Future adaptive beam forming facilitate improved target detection in presence of several jammer signals. Situation awareness can then be maintained even in a dense RF-environment. This is important for survivability.

### INCREASED OPERATIONAL AVAILABILITY

The modular design of the antenna, including the large numbers of transmit/receive modules, ensures graceful degradation. This means that the antenna will maintain excellent performance even with a percentage of failures. This ensures high availability which is an essential pre-requisite for high intensity operations.



The Gripen NG AESA radar consists of four line replaceable items (LRIs):

- The AESA, mounted on a repositioner
- Power supply unit for the AESA
- Exciter / Receiver for handling of the radio frequency (RF) radar signal
- Processor for executing the radar control software