# GRIPEN, PROGRAM OVERVIEW AND FUTURE DEVELOPMENT.

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## Abstract

*Modern fighter aircraft are continuously updated to meet new or changed requirements. This presentation gives an overview of the Gripen program and planned future development.*

## 1 General

Gripen is in service with, or selected by, the air forces of five nations; Czech Republic, Hungary, South Africa, Sweden and Thailand. Furthermore, Gripen is being offered to or evaluated by a number of nations who needs a modern, effective, affordable and deployable fighter that is fully networked and interoperable.

Gripen entered operational service in the Swedish Air Force in the mid nineties. Today the system has accumulated well above 100,000 flight hours which makes it a mature system.

From day one, Gripen was designed as a multirole aircraft flown by multirole pilots. The requirements also included growth potential for future updating, lightweight single engine aircraft, capability for dispersed operations, smart integrated logistics and low LCC. The aircraft and support systems are designed to fit in a dispersed basing system. This does not only apply to the capability to take off and land on road bases. It also means that Gripen has a small logistic footprint for turn around and servicing. One officer and five conscripts can do a turn around for an Air-to-Air mission in less than 10 minutes

**Figure 1. Gripen at road base**

## 2 Existing Gripen versions

### 2.1 Gripen A/B

Delivery of the first Gripen version, Gripen A/B (Single/Dual seat) to the Swedish Air Force, started 1993. Although the A/B-version is multirole, it was developed mainly for defense of the national territory. The system also includes several national specific solutions, e.g. Swedish IFF, communication system, and the cockpit is using metric system and Swedish texts. Gripen A/B is only used by the Swedish Air Force.

### 2.2 Gripen C/D

Development of an export version, Gripen C/D, started late nineties and the first delivery took place 2004/2005. The development was supported both by the industry and the Swedish Government since the requirements for the Swedish Air Force had changed towards international cooperation and not only defense of the national territory. The development also solved a number of obsolescence issues.

The Gripen C/D development included

- NATO adaptation of IFF, Comm system and Weapon system including pylons

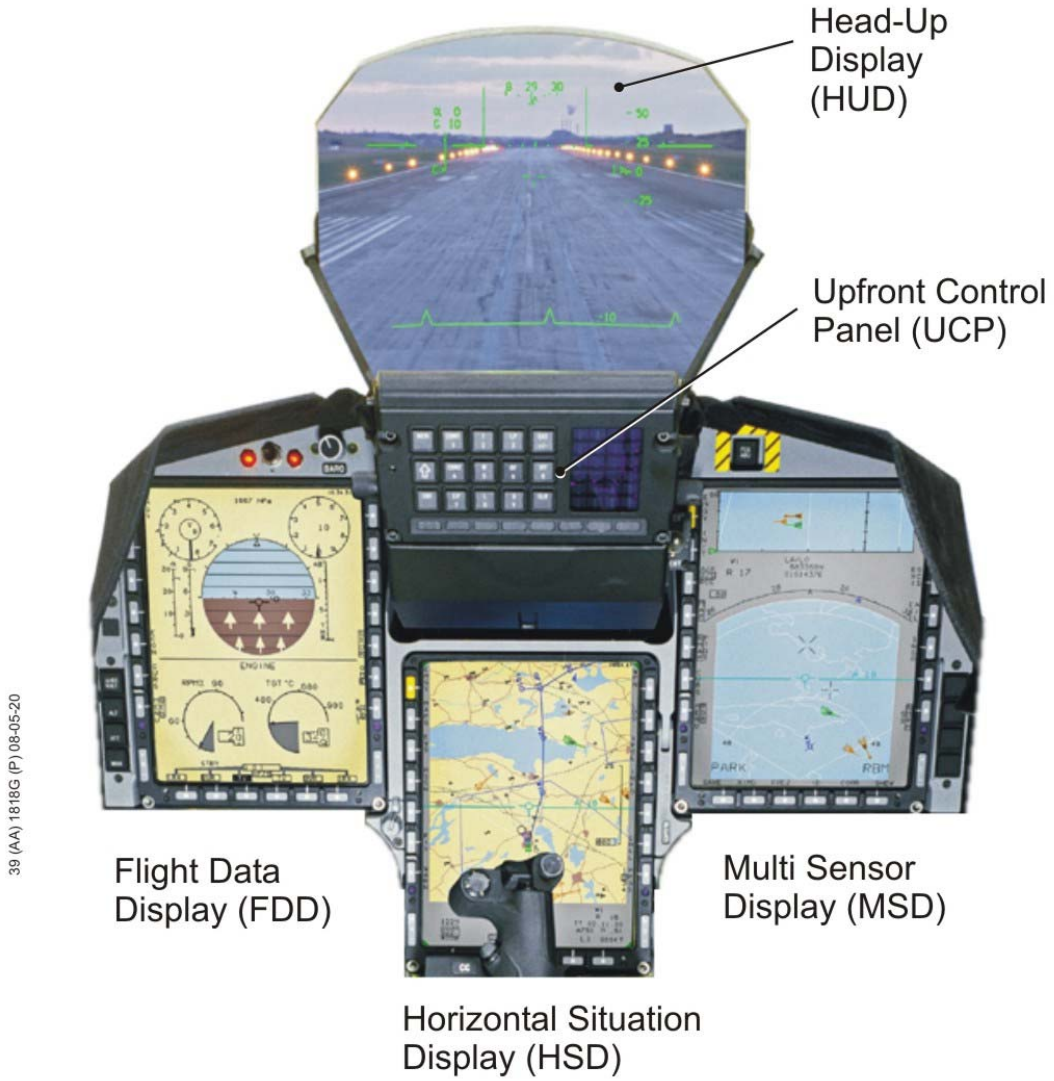


**Figure 2. Gripen C/D cockpit**

- Air-to-air refueling and OBOGS for long duration flights
- Modernized cockpit with three large 6” x 8” multi function color displays
- Modernized avionic system with enhanced processing capacity in the core system computers and increased data bus communication
- Integration of new weapons, in particular additional Air-to-Ground weapons
- Enhanced EW system
- English texts, imperial units
- Increased Growth potential

The Gripen C/D version is currently in production being delivered to and operated by our export customers as well as our national air force. After initial delivery the development has continued and the system has been further updated with integration of a Reconnaissance Pod, Helmet Mounted Display System, IRIS-T missile, GPS-bombs and Meteor Air-to-Air missile (ongoing) etc. This development process is performed in close cooperation with the customers and results in successive block updates being issued every three year.

The Gripen C/D aircraft is one of the most advanced combat aircraft on the market today and it will be offered to potential customers for at least another 10 years.

## 3 Future Gripen development

To remain “the one to beat” on the future export market, more thorough changes must be considered. As a platform for technology insertion, a demonstrator aircraft (Gripen Demo) has been developed. The Gripen Demo made its maiden flight in May 2008. It is a platform for evaluation and demonstration of leading edge technology for the whole Gripen family, next generation Gripen (**Gripen NG**) as well as Gripen C/D.

The development of the Gripen Demo has been performed in a small team using state of the art design methods. Even if more than 3500 parts have been changed Gripen Demo have been built in a very short time and to a limited budget. The Demo program has full support from the Swedish Air Force, the Swedish and

**Figure 3. Gripen demonstrator**

other governments as well as several of the manufacturers of the international industry. The most important enhancements being tested in the Demo aircraft are:

- **Increased MTOW, extra load carriage capacity**

  More store stations are added to the aircraft for extra load-carrying capacity. The Maximum Take Off Weight (MTOW) is increased with two tons.

- **Increased thrust, new engine F414**

  The F404 engine is replaced by the more powerful F414G engine to give better performance and to compensate for the extra weight. The air intakes have been redesigned to deliver the extra air flow required by the more powerful engine.

- **New landing gear**

  The landing gear has been strengthened and moved to the wing attachment.

- **Extended range, more internal fuel**

  The internal space gained by the moved landing gear is used to store more internal fuel. Also a new 450 US gallon underwing drop tank is integrated. The drop tanks and the extra internal fuel, gives Gripen an increased fuel capacity of 1800 kg providing significant increase in range/endurance performance.

- **AESA radar**

  The Gripen Demo aircraft will conduct trials with a new AESA radar developed by Saab and Thales. No changes are required to the radome and the aircraft exterior to house the radar. Internally new electronic boxes are fitted to the forward equipment bay and a new cooling system is installed.

- **Enhanced EW system**

  A Missile Approach Warning system, developed by Saab Avitronics is integrated in the aircraft. Four UV warning receivers are installed giving sufficient coverage. The system is modular and allows use of different sensors, UV, IR or a combination.

- **Enhanced Comm system**

  A satellite communication system is installed in the Demo aircraft as well as a new UHF broad band video data link for communication with ground forces in the Close Air Support role. Gripen is already a networked aircraft with a long tradition of using datalinks. However, the new systems will take the netcentric capability to a new level.

- **New avionic system architecture**

  In parallel with the Demo aircraft, a rig is developed with next generation avionic system. The aim is to significantly increase efficiency and reduce cost for the system development activities. This is accomplished by using the following key techniques

  - Model Based System Engineering, automatic code generation and testing
  - Increased use of COTS products (H/W and S/W). Using COTS products is also beneficial from an obsolescence and growth potential point of view
  - Separation of critical and customer specific functions/software using ARINC 653 standard
  - Introduction of the latest processor and high speed data bus technology

Besides the above system enhancements being tested in the Demo program, a number of

additional new technologies, mainly sensors and weapon, are studied for incorporation in future Gripen. Changes with major influence of the airframe will be introduced in the Gripen NG while new subsystem also can be introduced in the Gripen C/D.

## 4 Summary

In summary the ongoing changes represents a major change to the Gripen fighter, considering the influence of airframe and general systems whilst monitoring that other important characteristics, e.g. ILS and signatures, are not degraded.

The described demonstrator program is not just the first step towards a new Gripen, it is also driving the technology for existing Gripen customers and reassures customers buying Gripen today that they will be able to upgrade and enhance their aircraft when they need to.

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