



SAAB

GRIPEN NG

PERFORMANCE, FACTS AND FIGURES



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GRIPEN **THE SMART FIGHTER**



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GRIPEN ORIGINS

During the Cold War, Sweden felt threatened by the Warsaw Pact countries. The nation needed an aircraft that could outperform and outmanoeuvre a larger force of advanced fighters.

The north of Sweden is an unforgiving land with long, freezing winters and largely unpopulated areas. It presents a harsh environment in which to operate an aircraft – yet it was this place that gave birth to Gripen.

Defending these vast areas required a fighter that could perform air-to-air, air-to-surface and reconnaissance missions in a single sortie, without the need to return to base for reconfiguration. Gripen was also designed to use roads as temporary runways, allowing the Air Force to use logistical flexibility and speed to keep an invading force at bay. Easy maintenance and reconfiguration was also vital, as it would need to be performed by Swedish conscripts with only 10 weeks' training – usually outdoors in freezing, isolated conditions.

Sweden's relatively small defence budget and the tough conditions under which Gripen was designed, led Saab to make the fighter as efficient as possible. A fundamental aspect of this approach is Gripen's modular and open avionics architecture. This enables the integration of off-the-shelf products wherever possible, as well as continuous development of new functions to meet future needs.

Gripen NG embodies Saab's *thinking edge* by bringing together performance, cost-efficiency and industrial cooperation in one smart fighter system.

CONTINUOUS DEVELOPMENT

Saab works in close cooperation with its customers around the world to help improve the aircraft. Together, we have a long tradition of continuous development. Instead of conducting major and costly mid-life upgrades, Saab uses a short upgrade cycle which provides step-wise improvements. This ensures the fighter is always modern and that upgrades can be adapted to a changing world. Improvement costs are spread out over a long period and each customer can choose to implement upgrades at a time that best suits them.

FACTS

- ▶ **TURNAROUND TIME:**
10 minutes with air-to-air configuration
- ▶ **MINIMAL TAKE-OFF/
LANDING DISTANCE:**
500/600 m
- ▶ **MAXIMUM SPEED:**
Mach 2 at high altitude
- ▶ **TIME IN THE AIR WITH
A TYPICAL AIR-TO-AIR
CONFIGURATION:**
2 hours
- ▶ **DIMENSIONS:**
Length 15.2 m,
wingspan 8.6 m
- ▶ Small visual, radar
and IR signature

ONGOING DEVELOPMENT

In service for over 15 years, Gripen is the pinnacle of more than 75 years of Saab's aircraft design and development experience. The latest NG version is an evolution of the aircraft, building on its strengths and adding further capabilities.

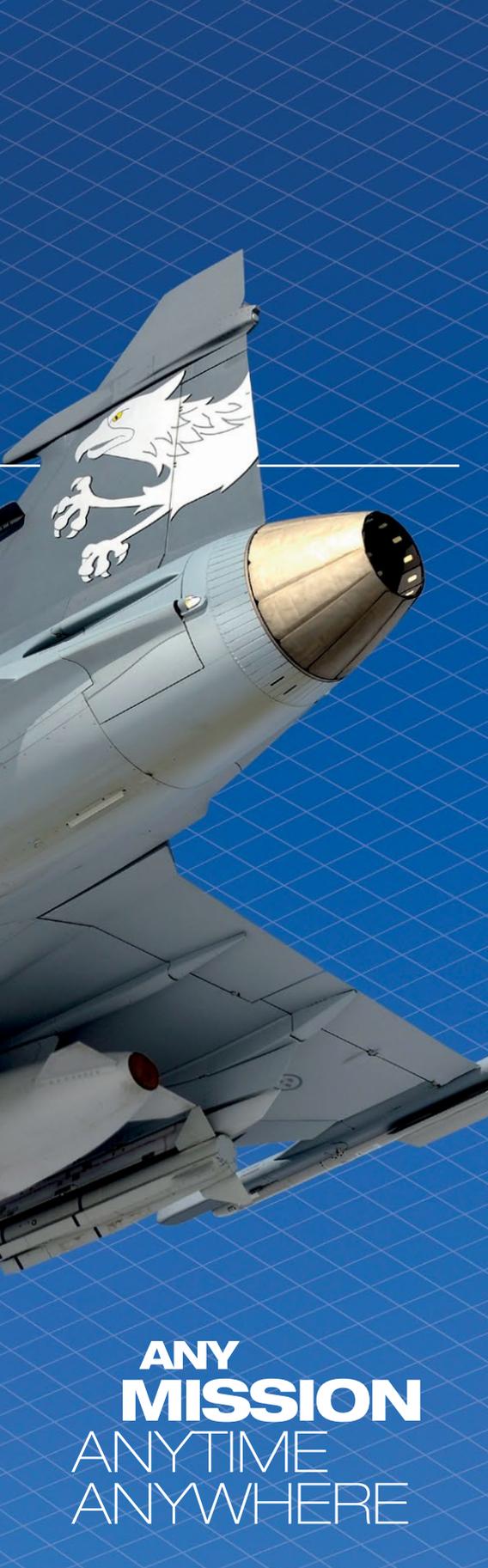
Gripen NG offers a range of options, enabling users to select a bespoke aircraft rather than a set system. Gripen E for example, is the single-seat airframe configuration that has been selected by Sweden.

The C/D versions of Gripen are the current generation of fighter. In service around the world, they are consistently being upgraded and are therefore always ready for modern missions.



SPECIFICATIONS

LENGTH	15.2 m	MAX. SPEED AT SEA LEVEL	> 1,400 km/h
WIDTH	8.6 m	MAX. SPEED AT HIGH ALTITUDE	Mach 2
MASS WHEN EMPTY	8,000 kg	SUPERCruise CAPABILITY	Yes
INTERNAL FUEL CAPACITY	3,400 kg	MAX. SERVICE ALTITUDE	> 16,000 m
MAX. TAKE-OFF WEIGHT	16,500 kg	FERRY RANGE	4,000 km
MAX. THRUST	98 kN	G-LIMITS	+9G/-3G
MIN. TAKE-OFF DISTANCE	500 m	HARDPOINTS	10
LANDING DISTANCE	600 m	COMBAT TURNAROUND AIR-TO-AIR	10 min
		FULL ENGINE REPLACEMENT	<1 hour



MULTI-ROLE CAPABILITIES

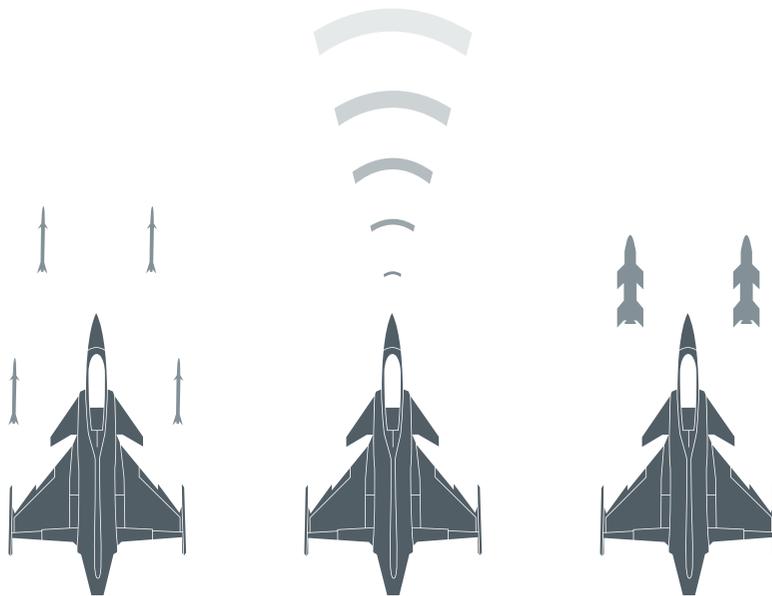
Gripen is among the first aircraft to focus on more than air-to-air combat. This means that it can cover a full range of mission requirements, saving customers the cost of owning separate bombers and fighters.

From the very beginning, Gripen has been designed to be a true multi-role and swing-role fighter – meaning it can perform air-to-air, air-to-surface and reconnaissance missions. Gripen can seamlessly change between roles within a single sortie if needed. Gripen NG can perform a wide range of missions, from offensive and defensive

counter strikes to air policing and tactical air reconnaissance. These missions can be performed 24/7 in all types of weather.

This multi-role capability will evolve as the fighter's AESA radar and other systems are further developed.

A multi-role fighter for air-to-air, air-to-surface and reconnaissance missions:



AIR-TO-AIR

Intercept enemy fighters, bombers or reconnaissance threats

RECONNAISSANCE

Identify threats and patrol your borders

AIR-TO-SURFACE

Destroy vehicles, ships, buildings and enemy weapons installations

ANY MISSION
ANYTIME
ANYWHERE

INFORMATION SUPPORT

Knowledge is everything in combat and knowing more than the enemy is vital to mission success.

To achieve information superiority, fighter pilots need to be able to identify enemy assets and share intelligence with wingmen, as well as be able to have it presented to them in a clear way. At the same time they need to stop the enemy from acquiring the same type of information.

Gripen NG's sensor suite identifies the enemy using a number of active and passive methods while retaining a relatively small radar and infrared signature. The onboard Electronic Warfare (EW) systems can also jam enemy sensors and approaching missiles, while the aircraft's relatively small size makes it difficult to detect visually.

MFS-EW

Electronic Warfare system – a complete, highly integrated suite that includes radar warning receiver, missile approach warning, electronic support measures and countermeasures

RECCE POD

Equips the fighter with a full range of reconnaissance capabilities

COMBAT RADIUS



Combat radius and time on station can be extended through air-to-air refuelling.

IRST

Provides passive situation awareness at long range against air and ground targets

ES-05 RAVEN AESA RADAR

Simultaneously and independently tracks air-to-air and air-to-surface targets

LITENING

Precision target pods that significantly improve the effectiveness of stand-off weapons

RANGE AND MANOEUVRABILITY

The maximum combat radius for Gripen NG on an air-to-surface configuration is approximately 800 nm (1,500 km). This is defined as flying to a target, releasing air-to-surface weapons, and then returning to home base. The actual combat radius depends on the configuration of the aircraft's external stores, its profiles and the availability of reserve fuel tanks. Gripen NG's combat radius meets the needs of air forces around the world, but at a much lower cost than its competitors.

The aircraft's maximum time on station in a mission depends on the stores carried and the distance from the home base to the combat air patrol station. In a typical air-to-air configuration for example, Gripen NG can patrol for over two hours.

AIR-TO-AIR REFUELLING

All Gripen NG are equipped to conduct air-to-air refuelling via the NATO standard probe-and-drogue system. This ability increases its combat radius and/or time on station considerably – in fact, missions of up to eight hours or more can be flown.

MANOEUVRABILITY

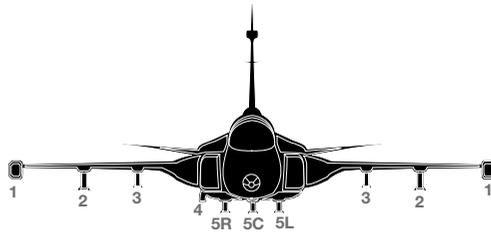
Gripen NG has a canard/delta wing configuration with relaxed stability. A triplex fly-by-wire aerodynamic control system enables stable and precise flight with highly agile manoeuvring. This aids pilots by optimising their commands across the entire flight envelope. It also reduces the effort required in executing demanding manoeuvres. The flight control system compensates for difficult environmental conditions and minimises drag. It is thoroughly tested and ensures care-free flight, meaning that the pilot can never overstress the aircraft except in an emergency.

WEAPON SYSTEMS

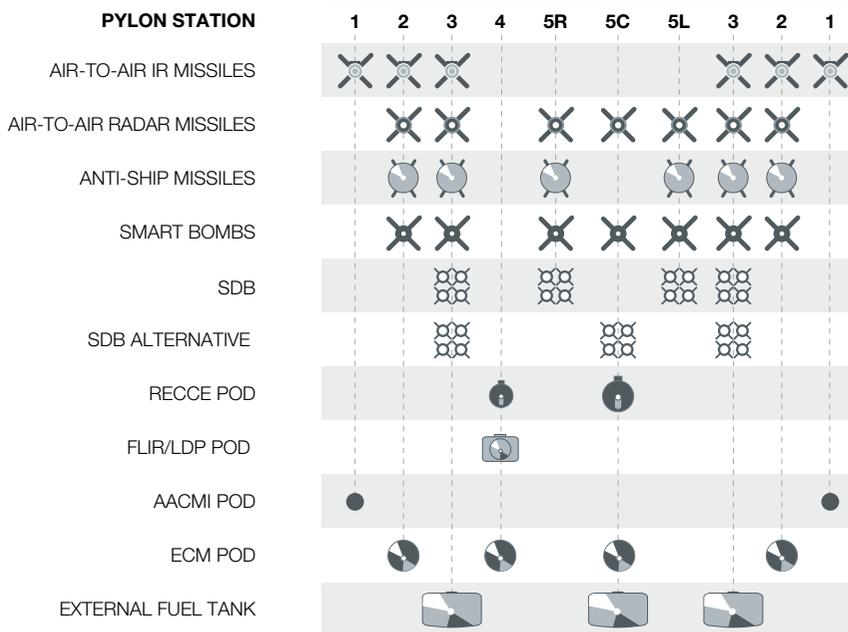
Gripen NG has weapons for all types of mission, from guided bombs for precision engagement with low collateral damage, to long-range and agile air-to-air missiles and heavy anti-ship armaments. Additionally, the aircraft has an inherent precision strike and stand-off capability.

The single-seat Gripen NG is equipped with a 27 mm Mauser BK27 gun. This can be used in air-to-surface attacks against land and sea targets and is suitable for air policing missions. Gripen NG can also carry pods and sensors for reconnaissance and special missions.

Gripen's flexible weapon system architecture allows easy and cost-efficient integration of new stores, from long-range and agile air-to-air missiles to anti-ship missiles and guided bombs. This is enabled by standard pylon interfaces, a modular avionics system, and adaptive payload classifications that eliminate the need for updates of the flight control system.



MULTI-ROLE CAPABILITY





SURVIVABILITY

Gripen NG is built to survive in combat via a series of integrated EW capabilities that enable smart tactics.

STRIKE **ANY**
TARGET

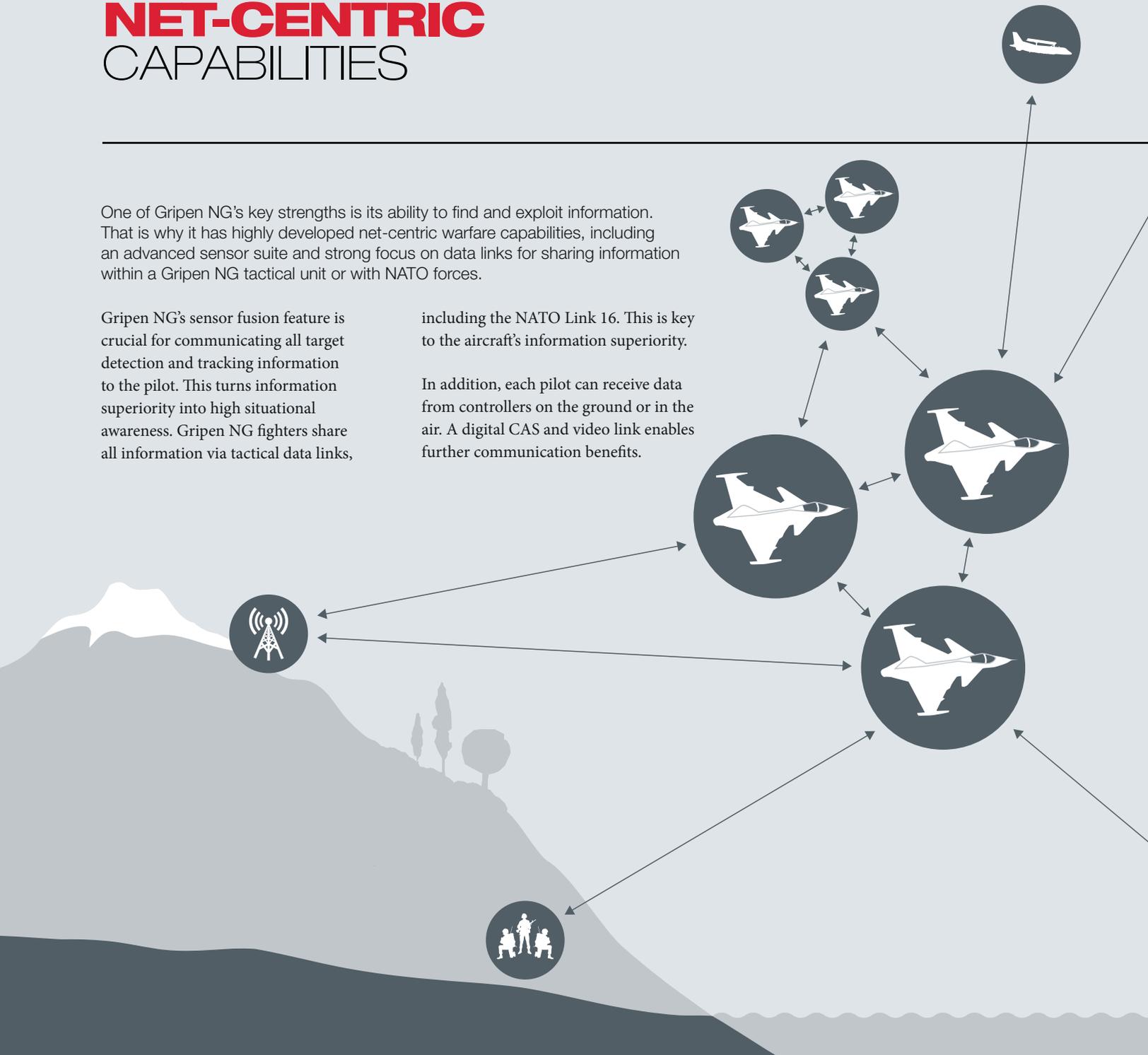
NET-CENTRIC CAPABILITIES

One of Gripen NG's key strengths is its ability to find and exploit information. That is why it has highly developed net-centric warfare capabilities, including an advanced sensor suite and strong focus on data links for sharing information within a Gripen NG tactical unit or with NATO forces.

Gripen NG's sensor fusion feature is crucial for communicating all target detection and tracking information to the pilot. This turns information superiority into high situational awareness. Gripen NG fighters share all information via tactical data links,

including the NATO Link 16. This is key to the aircraft's information superiority.

In addition, each pilot can receive data from controllers on the ground or in the air. A digital CAS and video link enables further communication benefits.



TO KNOW IS
TO WIN



BATTLEFIELD NETWORK

Gripen's Data Link System (TIDLS), along with a Link 16 or National Data Link provide the following capabilities:

- ▶ Data link within the Tactical Air Unit
- ▶ Data link between Gripen, AEW&C and C2 centres on ground or at sea
- ▶ Data link with Forward Air Controller



INTEROPERABILITY



*This image has been digitally created using 3D modelling software

Gripen NG is able to participate in joint missions around the world, as well as acting to protect the interests of the user's nation.

The aircraft is interoperable with army, navy and C2 organisations, and is also fully NATO-compatible. Originally designed to withstand the harsh arctic conditions of northern Sweden,

Gripen NG has been adapted to operate in a complete range of extreme climates – from tropical zones such as Thailand, through to the deserts of Africa.

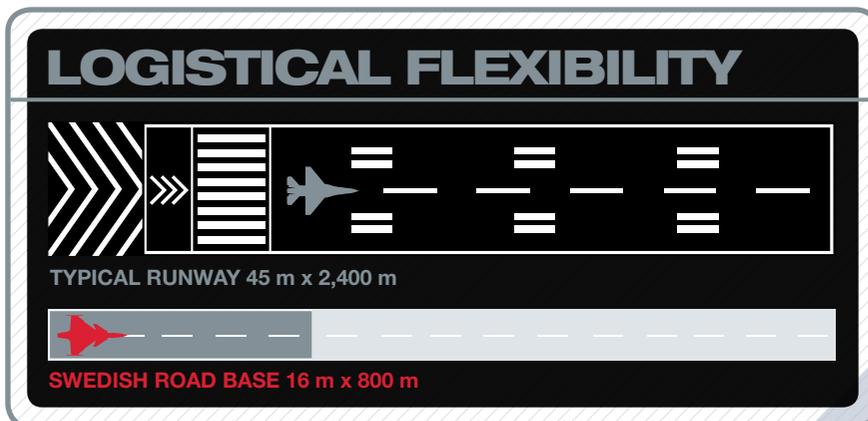
LOGISTICS

Gripen was originally designed for flexible deployment with a small logistical footprint. This was due to the Swedish Air Force's policy during the Cold War to operate out of a number of dispersed bases across the country. This made it vital to keep staff resources, support systems and spares to a minimum. As a result of this, Gripen was designed to operate from runways only 16 x 800 metres in length. This means it can land on a regular highway, which further improves its logistical flexibility. This capability has been carried over to Gripen NG.

AVAILABILITY

High availability is vital for small air forces. These organisations rely on aircraft that offer a long Mean Time Between Failure (MTBF) and short Mean Time To Repair (MTTR). Gripen NG has been designed with this in mind. For example, the entire engine can be exchanged and tested in the field in less than an hour.

These properties, together with low maintenance requirements per flight hour, give the aircraft higher availability than its competitors. Gripen NG has also been designed for minimal turnaround time. For example, an air-to-air combat set up takes only 10 minutes to perform, including refuelling and rearming.



THE WORLD'S MOST
ADVANCED
AVIONICS

MODULARITY

Gripen NG's modular design greatly enhances its ability to adapt. Using off-the-shelf products and integrating them in an open architecture makes the aircraft development process very flexible. It also enables distributed development of Gripen NG in customer nations as part of industrial cooperation and technology transfer packages.

FURTHER DEVELOPMENT

TWO-SEATER GRIPEN NG

A two-seater version of Gripen NG is in development and will be used for both pilot training and combat missions. For the combat role, this version will be optimised to enable air battle management from the back seat, including jamming, information warfare and network attack capabilities. Weapon System Officer (WSO) and EW roles can also be facilitated from this position.



FUTURE VERSIONS

SEA GRIPEN

Sea Gripen is a carrier-based fighter that enables affordable naval air power. It will make a first-class carrier-based fighter and will retain the combat capabilities offered by the regular NG version.

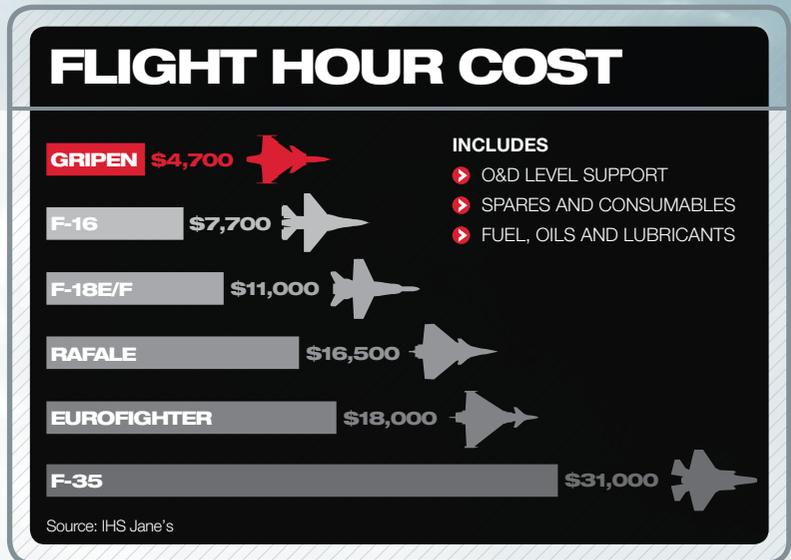
OPTIONALLY UNMANNED

An optionally unmanned Gripen NG would be useful for a range of situations, for example flying very high risk missions. It provides the operator with the flexibility to use the aircraft daily for either manned or unmanned missions.

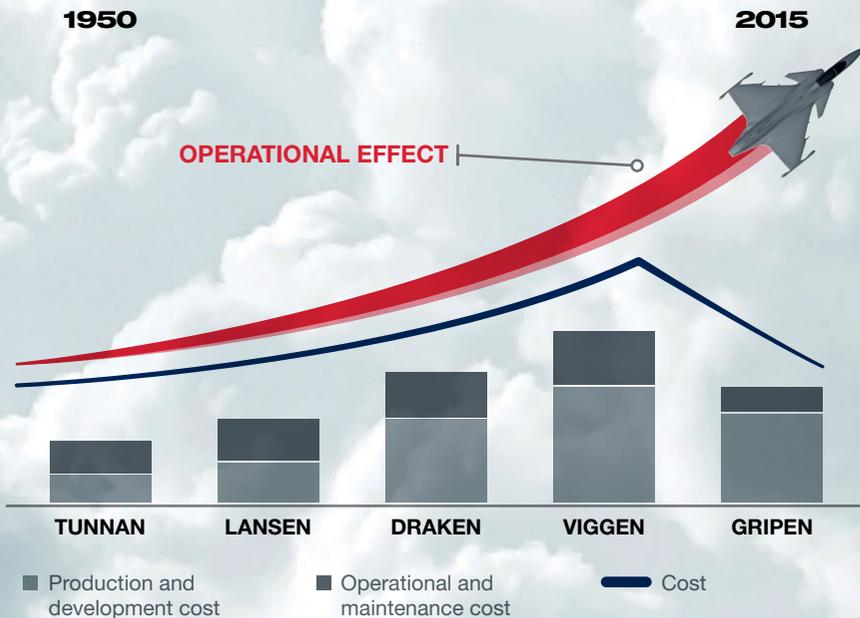
COST EFFICIENCY

An aircraft's lifecycle cost includes everything from initial acquisition spend through to operational expenses across its entire lifetime. Gripen NG has a very low lifecycle cost compared to its competitors.

The graph to the right shows an independent study on costs relating to next generation fighter systems. It shows flight hour costs for Gripen C/D and was conducted by IHS Jane's, based on open sources. Gripen NG has been further improved to continue this trend of reducing flight hour costs.



BREAKING THE COST CURVE



COST CONSCIOUSNESS FROM THE START

From the very beginning, cost has been a pivotal design parameter for Gripen. This is also true for Gripen NG. Throughout design and construction Saab has ensured that the aircraft is easy to service and repair – even outdoors, by conscript soldiers with minimum resources. Our engineers are asked to maximise performance at a set cost. This way, Saab avoids expensive solutions that may not add as much to performance as their cost would suggest. Cost is also a design parameter in the sense that every detail is created for maximum ease of use and low cost to maintain, and the whole lifecycle is taken into consideration when these prioritisations are made. This is not something that can be added later. This must be built in from the very beginning.

TRAINING AND SUPPORT

BORN TO
FLY



WE SELECT THE BEST SUPPLIERS

Saab constantly scans the market to ensure that its customers gain value from the Gripen NG supply chain. For every system category, we seek to buy the best materials for the best possible price.

LEAN MODEL-BASED DEVELOPMENT

Gripen NG is designed and manufactured using a lean model-based development process. Our models provide early validation and reduce risk. They are used during the upgrade cycle, enabling updates to be implemented considerably faster.

Most aircraft training is conducted in simulators, including Saab's own specialised Gripen trainer. This offers training for both pilots and technical staff on a wide range of areas.

A range of other simulators with different levels of complexity are also offered by Saab, from small desktops to large full mission simulators. They provide high fidelity visual environments, realistic threats, simulation of system behaviour and aircraft characteristics. Simulators can also be linked to provide multi-ship training.

Gripen NG's weapon system includes an aircraft support system that is based on a common client server platform. This provides several functions:

MISSION SUPPORT SYSTEM used by pilots and MSE officers to plan, rehearse, brief, evaluate and debrief missions.

DIGITAL MAP GENERATING SYSTEM for creation and administration of geographical databases used in the aircraft, simulators and support systems.

EW SUPPORT SYSTEM for development of EW and target recognition libraries.

MAINTENANCE GROUND SUPPORT SYSTEM for evaluation and administration of maintenance data recorded in the aircraft and for upload of software and data to the aircraft.

IMAGE ANALYSIS for storage and analysis of reconnaissance images.

GRIPEN USERS **AROUND THE WORLD**



Saab's opportunities on the world market have been solidified and expanded, following the order from Sweden for Gripen E. This has been further bolstered by Saab signing a contract with Brazil's Aeronautics Command (COMAER) for the development and production of Gripen NG for the country's Air Force.

These events have pushed Gripen to the forefront of the global fighter market and mean that we are a leading player, with increasing interest in all regions – from the Americas to Asia. This is proof of the aircraft's ability to meet the needs of nations large and small, in hot climates and cold.

With defence budgets tightening, affordability becomes an ever more important factor in customer nations' selection process.

The fighter is now recognised and accepted as the logical solution, capable of fulfilling any nation's need for a true multi-role fighter.

Gripen is unique, offering moderate operational and maintenance costs that no other aircraft comes close to matching. In addition, industrial cooperation and technology transfer can be offered to each customer country. That is why we call it the smart fighter.

GRIPEN NG

WEAPONS AND PODS



This image shows examples of the weapons that can be used on Gripen NG. Current level of integration may differ. The graphical representations herein are artistic impressions based on the latest available information within the public domain and should not be taken as establishing any commitments on the part of Saab AB.

GRIPEN NG

SYSTEMS AND COMPONENTS



- | | | | | | |
|----|---|----|----------------------|----|--------------------------|
| 1 | Nose pitot tube | 12 | Air inlet | 25 | Structure |
| 2 | Radome | 13 | Navigation light | 26 | Wing-tip station |
| 3 | Selex ES Actively Electronically Scanned Array (AESA) radar | 14 | 27 mm Mauser gun | 27 | Outboard elevon |
| 4 | Infrared Search and Track (IRST) | 15 | Canard | 28 | Inboard elevon |
| 5 | Windscreen | 16 | VHF antenna | 29 | APU |
| 6 | Wide angle Head-Up Display (HUD) | 17 | Integrated fuel tank | 30 | Air brake |
| 7 | Cockpit canopy | 18 | Fuselage pylons | 31 | GE Aviation F414G engine |
| 8 | Ejection seat | 19 | Fuselage pylons | 32 | Rudder |
| 9 | Fuselage pylon | 20 | Fuselage pylons | 33 | VHF/UHF antenna |
| 10 | Retractable air-to-air refuelling probe | 21 | Main landing gear | 34 | Fin pod |
| 11 | Nose landing gear | 22 | Under-wing pylons | 35 | ILS antenna |
| | | 23 | Under-wing pylons | 36 | Fin pitot tube |
| | | 24 | Leading edge flap | | |

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www.gripen.com

Saab AB
SE-581 88 Linköping
Sweden

Tel +46 13 18 00 00



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