

= Saab JAS 39 Gripen =

The Saab JAS 39 Gripen ( English : " griffin " ) is a light single @-@ engine multirole fighter aircraft manufactured by the Swedish aerospace company Saab . It was designed to replace the Saab 35 Draken and 37 Viggen in the Swedish Air Force ( Flygvapnet ) . The Gripen has a delta wing and canard configuration with relaxed stability design and fly @-@ by @-@ wire flight controls . It is powered by the Volvo RM12 , and has a top speed of Mach 2 . Later aircraft are modified for NATO interoperability standards and to undertake in @-@ flight refuelling .

In 1979 , the Swedish government began development studies for an aircraft capable of fighter , attack and reconnaissance missions to replace the Saab 35 Draken and 37 Viggen . A new design from Saab was selected and developed as the JAS 39 , first flying in 1988 . Following two crashes during flight development and subsequent alterations to the aircraft 's flight control software , the Gripen entered service with the Swedish Air Force in 1997 . Upgraded variants , featuring more advanced avionics and adaptations for longer mission times , began entering service in 2003 .

In order to market the aircraft to export customers , Saab has formed several partnerships and collaborative efforts with multiple overseas aerospace companies . One example of such efforts was Gripen International , a joint partnership between Saab and BAE Systems formed in 2001 . Gripen International was responsible for marketing the aircraft , and was heavily involved in the successful export of the type to South Africa ; the organization was later dissolved amidst allegations of bribery being employed to secure foreign interest and sales . On the export market , the Gripen has achieved moderate success in sales to nations in Central Europe , South Africa and Southeast Asia ; bribery has been suspected in some of these procurements , but authorities closed the investigation in 2009 .

A further version , designated Gripen JAS 39E / F , is under development as of 2014 ; it has been referred to as Gripen NG or Super @-@ JAS . The changes include the adoption of a new powerplant , the General Electric F414G , an active electronically scanned array radar , and significantly increased internal fuel capacity . Saab has proposed other derivatives , including a navalised Sea Gripen for carrier operations and an optionally manned aircraft for unmanned operations . Sweden and Brazil have ordered the Gripen E / F and Switzerland initially selected it for procurement . As of 2013 , more than 247 Gripens have been built .

= = Development = =

= = = Origins = = =

In the late 1970s , Sweden sought to replace its ageing Saab 35 Draken and Saab 37 Viggen . The Swedish Air Force required an affordable Mach 2 aircraft with good short @-@ field performance for a defensive dispersed basing plan in the event of invasion ; the plan included 800 m long by 9 m wide rudimentary runways as stated in the Base 90 directives . One goal was for the aircraft to be smaller than the Viggen while equalling or improving on its payload @-@ range characteristics . Early proposals included the Saab 38 , also called B3LA , intended as an attack aircraft and trainer , and the A 20 , a development of the Viggen that would have capabilities as a fighter , attack and sea reconnaissance aircraft . Several foreign designs were also studied , including the General Dynamics F @-@ 16 Fighting Falcon , the McDonnell Douglas F / A @-@ 18 Hornet , the Northrop F @-@ 20 Tigershark and the Dassault Mirage 2000 . Ultimately , the Swedish government opted for a new fighter to be developed by Saab ( Svenska Aeroplan Aktiebolag ) .

In 1979 , the government began a study calling for a versatile platform capable of " JAS " , standing for Jakt ( air @-@ to @-@ air ) , Attack ( air @-@ to @-@ surface ) , and Spaning ( reconnaissance ) , indicating a multirole , or swingrole , fighter aircraft that can fulfill multiple roles during the same mission . Several Saab designs were reviewed , the most promising being " Project 2105 " ( redesignated " Project 2108 " and , later , " Project 2110 " ) , recommended to the government by the Defence Materiel Administration ( Försvarets Materielverk , or FMV ) . In 1980 , Industrigruppen

JAS ( IG JAS , " JAS Industry Group " ) was established as a joint venture by Saab @-@ Scania , LM Ericsson , Svenska Radioaktiebolaget , Volvo Flygmotor and Försvarets Fabriksverk , the industrial arm of the Swedish armed forces .

The preferred aircraft was a single @-@ engine , lightweight single @-@ seater , embracing fly @-@ by @-@ wire technology , canards , and an aerodynamically unstable design . The powerplant selected was the Volvo @-@ Flygmotor RM12 , a license @-@ built derivative of the General Electric F404 @-@ 400 ; engine development priorities were weight reduction and lowering component count . On 30 June 1982 , with approval from the Riksdag , the FMV issued contracts worth SEK 25 @-@ 7 billion to Saab , covering five prototypes and an initial batch of 30 production aircraft . By January 1983 , a Viggen was converted to a flying test aircraft for the JAS 39 's intended avionics , such as the fly @-@ by @-@ wire controls . The JAS 39 received the name Gripen ( griffin ) via a public competition , which is the heraldry on Saab 's logo .

= = = Testing , production and improvements = = =

The first Gripen was rolled out on 26 April 1987 , marking Saab 's 50th anniversary . Originally planned to fly in 1987 , the first flight was delayed by 18 months due to issues with the flight control system . On 9 December 1988 , the first prototype ( serial number 39 @-@ 1 ) took its 51 @-@ minute maiden flight with pilot Stig Holmström at the controls . During the test programme , concern surfaced about the aircraft 's avionics , specifically the fly @-@ by @-@ wire flight control system ( FCS ) , and the relaxed stability design . On 2 February 1989 , this issue led to the crash of the prototype during an attempted landing at Linköping ; the test pilot Lars Rådeström walked away with a broken elbow . The cause of the crash was identified as pilot @-@ induced oscillation , caused by problems with the FCS 's pitch @-@ control routine .

In response to the crash Saab and US firm Calspan introduced software modifications to the aircraft . A modified Lockheed NT @-@ 33A was used to test these improvements , which allowed flight testing to resume 15 months after the accident . On 8 August 1993 , production aircraft 39102 was destroyed in an accident during an aerial display in Stockholm . Test pilot Rådeström lost control of the aircraft during a roll at low altitude when the aircraft stalled , forcing him to eject . Saab later found the problem to be high amplification of the pilot 's quick and significant stick command inputs . The ensuing investigation and flaw correction delayed test flying by several months , resuming in December 1993 .

The first order included an option for another 110 , which was exercised in June 1992 . Batch II consisted of 96 one @-@ seat JAS 39As and 14 two @-@ seat JAS 39Bs . The JAS 39B variant is 66 cm ( 26 in ) longer than the JAS 39A to accommodate a second seat , which also necessitated the deletion of the cannon and a reduced internal fuel capacity . By April 1994 , five prototypes and two series @-@ production Gripens had been completed ; but a beyond @-@ visual @-@ range missile ( BVR ) had not yet been selected . A third batch was ordered in June 1997 , composed of 50 upgraded single @-@ seat JAS 39Cs and 14 JAS 39D two @-@ seaters , known as ' Turbo Gripen ' , with NATO compatibility for exports . Batch III aircraft , delivered between 2002 and 2008 , possess more powerful and updated avionics , in @-@ flight refuelling capability via retractable probes on the aircraft 's starboard side , and an on @-@ board oxygen @-@ generating system for longer missions . In @-@ flight refueling was tested via a specially equipped prototype ( 39 ? 4 ) used in successful trials with a Royal Air Force VC10 in 1998 .

= = = Teaming agreements = = =

During the 1995 Paris Air Show , Saab Military Aircraft and British Aerospace ( BAe , now BAE Systems ) announced the formation the joint @-@ venture company Saab @-@ BAe Gripen AB with the goal of adapting , manufacturing , marketing and supporting Gripen worldwide . The deal involved the conversion of the A and B series aircraft to the " export " C and D series , which developed the Gripen for compatibility with NATO standards . This cooperation was extended in 2001 with the formation of Gripen International to promote export sales . In December 2004 , Saab

and BAE Systems announced that BAE was to sell a large portion of its stake in Saab , and that Saab would take full responsibility for marketing and export orders of the Gripen . In June 2011 , Saab announced that an internal investigation revealed evidence of acts of corruption by BAE Systems , including money laundering , in South Africa , one of the Gripen 's customers .

On 26 April 2007 , Norway signed a NOK150 million joint @-@ development agreement with Saab to cooperate in the development programme of the Gripen , including the integration of Norwegian industries in the development of future versions of the aircraft . In June of the same year , Saab also entered an agreement with Thales Norway A / S concerning the development of communications systems for the Gripen fighter ; this order was the first to be awarded under the provisions of the Letter of Agreement signed by the Norwegian Ministry of Defence and Gripen International in April 2007 . As a result of the United States diplomatic cables leak in 2010 , it was revealed that US diplomats had become concerned with cooperation between Norway and Sweden on the topic of the Gripen , and had sought to exert pressure against a Norwegian purchase of the aircraft .

In December 2007 , as part of Gripen International 's marketing efforts in Denmark , a deal was signed with Danish technology supplier Terma A / S which allows them to participate in an industrial cooperation programme over the next 10 ? 15 years . The total value of the programme is estimated at over DKK10 billion , and is partly dependent on a procurement of the Gripen by Denmark .

= = = Controversies , scandals , and costs = = =

Developing an advanced multi @-@ role fighter was a major undertaking for Sweden . The predecessor Viggen , despite being less advanced and less expensive , had been criticized for occupying too much of Sweden 's military budget and was branded " a cuckoo in the military nest " by critics as early as 1971 . At the 1972 party congress of the Social Democrats , the dominant party in Swedish politics since the 1950s , a motion was passed to stop any future projects to develop advanced military aircraft . In 1982 , the Gripen project passed in the Riksdag by a margin of 176 for and 167 against , with the entire Social Democratic party voting against the proposal due to demands for more studies . A new bill was introduced in 1983 and a final approval was given in April 1983 with the condition that the project was to have a predetermined fixed @-@ price contract , a decision that would later be criticized as unrealistic due to later cost overruns .

According to Annika Brändström , in the aftermath of the 1989 and 1993 crashes , the Gripen risked a loss of credibility and the weakening of its public image . There was public speculation that failures to address technical problems exposed in the first crash had directly contributed to the second crash and thus had been avoidable . Brändström observed that media elements had called for greater public accountability and explanation of the project ; ill @-@ informed media analysis had also distorted public knowledge of the Gripen . The sitting Conservative government quickly endorsed and supported the Gripen ? Minister of Defense Anders Björck issued a public reassurance that the project was very positive for Sweden . In connection to the Gripen 's marketing efforts to multiple countries , including South Africa , Austria , the Czech Republic and Hungary , there were reports of widespread bribery and corruption by BAE Systems and Saab . In 2007 , Swedish journalists reported that BAE had paid bribes equivalent to millions of dollars . Following criminal investigations in eight countries , only one individual in Austria , Alfons Mensdorf @-@ Pouilly , was prosecuted for bribery . The scandal tarnished the international reputation of the Gripen , BAE Systems , Saab , and Sweden .

The Gripen 's cost has been subject to frequent attention and speculation . In 2008 , Saab announced reduced earnings for that year , partly attributing this to increased marketing costs for the aircraft . In 2008 , Saab disputed Norway 's cost calculations for the Gripen NG as overestimated and in excess of real world performance with existing operators . A 2007 report by the European Union Institute for Security Studies stated the total research and development costs of Gripen to be ? 1 @. @ 84 billion . According to a study by Jane 's Information Group in 2012 , the Gripen 's operational cost was the lowest among several modern fighters ; it was estimated at \$ 4 @, @ 700 per flight hour . The Swedish Ministry of Defense estimated the cost of the full system , comprising 60 Gripen E / F , at SEK 90 billion distributed over the period 2013 ? 42 . The Swedish

Armed Forces estimated that maintaining 100 C / D @-@ model aircraft until 2042 would cost SEK 60 billion , while buying aircraft from a foreign supplier would cost SEK 110 billion .

= = = Further developments = = =

A two @-@ seat aircraft , designated " Gripen Demo " , was ordered in 2007 as a testbed for various upgrades . It was powered by the General Electric F414G , a development of the Boeing F / A @-@ 18E / F Super Hornet 's engine . The Gripen NG 's maximum take off weight was increased from 14 @,@ 000 to 16 @,@ 000 kg ( 30 @,@ 900 ? 35 @,@ 300 lb ) , internal fuel capacity was increased by 40 per cent by relocating the undercarriage , which also allowed for two hardpoints to be added on the fuselage underside . Its combat radius was 1 @,@ 300 kilometres ( 810 mi ) when carrying six AAMs and drop tanks . The PS @-@ 05 / A radar is replaced by the new Raven ES @-@ 05 active electronically scanned array ( AESA ) radar , which is based on the Vixen AESA radar family from Selex ES . The Gripen Demo 's maiden flight was conducted on 27 May 2008 . On 21 January 2009 , the Gripen Demo flew at Mach 1 @.@ 2 without reheat to test its supercruise capability . The Gripen Demo served as a basis for the Gripen E / F , also referred to as the Gripen NG ( Next Generation ) and MS ( Material Standard ) 21 .

Saab studied a variant of the Gripen capable of operating from aircraft carriers in the 1990s . In 2009 , it launched the Sea Gripen project in response to India 's request for information on a carrier @-@ borne aircraft . Brazil may also require new carrier aircraft . Following a meeting with Ministry of Defence ( MoD ) officials in May 2011 , Saab agreed to establish a development center in the UK to expand on the Sea Gripen concept . In 2013 , Saab 's Lennart Sindahl stated that development of an optionally manned version of the Gripen E capable of flying unmanned operations was being explored by the firm ; further development of the optionally manned and carrier versions would require the commitment of a customer . On 6 November 2014 , the Brazilian Navy expressed interest in a carrier @-@ based variant of the Gripen .

In 2010 , Sweden awarded Saab a four @-@ year contract to improve the Gripen 's radar and other equipment , integrate new weapons , and lower its operating costs . In June 2010 , Saab stated that Sweden planned to order the Gripen NG , designated JAS 39E / F , and was to enter service in 2017 or earlier dependent on export orders . On 25 August 2012 , following Switzerland 's intention to buy 22 of the E / F variants , Sweden announced it planned to buy 40 ? 60 Gripen E / Fs . The Swedish government approved the decision to purchase 60 Gripen Es on 17 January 2013 .

In July 2013 , assembly began on the first pre @-@ production aircraft . Originally 60 JAS 39Cs were to be retrofitted to the E @-@ models by 2023 , but this has been revised to Gripen Es having new @-@ built airframes and some reused parts from JAS 39Cs . The first production aircraft is to be delivered in 2018 . In March 2014 , Saab revealed the detailed design and indicated it planned to receive military type certification in early 2018 . The first Gripen E was rolled out on 18 May 2016 .

In September 2015 , Saab Aeronautics head Lennard Sindhal announced that an electronic warfare version of the Gripen F two @-@ seater was under development .

= = Design = =

= = = Overview = = =

The Gripen is a multirole fighter aircraft , intended to be a lightweight and agile aerial platform incorporating advanced , highly adaptable avionics . It has canard control surfaces which contributes a positive lift force at all speeds , while the generous lift from the delta wing compensates for the rear stabilizer producing negative lift at high speeds , increasing induced drag . Being intentionally unstable and employing digital fly @-@ by @-@ wire flight controls to maintain stability removes many flight restrictions , improves maneuverability , and reduces drag . The Gripen also has good short takeoff performance , being able to maintain a high sink rate and strengthened to withstand the stresses of short landings . A pair of air brakes are located on the sides of the rear fuselage ; the

canards also angle downward to act as air brakes and decrease landing distance . It is capable of flying at a 70 @-@ 80 degrees angle of attack .

In order to enable the Gripen to have a long service life , projected to be roughly 50 years , the aircraft was designed to have low maintenance requirements ; major systems such as the RM12 engine and PS @-@ 05 / A radar are of a modular type to reduce operating cost and increase reliability . The Gripen was designed to be flexible as it had been anticipated that newly developed sensors , computers , and armaments would need to be integrated as technology advances . The aircraft was estimated to be roughly 67 % sourced from Swedish or European suppliers and 33 % from the United States .

One key aspect of the Gripen program that Saab have been keen to emphasize has been technology @-@ transfer agreements and industrial partnerships with export customers . The Gripen is typically customized to customer requirements , enabling the routine inclusion of local suppliers in the manufacturing and support processes . A number of South African firms provide components and systems ? including the communications suite and electronic warfare systems ? for the Gripens operated by South African Air Force . Operators also have access to the Gripen 's source code and technical documentation , allowing for upgrades and new equipment to be independently integrated . Some export customers intend to domestically assemble the Gripen ; it has been proposed that Brazilian aerospace manufacturer Embraer may produce Gripens for other export customers as well .

= = = Avionics and sensors = = =

All of the Gripen 's avionics are fully integrated using total of five MIL @-@ STD @-@ 1553B digital data buses , described as " sensor fusion " . The total integration of the avionics makes the Gripen a " programmable " aircraft , allowing software updates to be introduced over time to increase performance and allow for additional operational roles and equipment . The Ada programming language was adopted for the Gripen , and is used for the primary flight controls on the final prototypes from 1996 onwards and all subsequent production aircraft . The Gripen 's software is continuously being improved to add new capabilities , as compared to the preceding Viggen which was updated only in an 18 @-@ month schedule .

Much of the data generated from the onboard sensors and by cockpit activity is digitally recorded throughout the length of an entire mission . This information can be replayed in the cockpit or easily extracted for detailed post @-@ mission analysis using a data transfer unit that can also be used to insert mission data to the aircraft . The Gripen , like the Viggen , was designed to operate as one component of a networked national defence system , which allows for automatic exchange of information in real @-@ time between Gripen aircraft and ground facilities . According to Saab , the Gripen features " the world 's most highly developed data link " . The Gripen 's Ternav tactical navigation system combines information from multiple onboard systems such as the air data computer , radar altimeter , and GPS to continuously calculate the Gripen 's location .

The Gripen entered service using the PS @-@ 05 / A pulse @-@ Doppler X band multi @-@ mode radar , developed by Ericsson and GEC @-@ Marconi , which is based on the latter 's advanced Blue Vixen radar for the Sea Harrier that also served as the basis for the Eurofighter 's CAPTOR radar . The all @-@ weather radar is capable of locating and identifying targets 120 km ( 74 mi ) away , and automatically tracking multiple targets in the upper and lower spheres , on the ground and sea or in the air . It can guide several beyond visual range air @-@ to @-@ air missiles to multiple targets simultaneously . Saab stated the PS @-@ 05 / A is able to handle all types of air defense , air @-@ to @-@ surface , and reconnaissance missions , and is developing a Mark 4 upgrade to it . The Mark 4 version has a 150 % increase in high @-@ altitude air @-@ to @-@ air detection ranges , detection and tracking of smaller targets at current ranges , 140 % improvement in air @-@ to @-@ air mode at low altitude , and full integration of modern weapons such as the AIM @-@ 120C @-@ 7 AMRAAM , AIM @-@ 9X Sidewinder , and MBDA Meteor missiles .

The future Gripen E / F will make use of a new active electronically scanned array ( AESA ) radar , Raven ES @-@ 05 , based on the Vixen AESA radar family from Selex ES . Among other

improvements , the new radar is to be capable of scanning over a greatly increased field of view and improved range . In addition , the new Gripen integrates the Skyward @-@ G Infra @-@ red search and track (IRST) sensor , which is capable of passively detecting thermal emissions from air and ground targets in the aircraft 's vicinity . The sensors of the Gripen E are claimed to be able to detect low radar cross @-@ section (RCS) targets at beyond visual range . Targets are tracked by a " best sensor dominates " system , either by onboard sensors or through the Transmitter Auxiliary Unit (TAU) data link function of the radar .

== Cockpit ==

The primary flight controls are compatible with the HOTAS control principle ? the centrally mounted stick , in addition to flying the aircraft , also controls the cockpit displays and weapon systems . A triplex , digital fly @-@ by @-@ wire system is employed on the Gripen 's flight controls , with a mechanical backup for the throttle . Additional functions , such as communications , navigational and decision support data , can be accessed via the up front control panel , directly above the central cockpit display . The Gripen includes the EP @-@ 17 cockpit display system , developed by Saab to provide pilots with a high level of situational awareness and reduces pilot workload through intelligent information management . The Gripen features a sensor fusion capability , information from onboard sensors and databases is combined , automatically analysed , and useful data is presented to the pilot via a wide field @-@ of @-@ view head @-@ up display , three large multi @-@ function colour displays , and optionally a helmet mounted display system (HMDS) .

Of the three multi @-@ function displays (MFD) , the central display is for navigational and mission data , the display to the left of the center shows aircraft status and electronic warfare information , and the display to the right of the center has sensory and fire control information . In two @-@ seat variants , the rear seat 's displays can be operated independently of the pilot 's own display arrangement in the forward seat , Saab has promoted this capability as being useful during electronic warfare and reconnaissance missions , and while carrying out command and control activities . In May 2010 , Sweden began equipping their Gripens with additional onboard computer systems and new displays . The MFDs are interchangeable and designed for redundancy in the event of failure , flight information can be presented on any of the displays .

Saab and BAE developed the Cobra HMDS for use in the Gripen , based on the Striker HMDS used on the Eurofighter . By 2008 , the Cobra HMDS was fully integrated on operational aircraft , and is available as an option for export customers ; it has been retrofitted into older Swedish and South African Gripens . The HMDS provides control and information on target cueing , sensor data , and flight parameters , and is optionally equipped for night time operations and with chemical / biological filtration . All connections between the HMDS and the cockpit were designed for rapid detachment , for safe use of the ejection system .

== Engine ==

All in @-@ service Gripens as of January 2014 are powered by a Volvo RM12 turbofan engine ( now GKN Aerospace Engine Systems ) , a license @-@ manufactured derivative of General Electric F404 , fed by a Y @-@ duct with splitter plates ; changes include increased performance and improved reliability to meet single engine use safety criteria , as well as a greater resistance to bird strike incidents . Several subsystems and components were also redesigned to reduce maintenance demands . By November 2010 , the Gripen had accumulated over 143 @, @ 000 flight hours without a single engine @-@ related failure or incident ; Rune Hyrefeldt , head of Military Program management at Volvo Aero , stated " I think this must be a hard record to beat for a single @-@ engine application " .

The JAS 39E and F variants currently under development are to adopt the F414G powerplant , a variant of the General Electric F414 . The F414G can produce 20 % greater thrust than the current RM12 engine , enabling the Gripen to supercruise ( maintain speed beyond the sound barrier without the use of afterburners ) at a speed of Mach 1 @. @ 1 while carrying an air @-@ to @-@ air

combat payload . In 2010 , Volvo Aero stated it was capable of further developing its RM12 engine to better match the performance of the F414G , and claimed that developing the RM12 would be a less expensive option . Prior to Saab 's selection of the F414G , the Eurojet EJ200 had also been under consideration for the Gripen ; proposed implementations included the use of thrust vectoring .

= = = Equipment and armaments = = =

The Gripen is compatible with a number of different armaments , beyond the aircraft 's single 27 mm Mauser BK @-@ 27 cannon ( omitted on the two @-@ seat variants ) , including air @-@ to @-@ air missiles such as the AIM @-@ 9 Sidewinder , air @-@ to @-@ ground missiles such as the AGM @-@ 65 Maverick , and anti @-@ ship missiles such as the RBS @-@ 15 . In 2010 , the Swedish Air Force 's Gripen fleet completed the MS19 upgrade process , enabling compatibility with a range of weapons , including the long @-@ range MBDA Meteor missile , the short @-@ range IRIS @-@ T missile and the GBU @-@ 49 laser @-@ guided bomb . Speaking on the Gripen 's selection of armaments , Saab 's campaign director for India Edvard de la Motte stated that : " If you buy Gripen , select where you want your weapons from . Israel , Sweden , Europe , US ? South America . It 's up to the customer " .

In flight , the Gripen is typically capable of carrying up to 14 @,@ 330 lb ( 6 @.@ 50 t ) of assorted armaments and equipment . Equipment includes external sensor pods for reconnaissance and target designation , such as Rafael 's LITENING targeting pod , Saab 's Modular Reconnaissance Pod System , or Thales ' Digital Joint Reconnaissance Pod . The Gripen has an advanced and integrated electronic warfare suite , capable of operating in an undetectable passive mode or to actively jam hostile radar ; a missile approach warning system passively detects and tracks incoming missiles . In November 2013 , it was announced that Saab will be the first to offer the BriteCloud expendable Active jammer developed by Selex ES . In June 2014 , the Enhanced Survivability Technology Modular Self Protection Pod , a defensive missile countermeasure pod , performed its first flight on the Gripen .

Saab describes the Gripen as a " swing @-@ role aircraft " , stating that it is capable of " instantly switching between roles at the push of a button " . The human / machine interface changes when switching between roles , being optimized by the computer in response to new situations and threats . The Gripen is also equipped to use a number of different communications standards and systems , including SATURN secure radio , Link @-@ 16 , ROVER , and satellite uplinks . Equipment for performing long range missions , such as an aerial refueling probe and onboard oxygen generation system ( OBOGS ) , was integrated upon the Gripen C / D.

= = = Usability and maintenance = = =

During the Cold War , the Swedish Armed Forces were to be ready to defend against a possible invasion . This scenario required combat aircraft to be dispersed in order to maintain an air defence capacity . Thus , a key design goal during the Gripen 's development was the ability to take off from snow @-@ covered landing strips of only 800 metres ( 2 @,@ 600 ft ) ; furthermore , a short @-@ turnaround time of just ten minutes , during which a team composed of a technician and five conscripts would be able to re @-@ arm , refuel , and perform basic inspections and servicing inside that time window before returning to flight .

During the design process , great priority was placed on facilitating and minimising aircraft maintenance ; in addition to a maintenance @-@ friendly layout , many subsystems and components require little or no maintenance at all . Aircraft are fitted with a Health and Usage Monitoring Systems ( HUMS ) that monitors the performance of various systems , and provides information to technicians to assist in servicing it . Saab operates a continuous improvement programme ; information from the HUMS and other systems can be submitted for analysis . According to Saab , the Gripen provides " 50 % lower operating costs than its best competitor " .

A 2012 Jane 's Aerospace and Defense Consulting study compared the operational costs of a number of modern combat aircraft , concluding that Gripen had the lowest cost per flight hour (

CPFH ) when fuel used , pre @-@ flight preparation and repair , and scheduled airfield @-@ level maintenance together with associated personnel costs were combined . The Gripen had an estimated CPFH of \$ 4 @,@ 700 whereas the next lowest , the F @-@ 16 Block 40 / 50 , had a 49 % higher CPFH at \$ 7 @,@ 000 .

= = Operational history = =

= = = Sweden = = =

The Swedish Air Force placed a total order for 204 Gripens in three batches . The first delivery occurred on 8 June 1993 , when 39102 was handed over to the Flygvapnet during a ceremony at Linköping ; the last was handed over on 13 December 1996 . The air force received its first Batch II example on 19 December 1996 . Instead of the fixed @-@ price agreement of Batch I , Batch II aircraft were paid as a " target price " concept : any cost under / overruns would be split between FMV and Saab .

The JAS 39 entered service with the F 7 Wing ( F 7 Skaraborgs Flygflottilj ) on 1 November 1997 . The final Batch three aircraft was delivered to FMV on 26 November 2008 . This was accomplished at 10 % less than the agreed @-@ upon price for the batch , putting the JAS 39C flyaway cost at under US \$ 30 million . This batch of Gripens was equipped for in @-@ flight refuelling from specially equipped TP84s . In 2007 , a programme was started to upgrade 31 of the air force 's JAS 39A / B fighters to JAS 39C / Ds . The SwAF had a combined 134 JAS 39s in service in January 2013 . In March 2015 , the Swedish Air Force received its final JAS 39C .

On 29 March 2011 , the Swedish parliament approved the Swedish Air Force for a 3 @-@ month deployment to support the UN @-@ mandated no @-@ fly zone over Libya . Deployment of eight Gripens , ten pilots , and other personnel began on 2 April . On 8 June 2011 , the Swedish government announced an agreement to extend the deployment for five of the Gripens . By October 2011 , Gripens had flown more than 650 combat missions , almost 2 @,@ 000 flight hours , and delivered approximately 2 @,@ 000 reconnaissance reports to NATO . Journalist Tim Hetherington suggested that the Libyan operations may stimulate sales of the Gripen and other aircraft .

In November 2012 , Lieutenant Colonel Lars Helmrich of the Swedish Air Force testified to the Riksdag regarding the Gripen E. He stated that the current version of the Gripen would be outdated in air @-@ to @-@ air combat by 2020 . With 60 Gripens having been judged to be the minimum required to defend Swedish Airspace , the Swedish Air Force wants to have 60 ? 80 Gripens upgraded to the E / F standard by 2020 .

On 25 August 2012 , the Swedish government announced that 40 ? 60 JAS 39E / F Gripens were expected to be procured and in service by 2023 . On 11 December 2012 , the Riksdag approved the purchase of 40 to 60 JAS 39E / Fs with an option to cancel if at least 20 aircraft are not ordered by other customers. on 17 January 2013 , the government approved the deal for 60 JAS 39Es to be delivered between 2018 and 2027 . On 3 March 2014 , the Swedish defence minister stated that another 10 JAS 39Es might be ordered , this was later confirmed by the government . 60 JAS 39E are to be delivered from 2018 to 2026 .

= = = Czech Republic = = =

When the Czech Republic became a NATO member in 1999 , the need to replace their existing Soviet @-@ built MiG @-@ 21 fleet with aircraft compatible with NATO interoperability standards became apparent . In 2000 , the Czech Republic began evaluating a number of aircraft , including the F @-@ 16 , F / A @-@ 18 , Mirage 2000 , Eurofighter Typhoon and the Gripen . One major procurement condition was the industrial offset agreement , set at 150 % of the expected purchase value . In December 2001 , having reportedly been swayed by Gripen International 's generous financing and offset programme , the Czech Government announced that the Gripen had been selected . In 2002 , the deal was delayed until after parliamentary elections had taken place ;



alternative means of air defense were also studied , including leasing the aircraft .

On 14 June 2004 , it was announced that the Czech Republic was to lease 14 Gripen aircraft , modified to comply with NATO standards . The agreement also included the training of Czech pilots and technicians in Sweden . The first six were delivered on 18 April 2005 . The lease was for an agreed period of 10 years at a cost of ? 780 million ; the 14 ex @-@ Swedish Air Force aircraft included 12 single @-@ seaters and two JAS 39D two @-@ seat trainers . In September 2013 , the Defence and Security Export Agency announced that a follow @-@ up agreement with the Czech Republic had been completed to extend the lease by 14 years , until 2029 ; the leased aircraft shall also undergo an extensive modernisation process , including the adoption of new datalinks . The lease also has an option of eventually acquiring the fighters outright . In 2014 the lease was extended to 2027 and the Saab service contract was extended to 2026 .

As of November 2014 , the Czech Government considers leasing further six Gripens due to Russia 's deteriorating relationship with the West . More recently , it decided to upgrade its fleet to the MS20 configuration .

= = = Hungary = = =

Following Hungary 's membership of NATO in 1999 , there were several proposals to achieve a NATO @-@ compatible fighter force . Considerable attention went into studying second @-@ hand aircraft options as well as modifying the nation 's existing MiG @-@ 29 fleet . In 2001 , Hungary received several offers of new and used aircraft from various nations , including Sweden , Belgium , Israel , Turkey , and the United States . Although the Hungarian government initially intended to procure the F @-@ 16 , in November 2001 it was in the process of negotiating a 10 @-@ year lease contract for 12 Gripen aircraft , with an option to purchase the aircraft at the end of the lease period .

As part of the procurement arrangements , Saab had offered an offset deal valued at 110 per cent of the cost of the 14 fighters . Initially , Hungary had planned to lease several Batch II aircraft ; however , the inability to conduct aerial refuelling and weapons compatibility limitations had generated Hungarian misgivings . The contract was renegotiated and was signed on 2 February 2003 for a total of 14 Gripens , which had originally been A / B standard and had undergone an extensive upgrade process to the NATO @-@ compatible C / D ' Export Gripen ' standard . The last aircraft deliveries took place in December 2007 .

While the Hungarian Air Force operates a total of 14 Gripen aircraft under lease , in 2011 , the country reportedly intended to purchase these aircraft outright . However , in January 2012 , the Hungarian and Swedish governments agreed to extend the lease period for a further ten years ; according to Hungarian Defence Minister Csaba Hende , the agreement represented considerable cost savings .

Two Gripens were lost in crashes in May and June 2015 , leaving 12 Gripens in operation . Hungary will be back to 14 Gripen with the signing of a replacement contract .

= = = South Africa = = =

In 1999 , South Africa signed a contract with BAe / Saab for the procurement of 26 Gripens ( C / D standard ) with minor modifications to meet their requirements . Deliveries to the South African Air Force commenced in April 2008 . By April 2011 , 18 aircraft ( nine two @-@ seater aircraft and nine single @-@ seaters ) had been delivered . While the establishment of a Gripen Fighter Weapon School at Overberg Air Force Base in South Africa had been under consideration , in July 2013 Saab ruled out the option due to a lack of local support for the initiative ; Thailand is an alternative location being considered , as well as the ?áslav Czech air base .

Between April 2013 and December 2013 , South African contractors held prime responsibility for maintenance work on the Gripen fleet as support contracts with Saab had expired ; this arrangement led to fears that extended operations may not be possible due to a lack of proper maintenance . In December 2013 , Armscor awarded Saab a long @-@ term support contract for

the company to perform engineering , maintenance , and support services on all 26 Gripens through 2016 . On 13 March 2013 , South African Defense Minister Nosiviwe Mapisa @-@ Nqakula stated that " almost half of the SAAF Gripens " have been stored because of an insufficient budget to keep them flying . In September 2013 , the SAAF decided not to place a number of its Gripens in long @-@ term storage ; instead all 26 aircraft would be rotated between flying cycles and short @-@ term storage . Speaking in September 2013 , Brigadier @-@ General John Bayne testified that the Gripen met the SAAF 's minimum requirements , as the country faced no military threats .

= = = Thailand = = =

In 2007 , Thailand 's Parliament authorized the Royal Thai Air Force to spend up to 34 billion baht ( US \$ 1 @. 1 billion ) as part of an effort to replace Thailand 's existing Northrop F @-@ 5 fleet . In February 2008 , the Thai Air Force ordered six Gripens ( two single @-@ seat C @-@ models and four two @-@ seat D @-@ models ) from Saab ; deliveries began in 2011 . Thailand ordered six more Gripen Cs in November 2010 ; deliveries began in 2013 . Thailand may eventually order as many as 40 Gripens . In 2010 , Thailand selected the Surat Thani Airbase as the main operating base for its Gripens . The first of the six aircraft were delivered on 22 February 2011 .

Saab delivered three Gripens in April 2013 , and three more in September 2013 . In September 2013 , Air Force Marshal Prajin Jantong stated that Thailand is interested in purchasing six aircraft more in the near future , pending government approval . Thai Supreme Commander General Thanasak Patimapragorn has stated that the air force intends for the Gripen 's information systems to be integrated with Army and Navy systems ; the armed forces will officially inaugurate the Gripen Integrated Air Defence System during 2014 .

= = = United Kingdom = = =

The Empire Test Pilots ' School ( ETPS ) in the United Kingdom has used the Gripen for advanced fast jet training of test pilots since 1999 . It operates a D aircraft .

= = = Potential and future operators = = =

= = = = Botswana = = = =

Botswana has shown interest in the Gripen leading to Saab opening an office in Botswana in 2014 . The country is interested in purchasing eight surplus C and D model Gripens , with the order possibly being extended to 16 . The Gripens would replace the fourteen ex @-@ Canadian Air Force CF @-@ 5 fighters the Botswana Defence Force Air Wing ( BDF ) has been using since 1996 , that are up to 40 years old .

BDF Air Wing top officials believe acquisition of the fighter jet is a done deal . Whether eight or twelve or sixteen , the BDF is looking to replace its fighter jet fleet .

= = = = Brazil = = = =

In October 2008 , Brazil selected three finalists for its F @-@ X2 fighter programme : the Dassault Rafale B / C , the Boeing F / A @-@ 18E / F Super Hornet , and the JAS 39E / F Gripen NG . The Brazilian Air Force initially planned to procure at least 36 and possibly up to 120 later , to replace its Northrop F ? 5EM and Dassault Mirage 2000C aircraft . In February 2009 , Saab submitted a tender for 36 Gripen NGs . On 5 January 2010 , reports claimed that the Brazilian Air Force 's final evaluation report placed the Gripen ahead of other contenders ; the decisive factor was reportedly lower unit cost and operational costs . Amid delays due to financial constraints , there were reports in 2010 of the Rafale 's selection , and in 2011 of the F / A @-@ 18 's selection . On 18 December 2013 , President Dilma Rousseff announced the Gripen NG 's selection .

Key decision factors were the domestic manufacturing opportunities , participation in developing the Gripen , and potential exports to Africa , Asia and Latin America ; Argentina and Ecuador are interested in procuring Gripens from or through Brazil , and Mexico is considered an export target . Another factor was the distrust of the US due to the NSA surveillance scandal . The Gripen is not immune to foreign pressure , the UK may use their 30 % component percentage in the Gripen to veto a sale to Argentina due to the Falkland Islands dispute ; thus Argentina is considering Russian or Chinese aircraft instead . Until Gripen E deliveries begin , Brazil intends to lease several Gripen C aircraft .

On 24 October 2014 , Brazil and Sweden signed a 39 @. @ 3 billion SEK ( US \$ 5 @. @ 44 bn , R \$ 13 bn ) contract for 28 Gripen E and 8 Gripen F aircraft to be delivered from 2019 to 2024 and maintained until 2050 ; the Swedish government will provide a subsidized 25 @- @ year , 2 @. @ 19 % interest rate loan for the purchase . At least 15 aircraft are to be assembled in Brazil , and Brazilian companies are to be involved in the full production run ; Gripen Fs are to be delivered later . An almost \$ 1 billion price increase since selection is due to developments requested by Brazil , such as the " wide area display " ( WAD ) , a panoramic 19 by 8 inches touchscreen display . The compensation package is set at US \$ 9 billion , or 1 @. @ 7 times the order value . Two Brazilian pilots were trained in Sweden between November 2014 and April 2015 . The Brazilian Air Force has a requirement for 108 Gripens , to be delivered in three batches . The Brazilian Navy is interested in the Sea Gripen to replace its Douglas A @- @ 4KU Skyhawk carrier @- @ based fighters . Brazil and Sweden finalized the deal for the F @- @ 39 development in 2015 .

== == Colombia == ==

Saab has offered Gripen C / D or E to Colombia , with possible deliveries during 2018 ? 21 , depending on variant selected .

== == Croatia == ==

A Gripen deal including 12 aircraft ( 10 single @- @ seat C @- @ models , and 2 two @- @ seat D @- @ models ) valued at 700 million euro ( US \$ 1 @. @ 1 billion ) was first offered to Croatia in 2007 . However , this procurement stalled due to the 2008 financial crisis , in which the Croatian government had to reprioritise government spending programmes .

On 24 October 2015 , Sweden announced its bid of the JAS 39 Gripen C / D for Croatia 's fighter replacement requirement , following a request for information from the Croatian Ministry of Defence in June for between 8 and 12 newly built aircraft in order to replace the Croatian fleet of ageing MiG @- @ 21bis aircraft . According to the Ministry of Defence 's Long @- @ Term Development Plan ( LTDP ) , however , the MiG @- @ 21 is to remain in service until 2024 as a result of ongoing modernisation programmes . The LTDP will run from 2015 to 2024 and is scheduled to have funding available for a replacement aircraft in 2019 . Second @- @ hand F @- @ 16s from another country may also be considered .

== == Finland == ==

In June 2015 , a working group set up by the Finnish MoD proposed starting the HX program to replace the Finnish Air Force 's current fleet of F / A @- @ 18 Hornets . The group recognises five potential types : Boeing F / A @- @ 18E / F Super Hornet , Dassault Rafale , Eurofighter Typhoon , Lockheed Martin F @- @ 35 , and Saab JAS Gripen .

In December 2015 the Finnish MoD sent a letter to Great Britain , France , Sweden and the United States informing them that the fighter project had been launched in the Defence Forces . The goal of the project is to replace the Hornet fleet , which will be decommissioned as of 2025 , with multi @- @ role fighters . The project has been named the HX Fighter Program . The JAS @- @ 39 is mentioned in the letter as a potential fighter for the program . The request for information concerning the HX Fighter Program was sent in April 2016 . A call for tender will be sent in spring 2018 and the buying

decision is scheduled to take place in 2021 .

===== Poland =====

The Gripen C / D was a contender for 48 multirole fighters for the Polish Air Force started in 2001 . On 27 December 2002 , the Polish Defence Minister announced the F @-@ 16C / D Block 50 / 52 + ' s selection . According to Stephen Larrabee , the selection was heavily influenced by Lockheed Martin ' s lucrative offset agreement ( totaling \$ 3 @.@ 5 billion and 170 % offset against Gripen International ' s ? 3 @.@ 2 billion with 146 % offset ) and by a political emphasis on Poland ' s strategic relationship with the US and NATO . Both Gripen International and Dassault Aviation ( who offered the Mirage 2000 @-@ 5 Mk 2 ) described the decision as political . According to a former Polish military defence vice @-@ minister , the JAS 39 offer was better and included research participation proposals .

Poland plans to purchase 64 multirole combat aircraft from 2021 to replace the Polish Air Force ' s fleet of Sukhoi Su @-@ 22M4 ' Fitter @-@ K ' ground attack aircraft and Mikoyan MiG @-@ 29 fighters . The open tender procedure could include the F @-@ 35 Lightning II , the JAS 39 Gripen E / F , the Eurofighter Typhoon , the Dassault Rafale , and Boeing ' s F / A @-@ 18E / F Advanced Super Hornet .

===== Slovakia =====

On 30 August 2014 , the Czech Republic , Slovakia and Sweden signed a letter of intent agreeing to co @-@ operate on using the Gripen , which may lead to acquisition of the aircraft by the Slovak Air Force . The letter of intent laid the foundation for bilateral co @-@ operation around a common airspace surveillance of Slovakia and the Czech Republic . Slovakia is looking to replace its MiG @-@ 29 fighters and the Gripen has been reported as the aircraft of choice , although the requirement will go to open competition . They may seek to lease fighters rather than buy , as did neighbouring Hungary and the Czech Republic .

===== Switzerland =====

In January 2008 , the Swiss Defence Material Administration invited Gripen International to submit bids to replace the nation ' s ageing F @-@ 5 fleet . Saab responded with an initial proposal on 2 July 2008 ; other contenders were the Dassault Rafale and Eurofighter Typhoon . On 30 November 2011 , the Swiss government announced its decision to buy 22 Gripen NG aircraft for 3 @.@ 1 billion Swiss francs . In 2012 , a confidential report of the Swiss Air Force ' s 2009 tests of the three contenders was leaked , which had rated the Gripen as performing substantially below both the Rafale and the Eurofighter . The Gripen was assessed as satisfactory for reconnaissance but unsatisfactory for combat air patrol and strike missions . The JAS 39C / D was evaluated , while the Gripen NG had been bid . The parliamentary security commission found that the Gripen offered the most risks , but voted to go ahead as it was the cheapest option . The Gripen was considered satisfactory in all roles .

On 25 August 2012 , the plan to order was confirmed by both Swedish and Swiss authorities . Deliveries were expected to run from 2018 to 2021 at a fixed price of CHF 3 @.@ 126 billion ( \$ 3 @.@ 27 billion ) including development costs , mission planning systems , initial spares and support , training , and certification ; the Swedish government also guaranteed the price , performance and operational suitability . 8 JAS 39Cs and 3 JAS 39Ds were to be leased from 2016 to 2020 to train Swiss pilots and allow the F @-@ 5s to be retired . In 2013 , Saab moved to increase Swiss industry offsets above 100 % of the deal value after the Swiss parliament ' s upper house voted down the deal ' s financing . On 27 August 2013 , the National Council ' s Security Commission approved the purchase , followed by the lower and upper houses of the parliament ' s approval in September 2013 . Elements of the left and center of the political spectrum often criticized the Gripen as unnecessary and too expensive . On 18 May 2014 , 53 @.@ 4 % of Swiss voters voted against the plan in a

national referendum . According to the press , objectors questioned the role of manned fighter aircraft in general , and the relevance of alternatives such as UAVs , surface @-@ to @-@ air missiles , or cyberwarfare capabilities .

In April 2015 , Switzerland is set to relaunch the F @-@ 5E / F replacement programme ; the Gripen is again the favourite .

===== Others =====

Other nations that have expressed interest in Gripen include Argentina ( E / F versions from Brazil , subject to UK veto ) , Austria ( C / D or E / F versions ) , Belgium ( E / F ) , Bulgaria ( C / D ) , Canada , Colombia ( C / D , or E / F from Brazil ) , Croatia ( possibly newly built C / D ) , Ecuador ( C / D , or E / F from Brazil ) , Estonia , Finland ( E / F ) India ( Sea Gripen and E / F ) , Indonesia ( C / D ) , Kenya ( C / D ) , Latvia , Lithuania , Malaysia ( C / D ) , Mexico ( C / D , or E / F from Brazil ) , Namibia ( C / D ) , Peru ( C / D , or E / F from Brazil ) , the Philippines ( C / D ) , Portugal ( C / D ) , Serbia , Slovakia ( C / D ) , Slovenia , Uruguay ( C / D , or E / F from Brazil ) and Vietnam .

Saab 's head of exports Eddy de La Motte has stated that the Gripen 's chances have improved as nations waver in their commitments to the F @-@ 35 . Richard Aboulafia of the Teal Group ( an aerospace & defense analysis enterprise ) has attributed difficulty securing export sales to the Swedish government 's inability to offer the same sort of strategic partnership as some rival aircraft manufacturing nations . In September 2013 , Saab 's CEO Håkan Buskhe said he envisioned Gripen sales to reach 400 or 450 aircraft .

===== Failed bids =====

===== Denmark =====

In 2007 , Denmark signed a Memorandum of Understanding between the Defence Ministers of Sweden and Denmark to evaluate the Gripen as a replacement for Denmark 's fleet of 48 F @-@ 16s . Denmark also requested the development of Gripen variants featuring more powerful engines , larger payloads , longer range , and additional avionics ; this request contributed to Saab 's decision to proceed with the JAS E / F 's development . Denmark repeatedly delayed the purchase decision ; in 2013 , Saab indicated that the Gripen was one of four contenders for the Danish purchase , alongside Boeing 's Super Hornet , Lockheed Martin 's F @-@ 35 Joint Strike Fighter , and the Eurofighter . Denmark is a level @-@ 3 partner in the JSF programme , and has already invested US \$ 200 million . The final selection will be in mid @-@ 2015 where 24 to 30 fighters are expected . The Swedish government announced on 21 July 2014 the Gripen 's withdrawal from the Danish competition , having chosen not to respond to the invitation to tender .

===== Finland =====

Gripen first export bid was to Finland , where it competed against F @-@ 16 , F / A @-@ 18 , MiG @-@ 29 and Mirage 2000 to replace Finnish Air Force 's J 35 Draken and MiG @-@ 21 fleet . In May 1992 , McDonnell Douglas F / A @-@ 18 was announced as a winner on performance and cost grounds . The Finnish Minister of Defence , Elisabeth Rehn stated that delays in Gripen 's development schedule had hurt its chances in the competition .

===== India =====

The Gripen was a contender for the Indian MRCA competition for 126 multirole combat aircraft . In April 2008 , Gripen International offered the Next Generation Gripen for India 's tender and opened an office in New Delhi in order to support its efforts in the Indian market . On 4 February 2009 , Saab announced that it had partnered with India 's Tata Group to develop the new Gripen variant to

fit India 's needs .

The Indian Air Force ( IAF ) conducted extensive field trials and evaluated Gripen 's flight performance , logistics capability , weapons systems , advanced sensors and weapons firing . In April 2011 , the IAF rejected Gripen 's bid in favour of the Eurofighter Typhoon and the Dassault Rafale . Senior Indian Air Force officials , while happy with the improved capabilities of Gripen NG , identified its high reliance on US @-@ supplied hardware , including electronics , weaponry and the GE F414 engine , as a factor that may hamper its ability to be exported .

In 2015 after the Rafale order was cut back to just 36 aircraft , Saab indicated a willingness to set up joint production of the Gripen in India .

== == Netherlands == ==

In July 2008 , the Netherlands announced it would evaluate Gripen NG together with four other competitors ; in response , Saab offered 85 aircraft to the Royal Netherlands Air Force in August 2008 . On 18 December 2008 , it was reported that the Netherlands had evaluated the F @-@ 35 as having a better performance @-@ price relation than the Gripen NG . On 13 January 2009 , NRC Handelsblad claimed that , according to Swedish sources , Saab had offered to deliver 85 Gripens for ? 4 @. @ 8 billion to the Dutch Air Force , about 1 billion euro cheaper than budgeted for the F @-@ 35 .

== == Norway == ==

On 18 January 2008 , the Norwegian Ministry of Defence issued a Request for Binding Information ( RBI ) to the Swedish Defence Material Administration , who issued an offer for 48 Gripens in April 2008 . On 20 November 2008 , the selection of the F @-@ 35 Lightning II for the Royal Norwegian Air Force was announced , stating that the F @-@ 35 is the only candidate to meet all operational requirements ; media reports claimed the requirements were tilted in the F @-@ 35 's favour . Saab and Sweden 's defence minister Sten Tolgfors stated that Norway 's cost calculations were flawed ; the offer being for 48 Gripens over 20 years , but Norway had extrapolated it to operating 57 aircraft over 30 years , thus doubling the cost ; cost projections also failed to relate to the Gripen 's operational costs . Norway also calculated greater attrition losses than what Sweden considered reasonable . According to Tolgfors , Norway 's decision complicated further export deals .

In December 2010 leaked United States diplomatic cables revealed that the United States deliberately delayed Sweden 's request for access to a US AESA radar until after Norway 's selection . The cables also indicated that Norwegian consideration of the Gripen " was just a show " and that Norway had decided to purchase the F @-@ 35 due to " high @-@ level political pressure " from the US .

== == Others == ==

The Gripen was one of the candidates to replace the Austrian Air Force 's ageing Saab 35 Drakens ; the Eurofighter Typhoon was selected in 2003 . Oman ended up with the Eurofighter Typhoon . Romania went with the F @-@ 16 instead .

== Variants ==

JAS 39A : initial version that entered service with the Swedish Air Force in 1996 . A number have been upgraded to the C standard .

JAS 39B : two @-@ seat version of the 39A for training , specialised missions and type conversion . To fit the second crew member and life support systems , the internal cannon and an internal fuel tank were removed and the airframe lengthened 0 @. @ 66 m ( 2 ft 2 in ) .

JAS 39C : NATO @-@ compatible version of Gripen with extended capabilities in terms of armament , electronics , etc . Can be refuelled in flight .

JAS 39D : two @-@ seat version of the 39C , with similar alterations as the 39B .

Gripen NG : improved version following on from the Gripen Demo technology demonstrator . Changes from the JAS 39C / D include the more powerful F414G engine , Raven ES @-@ 05 AESA radar , increased fuel capacity and payload , two additional hardpoints , and other improvements . These improvements have reportedly increased the Gripen NG costs to an estimated 24 @,@ 000 Swiss Francs ( US \$ 27 @,@ 000 ) per hour , and increased the flyaway cost to 100 million Swiss Francs ( US \$ 113M ) .

JAS 39E : single @-@ seat production version developed from the Gripen NG program . Sweden and Brazil have ordered the variant . First flight of prototype expected in 2016 .

JAS 39F : two @-@ seat version of the E variant . Eight ordered by Brazil , to be developed and assembled there ; planned for pilot training and combat , being optimised for back seat air battle management , with jamming , information warfare and network attack , besides weapon system officer and electronic warfare roles .

= = = Proposals = = =

Sea Gripen : proposed carrier @-@ based version based on the Gripen NG . As of 2011 , its development was underway . As of 2013 , Brazil and India were interested .

Gripen UCAV : proposed unmanned combat aerial vehicle ( UCAV ) variant of the Gripen E.

Gripen EW : proposed electronic war ( EW ) ? Growler ? variant of the Gripen F.

= = Operators = =

There were 186 Gripens in service with military users as of January 2013 .

Brazil

The Brazilian Air Force ordered 28 Gripen E and 8 Gripen F aircraft .

Czech Republic

The Czech Air Force has 14 Gripens on lease , they serve at the " 211 @.@ taktická letka " ( 211th Tactical Squadron ) ; these include 12 single @-@ seat C models and two two @-@ seat D models , in operation as of January 2013 .

Hungary

The Hungarian Air Force operates 12 Gripens ( 11 C @-@ models and one D @-@ model ) on a lease @-@ and @-@ buy arrangement as of January 2016 .

South Africa

The South African Air Force ( SAAF ) ordered 26 aircraft ; 17 single @-@ seat C @-@ models and nine two @-@ seater D @-@ models . The first delivery , a two @-@ seater , took place on 30 April 2008.No. 2 Squadron

Sweden

The Swedish Air Force originally ordered 204 aircraft , including 28 two @-@ seaters . Sweden leases 28 of the aircraft , to the Czech and Hungarian Air Forces . The SwAF has 134 JAS 39s , including 50 JAS 39As , 13 JAS 39Bs , 60 JAS 39Cs and 11 JAS 39D Gripens in inventory in January 2013 , with approximately 100 JAS 39C / D Gripens in operational use ( including 31 A models refitted to the C level ) .F 7 Såtenäs

F 17 Kallinge

F 21 Luleå

Thailand

The Royal Thai Air Force ordered 12 JAS 39 Gripens ( eight single @-@ seat JAS 39C and four JAS 39D two @-@ seaters ) . It had six JAS 39s , including four JAS 39Cs , and two JAS 39Ds in use As of January 2013 . Nine were delivered in April 2013 , and another three in September 2013 . On 18 October 2013 , the Thai government announced its intention to purchase another six Gripens.701 Fighter Squadron

United Kingdom

The Empire Test Pilots ' School operates Gripens for training . ETPS instructor pilots and students

undergo simulator training with the Swedish Air Force , and go on to fly the two @-@ seater Gripen at Saab in Linköping , in two training campaigns per year ( Spring and Autumn ) . The agreement was renewed in 2008 .

= = Aircraft on display = =

Second prototype JAS 39 @-@ 2 is on display at the Swedish Air Force Museum , Linköping .  
Single seat JAS 39 serial 39113 is displayed at the F 7 Såtenäs wing .

The Swedish government has donated one Swedish Air Force JAS 39A to Thailand for display at the Royal Thai Air Force Museum in Don Mueang , Bangkok .

= = Accidents and incidents = =

As of July 2011 , the Gripen has been involved in eight incidents , including five hull @-@ loss accidents , with no loss of life .

The first two crashes , in 1989 and 1993 respectively , occurred during public displays of the Gripen and resulted in considerable negative media reports . The first crash was filmed by a Sveriges Television news crew and led to calls from previous critics of the project to cancel development altogether . The second crash occurred in an empty area on the island of Långholmen during the 1993 Stockholm Water Festival with tens of thousands of spectators present . The decision to display the Gripen over large crowds was publicly criticised , and was compared to the 1989 crash . Both the 1989 and 1993 crashes were related to flight control software issues .

= = Specifications ( JAS 39C / D Gripen ) = =

Data from Spick 2000 , p . 431 ; Williams 2003 , p . 90 ; Saab , Czech Air Force .

General characteristics

Crew : 1 ( 2 for JAS 39D )

Payload : 5 @, @ 300 kg ( 11 @, @ 700 lb )

Length : 14 @. @ 1 m ( 46 ft 3 in ) ; two @-@ seater : 14 @. @ 8 m ( 48 ft 5 in )

Wingspan : 8 @. @ 4 m ( 27 ft 7 in )

Height : 4 @. @ 5 m ( 14 ft 9 in )

Wing area : 30 @. @ 0 m <sup>2</sup> ( 323 ft <sup>2</sup> )

Empty weight : 6 @, @ 800 kg ( 14 @, @ 990 lb )

Loaded weight : 8 @, @ 500 kg ( 18 @, @ 700 lb )

Max. takeoff weight : 14 @, @ 000 kg ( 31 @, @ 000 lb )

Powerplant : 1 × Volvo RM12 afterburning turbofan

Dry thrust : 54 kN ( 12 @, @ 100 lbf )

Thrust with afterburner : 80 @. @ 5 kN ( 18 @, @ 100 lbf )

Wheel track : 2 @. @ 4 m ( 7 ft 10 in )

Performance

Maximum speed : Mach 2 ( 2 @, @ 204 km / h ( 1 @, @ 190 kn ; 1 @, @ 370 mph ) ) at high altitude

Combat radius : 800 km ( 497 mi , 432 nmi )

Ferry range : 3 @, @ 200 km ( 1 @, @ 983 mi ) with drop tanks

Service ceiling : 15 @, @ 240 m ( 50 @, @ 000 ft )

Wing loading : 283 kg / m <sup>2</sup> ( 58 lb / ft <sup>2</sup> )

Thrust / weight : 0 @. @ 97

Maximum g @-@ load : + 9 g

Armament

Guns : 1 × 27 mm Mauser BK @-@ 27 Revolver cannon with 120 rounds ( single @-@ seat models only )

Hardpoints : 8 ( three on each wing and two under fuselage ) and provisions to carry combinations



of :

Rockets : 4 x rocket pods , 13 @. @ 5 cm rockets

Missiles : 6 x AIM @-@ 9 Sidewinder ( Rb.74 ) or IRIS @-@ T ( Rb 98 ) or A @-@ Darter

4 x AIM @-@ 120 AMRAAM ( Rb.99 ) or MICA

4 x Meteor

4 x AGM @-@ 65 Maverick ( Rb.75 )

2 x KEPD.350

2 x Rbs.15F anti @-@ ship missile

Bombs : 4 x GBU @-@ 12 Paveway II laser @-@ guided bomb

2 x Bk.90 cluster bomb

8 x Mark 82 bombs