

= SEPECAT Jaguar =

The SEPECAT Jaguar is an Anglo @-@ French jet attack aircraft , originally used by the British Royal Air Force and the French Air Force in the close air support and nuclear strike role , and still in service with the Indian Air Force .

Originally conceived in the 1960s as a jet trainer with a light ground attack capability , the requirement for the aircraft soon changed to include supersonic performance , reconnaissance and tactical nuclear strike roles . A carrier @-@ based variant was also planned for French service , but this was cancelled in favour of the cheaper Dassault Super Étendard . The airframes were manufactured by SEPECAT ( Société Européenne de Production de l 'avion Ecole de Combat et d 'Appui Tactique ) , a joint venture between Breguet and the British Aircraft Corporation , one of the first major joint @-@ Anglo @-@ French military aircraft programs .

The Jaguar was exported to India , Oman , Ecuador and Nigeria . With various air forces , the Jaguar was used in numerous conflicts and military operations in Mauritania , Chad , Iraq , Bosnia , and Pakistan , as well as providing a ready nuclear delivery platform for Britain , France , and India throughout the latter half of the Cold War and beyond . In the Gulf War , the Jaguar was praised for its reliability and was a valuable coalition resource . The aircraft served with the French Air Force as the main strike / attack aircraft until 1 July 2005 , and with the Royal Air Force until the end of April 2007 . It was replaced by the Panavia Tornado and the Eurofighter Typhoon in the RAF and the Dassault Rafale in the French Air Force .

= = Development = =

= = Background = = =

The Jaguar programme began in the early 1960s , in response to a British requirement ( Air Staff Target 362 ) for an advanced supersonic jet trainer to replace the Folland Gnat T1 and Hawker Hunter T7 , and a French requirement ( ECAT or École de Combat et d 'Appui Tactique , " Tactical Combat Support Trainer " ) for a cheap , subsonic dual role trainer and light attack aircraft to replace the Fouga Magister , Lockheed T @-@ 33 and Dassault Mystère IV . In both countries several companies tendered designs : BAC , Hunting , Hawker Siddeley and Folland in Britain ; Breguet , Potez , Sud @-@ Aviation , Nord , and Dassault from France . A Memorandum of Understanding was signed in May 1965 for the two countries to develop two aircraft , a trainer based on the ECAT , and the larger AFVG ( Anglo @-@ French Variable Geometry ) .

Cross @-@ channel negotiations led to the formation of SEPECAT ( Société Européenne de Production de l 'Avion d 'École de Combat et d 'Appui Tactique ? the " European company for the production of a combat trainer and tactical support aircraft " ) in 1966 as a joint venture between Breguet and the British Aircraft Corporation to produce the airframe . Though based in part on the Breguet Br.121 , using the same basic configuration and an innovative French @-@ designed landing gear , the Jaguar as built also incorporated major elements designed by BAC ? notably the wing and high lift devices . Production of the aircraft components would be split between Breguet and BAC and these would be assembled on two production lines ; one in the UK and one in France , There would be no duplication of work ; each component for the aircraft had only one source . The British trainer requirement had been more demanding , requiring supersonic performance and superior avionics ; as a result , the Br.121 needed a thinner wing , increased weapon load and more power , the latter to meet the RAF 's required ferry range of 2 @,@ 600 miles ( 4 @,@ 200 km ) . A separate partnership was formed between Rolls @-@ Royce and Turbomeca to develop the Adour afterburning turbofan engine . The Br.121 was proposed with Turbomeca 's Tourmalet engine for ECAT but Breguet preferred the RR RB.172 and their joint venture would use elements of both . The new engine , which would be used for the AFVG as well , would be built in Derby and Tarnos .

Previous collaborative efforts between Britain and France had been complicated ? the AFVG programme ended in cancellation , and controversy surrounded the development of the supersonic

airliner Concorde . Whilst the technical collaboration between BAC and Breguet went well , when Dassault took over Breguet in 1971 it encouraged acceptance of its own designs , such as the Super Étendard naval attack aircraft and the Mirage F1 , for which it would receive more profit , over the Anglo @-@ French Jaguar .

The initial plan was for Britain to buy 150 Jaguar " B " trainers , with its strike requirements being met by the advanced BAC @-@ Dassault AFVG aircraft , with France to buy 75 " E " trainers ( école ) and 75 " A " single @-@ seat strike attack aircraft ( appui ) . Dassault favoured its own Mirage G aircraft above the collaborative AFVG , and in June 1967 , France cancelled the AFVG on cost grounds . This left a gap in the RAF 's planned strike capabilities for the 1970s ; at the same time as France 's cancellation of the AFVG , Germany was expressing a serious interest in the Jaguar , and thus the design became more oriented towards the low @-@ level strike role .

By October 1970 , the RAF 's requirements had changed to 165 single @-@ seat strike aircraft and 35 trainers . The Jaguar was to replace the McDonnell Douglas Phantom FGR2 in the close air support , tactical reconnaissance and tactical strike roles , freeing the Phantom to be used for air defence . Both the French and British trainer requirements had developed significantly , and were eventually fulfilled instead by the Alpha Jet and Hawker Siddeley Hawk respectively . The French , meanwhile , had chosen the Jaguar to replace the Aeronavale 's Dassault Étendard IV , and increased their order to include an initial 40 of a carrier @-@ capable maritime version of the Jaguar , the Jaguar M , for the Aeronavale . From these apparently disparate aims would come a single and entirely different aircraft : relatively high @-@ tech , supersonic , and optimised for ground @-@ attack in a high @-@ threat environment .

### == = Prototypes == =

The first of eight prototypes flew on 8 September 1968 , a two @-@ seat design fitted with the first production model Adour engine . This aircraft later went supersonic on its third flight but was lost on landing on 26 March 1970 following an engine fire . The second prototype flew in February 1969 ; a total of three prototypes appeared in flight at the Paris Air Show that year . The first French " A " prototype flew in March 1969 . In October a British " S " conducted its first flight .

An " M " prototype flew in November 1969 . The " M " had a strengthened airframe , an arrestor hook and different undercarriage : twin nosewheel and single mainwheels . After testing in France it went to RAE at Thurleigh for carrier landing trials from their land based catapult . In July 1970 it made real take offs and landings from the French carrier Clemenceau . From these trials there were doubts about the throttle response in case of an aborted landing ; the shipboard testing has also revealed problems with the aircraft 's handling when flying on one engine , although planned engine improvements were to have rectified these problems . The " M " was considered a suitable replacement for the Etendard IV but the Aeronavale would only be able to purchase 60 instead of 100 aircraft .

Furthermore , the Jaguar M was expensive , limiting the size of the force the French Navy could afford . In 1971 , Dassault proposed the Super Étendard , claiming that it was a simpler and cheap development of the existing Étendard IV , and in 1973 , the French Navy agreed to order it instead of the Jaguar , although rising costs of the Super Étendard meant that only 71 of the planned 100 aircraft were purchased . The M was cancelled by the French government in 1973 .

### == = Design == =

### == = Overview == =

The Jaguar is an orthodox single @-@ seat , swept @-@ wing , twin @-@ engine monoplane design , with tall tricycle @-@ type retractable landing gear . In its original configuration , it had a maximum take @-@ off weight in the 15 tonne class ; and could manage a combat radius on internal fuel alone of 850 km ( 530 mi ) , giving the Jaguar a greater operational range than

competitor aircraft such as the Mikoyan MiG @-@ 27 . The aircraft had hardpoints fitted for an external weapons load of up to 10 @,@ 000 lb ( 4 @,@ 500 kg ) , typical weapons fitted included the MATRA LR.F2 rocket pod , BAP 100 @-@ mm bombs , MATRA AS37 anti @-@ radar missiles , AIM @-@ 9 Sidewinder missiles , and Rockeye cluster bombs . The RAF 's Jaguars gained several new weapons during the Gulf War , including CRV7 high @-@ velocity rockets and American CBU @-@ 87 cluster bombs . Finally , the Jaguar was equipped with either a pair of French DEFA cannons , or alternatively British Aden cannons .

The Jaguar International had the unusual optional provision for overwing pylons , used for short @-@ range air @-@ to @-@ air missiles , such as the Matra R550 Magic or the AIM @-@ 9 Sidewinder . This option frees up the under @-@ wing pylons for other weapons and stores . RAF Jaguars gained overwing pylons in the buildup to Operation Granby in 1990 , but French Jaguars were not modified . The RAF 's Jaguar 97s were intended to be wired for the carriage of ASRAAMs on the overwing launchers , but clearance of this weapon was never completed because of funding cuts .

= = = Engine = = =

The SEPECAT Jaguar is powered by the Rolls @-@ Royce Turbomeca Adour turbofan engine , which was developed in parallel and primarily for the Jaguar . A separate partnership was formed between Rolls @-@ Royce and Turbomeca to develop the Adour , a two @-@ shaft turbofan engine equipped with afterburners . Twin engines were selected for survivability ; ease of maintenance was a major consideration , an engine change being possible within 30 minutes . For the Jaguars it needed a high @-@ bypass capable of high thrust for take @-@ off , supersonic flight and low level " dashes " .

When the first prototype Jaguar flew on 8 September 1968 , it was also the first flight for the engine . In its initial development the Adour engine had complications with the stability of the afterburner system , and shipboard testing showed slow throttle response times , problematic in the situation of an aborted landing ; engine improvements rectified these problems prior to the Jaguar coming into service . In French service , the Jaguars were introduced using the original Mk.101 engine . RAF Jaguars entered service using the Mk.102 engine , mainly featuring better afterburner @-@ throttle control over the Mk.101. in 1974 , the RAF later had its Jaguars re @-@ engined around 1981 with improved Adour Mk.104 , and again in 1999 with the Mk.106 , each providing greater performance .

The Adour was developed into both afterburning and non @-@ afterburning models ; the BAE Hawk , which had beaten the Jaguar to fulfill the Air Staff Target 362 trainer requirement , also adopted the non @-@ afterburning Adour engine developed for the Jaguar . The Adour engine found use in several aircraft abroad , such as the McDonnell Douglas T @-@ 45 Goshawk , the Mitsubishi T @-@ 2 , and the Mitsubishi F @-@ 1 ( which resembles the Jaguar ) . Even following the Jaguar 's retirement in Europe , the Adour continues to be an active product with new variants being developed . As of Feb 2013 , the Indian Air Force was considering the fitting of 125 Jaguars with new Honeywell F125IN engines

= = = Avionics = = =

Although in operational theatres such as the Gulf War the Jaguar proved to be mechanically more reliable than the Panavia Tornado , the aircraft 's avionics were a hindrance to conducting missions . Owing to the Jaguar 's original shortcomings in navigation and target acquisition , French Jaguars had to be escorted by Dassault Mirage F1CR reconnaissance aircraft to act as guides for the Jaguars . The Jaguar provided a valuable component of the campaign , the RAF detachment of 12 Jaguars flew 612 combat sorties , with no aircraft lost . Significant changes were made both during and shortly after the war .

Owing to obsolete navigational systems being unable to provide the accuracy required , both French and British Jaguars were quickly modified with Global Positioning System ( GPS ) receivers , a recent technology at the time . Prior to 1995 NATO bombing campaign in Bosnia and Herzegovina

known as Operation Deliberate Force , a dozen Jaguars were upgraded with the capability to carry the TIALD laser designator pod and redesignated Jaguar GR1B or T2B respectively . Shortly afterwards , the RAF upgraded its Jaguar fleet to a common standard , incorporating TIALD and the ability to use new reconnaissance pods . The interim GR3 ( Jaguar 96 ) upgrade added a new HUD , a new hand controller and stick top , integrated GPS and TERPROM Terrain Referenced Navigation . The further upgraded Jaguar GR3A introduced the new EO GP1 ( JRP ) digital reconnaissance pod , a helmet @-@ mounted sight , improved cockpit displays , a datalink , and improved night vision goggles compatibility .

A single Jaguar was converted into the Jaguar Active Control Technology ( ACT ) with fly @-@ by @-@ wire controls and aerodynamic alterations to the airframe ; the aerodynamic instability improved manoeuvrability and the test data was used in the development of the Eurofighter .

= = Operational history = =

= = = France = = =

The French Air Force took delivery of the first production Jaguar in 1973 , one of an eventual 160 single @-@ seat Jaguar As . For type conversion training , France also took 40 of the two @-@ seat Jaguar E. While the Jaguar was capable of carrying a single AN @-@ 52 nuclear bomb , the French government did not assign any Jaguars for use in the Force de frappe , France 's strategic nuclear deterrent ; this task was carried out by the Dassault Mirage IV , and the later Mirage 2000 @-@ N. Nuclear armed Jaguars were instead assigned the " Pre @-@ Strategic " role , to clear a path for the Strategic strike force . The AN @-@ 52 nuclear bomb was retired from service in September 1991 , when the formerly nuclear @-@ armed squadrons of Escadron de Chasse 7 then concentrated on conventional attack . French Jaguars also performed in the role of Electronic Counter Measures ( ECM ) aircraft , bearing the Martel anti @-@ radiation missile , capable of staying airborne to suppress enemy defences for long periods of time through mid air refuelling .

In French service , the Jaguar was frequently deployed in defence of national interests in Africa during the 1970s , a policy sometimes referred to as " Jaguar diplomacy " ( la diplomatie du Jaguar ) . Jaguars made their combat debut against Polisario Front forces in Mauritania in December 1977 , as part of Opération Lamantin . In August 1978 a conventionally armed rapid reaction squadron was established , intended to deploy in support of French forces and interests to anywhere in the world . One Jaguar was shot down in 1978 by an SA @-@ 7 missile of the Polisario Front .

France had been involved in the conflict in Chad for many years , and 2 @, @ 000 men of the Force d 'Intervention along with helicopters and Jaguars were deployed to defend central Chad in 1978 , further forces arriving later as part of Opération Tacaud . The Jaguars were engaged in May and June 1978 , contributing significantly in halting an offensive by Goukouni Oueddei 's FROLINAT forces , who were routed . One aircraft was shot down , but the pilot was recovered by helicopter .

In support of the further military action in the region , known as Operation Manta , Jaguars were deployed to Bangui , Central African Republic , in 1983 , before being rebased inside Chad at N 'Djamena International Airport . On 25 January 1984 , Jaguars attacked a rebel column that was withdrawing after raiding the town of Zigey . One aircraft was shot down and the pilot , Captain Michel Croci , was killed ; the Libyans denied involvement . The " Manta " forces were withdrawn in 1984 , as part of a de @-@ escalation agreement , whereby both Libyan and French forces were to be withdrawn from Chad . The Libyans did not respect the agreement , and Jaguars returned to Chad in 1986 , as part of Operation Epervier , this time with a more forceful role . On 16 February 1986 , 11 Jaguars , escorted by Mirage F @-@ 1 fighters and supported by C @-@ 135F tankers and Breguet Atlantic aircraft , launched a raid on the airfield at Wadi Doum , which the Libyans had constructed in Northern Chad , using BAP @-@ 100 anti @-@ runway bombs . In response to Libyan incursions , another strike was carried out on 7 January 1987 , when a Jaguar destroyed a Libyan radar with a Martel missile . The Jaguars stationed at Ndjamena were a target for Libyan sabotage owing to their effectiveness against enemy forces , but the attempts were unsuccessful .

As France was not then a full member of NATO , joint operations with British Jaguars were limited in the 1980s . Jaguars from France were dispatched to participate in several coalition campaigns in the 1990s , from the 1991 Gulf War to the 1999 Kosovo conflict . In Operation Deliberate Force , the NATO bombing campaign over Bosnia in 1995 , six Jaguars , based in Italy , conducted 63 strike missions . The last Jaguars in French service were retired in 2005 , being replaced in the ground attack roles by the Dassault Rafale .

= = = United Kingdom = = =

The RAF accepted delivery of the first of 165 single @-@ seat Jaguar GR1s ( the service designation of the Jaguar S ) with 54 ( F ) squadron in 1974 . These were supplemented by 35 two @-@ seat trainers , the Jaguar T2 ( previously Jaguar B ) . The Jaguar S and B had a more comprehensive nav / attack system than the A and E models ( consisting of a Ferranti / Marconi NAVWASS ( NAVigation and Weapon @-@ Aiming Sub @-@ System ) and a Plessey 10 Way Weapon Control System ) used by the French Air Force . RAF Jaguars were used for rapid deployment and regional reinforcement , and others flew in the tactical nuclear strike role , carrying the WE.177 bomb .

Beginning in 1975 with 6 Squadron , followed by 54 Squadron based at RAF Coltishall , and a ' Shadow squadron ' , 226 OCU ( a reserve unit with a peacetime training role ) based at RAF Lossiemouth , Jaguar squadrons were declared operational to SACEUR with the British nuclear weapon WE.177. 14 Squadron and 17 Squadron based at RAF Bruggen followed by 1977 . 20 Squadron and 31 Squadron also based at RAF Bruggen brought the RAF Jaguar force to its peak strength of six squadrons plus the OCU , each of twelve aircraft equipped with eight WE.177 nuclear weapons . Two further squadrons , 2 Squadron and 41 Squadron based at RAF Laarbruch and RAF Coltishall respectively , were primarily tasked with tactical reconnaissance . From 1975 the OCU 's wartime role was as an operational squadron in the front line assigned to SACEUR with 12 Jaguar aircraft , eight WE.177 nuclear bombs , and a variety of conventional weapons .

In April 1975 , a single Jaguar was used to test the aircraft 's rough airstrip capacity , by landing and taking off multiple times from the M55 motorway , the final test flight was conducted with a full weapons load ; the ability was never used in service but was considered useful as improvised runways might be the only runways left available in a large @-@ scale European conflict . In a high @-@ intensity European war , the role of the Jaguar was to support land forces on the Continent in resisting a Soviet assault on Western Europe , striking targets beyond the forward edge of the battlefield should a conflict escalate . The apparent mismatch between aircraft numbers and nuclear bombs was a consequence of RAF staff planners concluding that there would be one @-@ third attrition of Jaguars in an early conventional phase , leaving the survivors numerically strong enough to deliver the entire allocated stockpile of 56 nuclear bombs .

From December 1983 , 75 Jaguar GR1s and 14 T2s were updated to the GR1A and T2A standards with FIN1064 navigation and attack systems replacing the original NAVWASS . At about the same time , most were also re @-@ engined with Adour 104 engines and were fitted with the ability to carry Sidewinder air @-@ to @-@ air missiles or AN @-@ ALQ @-@ 101 ( V ) -10 electronic countermeasures pods under the wings .

The RAF Jaguar force was altered in late 1984 , when 17 Squadron , 20 Squadron and 31 Squadron exchanged their Jaguars for Tornado GR1s , although their assignment to SACEUR and their wartime role remained unchanged . The two other RAF Germany units , 14 Squadron and 2 Squadron , followed suit in 1985 and 1989 respectively , which left the operational Jaguar force concentrated in 6 , 41 and 54 Squadrons at RAF Coltishall .

In 1991 , 12 RAF Jaguars participated in the Gulf War . In 1994 , in order to meet an urgent need to increase the number of aircraft able to designate targets for laser @-@ guided bombs , 10 GR1As and two T2As were upgraded with the capability to carry the TIALD laser designator pod and redesignated Jaguar GR1B or T2B respectively . TIALD equipped Jaguar GR1Bs were deployed to Italy in August to take part in Operation Deliberate Force against Bosnian Serb forces , being used to designate targets for RAF Harriers . During the Bosnian operations , a Jaguar of 41 Squadron

carried out the first RAF bombing raid in Europe since the end of the Second World War fifty years before .

Following the success of the GR1B / T2B upgrade , the RAF launched a plan to upgrade its Jaguar fleet to a common standard , incorporating improvements introduced to some aircraft during the Gulf War , together with adding the ability to use TIALD and new reconnaissance pods . The upgrade came in two parts ; the interim GR3 ( Jaguar 96 ) upgrade added a new HUD , a new hand controller and stick top , integrated GPS and TERPROM Terrain Referenced Navigation . It was delivered in two standards , for recce and TIALD . The further upgraded Jaguar GR3A ( also known as Jaguar 97 ) introduced fleet @-@ wide compatibility with TIALD and the new EO GP1 ( JRP ) digital reconnaissance pod , a helmet mounted sight , improved cockpit displays , a datalink , and improved Night vision goggles compatibility . All GR3As were subsequently re @-@ engined with the new Adour 106 turbofan .

The Jaguars did not see service in the 2003 Iraq War ; they had been planned to operate from bases in Turkey , to the north of Iraq , but Turkey refused access to its airbases and the northern attack was cancelled . Demands by the UK Treasury to cut the defence budget led to Defence Secretary Geoff Hoon detailing plans on 21 July 2004 to withdraw the Jaguar by 2007 . An expected date of October 2007 for the out of service date was brought forward at just five days notice to 30 April 2007 . On 20 December 2007 , a Jaguar operated by Qinetiq undertook the last ever British military Jaguar flight .

Following their retirement from flying service , many Jaguars continue to serve as ground instructional airframes , most notably at RAF Cosford , used in the training of RAF fitters .

== = India == =

India had been approached as a possible customer for the Jaguar as early as 1968 , but had declined , partly on the grounds that it was not yet clear if the French and British would themselves accept the aircraft into service . A decade later they would become the largest single export customer , with a \$ 1 billion order for the aircraft in 1978 , the Jaguar being chosen ahead of the Dassault Mirage F1 and the Saab Viggen after a long and difficult evaluation process . The order involved 40 Jaguars built in Europe at Warton , and 120 licence @-@ built aircraft from Hindustan Aeronautics Limited ( HAL ) under the local name Shamsher ( " Sword of Justice " ) .

As an interim measure , 18 Royal Air Force Jaguars were loaned to the Indian Air Force , with the first two loaned aircraft operational with Western Air Command on 27 July 1979 . The second batch of aircraft for the Indian Air Force were 40 Jaguar Internationals built at Warton , the first aircraft being delivered in March 1981 . Batch Three was the assembly of another 45 aircraft by HAL of kits shipped from the United Kingdom , the first kit being shipped to India in May 1981 . In the following phases more aircraft would be built in India with less European content .

Indian Jaguars were used to carry out reconnaissance missions in support of the Indian Peace Keeping Force in Sri Lanka between 1987 and 1990 . They later played an active role in the 1999 Kargil War with Pakistan , dropping both unguided and laser @-@ guided bombs , the IAF defining its role as a " deep penetrating strike aircraft " . The Jaguar is also used in small numbers for the anti @-@ ship role , equipped with the Sea Eagle missile . The Jaguar remains an important element of the Indian military as , along with the Mirage 2000 , the Jaguar has been described as one of the few aircraft capable of performing the nuclear strike role with reasonable chances of success . It has been alleged that the Indian military decided against developing the Jaguar into an active nuclear platform because of its lack of ground clearance for deploying India 's gravity @-@ dropped nuclear bombs .

As the aircraft aged , the avionics were viewed as lacking suitable components for the ground attack mission , such as terrain @-@ following radar , GPS navigation or modern night @-@ flight systems ; consequently , several upgrades were carried out in the mid @-@ 1990s , including the addition of the Litening targeting pod . India placed an order for 17 additional upgraded Jaguar aircraft from Hindustan Aeronautics in 1999 and a further 20 in 2001 ? 2002 . The Indian Air Force plans to upgrade up to 125 Jaguars starting in 2013 by upgrading the avionics ( including multi

mode radar , auto @-@ pilot and other changes ) as part of the DARIN III programme and is considering fitting more powerful engines , Honeywell F125IN to improve performance , particularly at medium altitudes .

= = = Persian Gulf War = = =

Following the invasion of Kuwait , on 9 August 1990 the British government assigned an initial 12 Jaguar GR1A and 12 Tornado F3 aircraft to the Middle East in Operation Granby , these aircraft operated from bases in Oman and Bahrain . On 23 August 1990 , a squadron of Tornado GR1 interdictors were dispatched to the region as well , but the Tornado GR1 was difficult to keep operational in the high temperatures . Blackburn Buccaneers were dispatched in January 1991 to act as laser designators for the ground strike aircraft . The RAF 's Jaguars gained several new weapons during the Persian Gulf War , including CRV7 high @-@ velocity rockets and American CBU @-@ 87 cluster bombs which were used because the RAF 's existing BL755 bombs were designed for low @-@ level release , and therefore unsuitable for higher @-@ altitude operations common over the Persian Gulf . The RAF 's detachment of 12 Jaguars flew 612 combat sorties , with no aircraft being lost . XZ364 " Sadman " flew 47 missions ; the highest number of missions of any aircraft .

France also committed military assets to the coalition ; in October 1990 , eight Jaguar A aircraft along with several Dassault Mirage F1CR reconnaissance aircraft were sent to the Middle East , with the Mirages , which had more advanced avionics , acting as guides for the Jaguars . Owing to obsolete navigational systems being unable to provide the accuracy required , both French and British Jaguars were quickly modified with GPS receivers , RAF Tornados also required adaption to a lesser extent . The French Jaguar force in Saudi Arabia built up to a maximum of 28 aircraft , which carried out 615 combat sorties , with one Jaguar damaged by an Iraqi surface @-@ to @-@ air missile . Typical targets were Iraqi armoured units , Scud missile sites , and naval vessels .

On 15 January 1991 , 12 French Jaguars bombed Ahmed Al Jaber Air Base , Kuwait ; three were damaged in the attack but all returned to base . On 26 January , RAF Jaguars and Tornados raided several Silkworm missile batteries in Kuwait to encourage the perception of an imminent amphibious invasion to liberate the country . On the 30th , two RAF Jaguars destroyed a Polnochny @-@ class landing ship with rockets and cannon . The Iraqi Republican Guard , entrenched on the Kuwait @-@ Saudi border , were subjected to a continuous intensive bombing campaign for weeks to demoralise them , allied Jaguars forming a portion of the delivering aircraft . The Jaguars also performed valuable reconnaissance of the combat area for Coalition forces . Both nations ' Jaguars were withdrawn from the region in March 1991 , at the end of Desert Storm .

= = = Other operators = = =

Early in development , it was decided that the Jaguar should be offered for export . In 1969 , while still in the prototype stage of development , formal approaches had been made to Switzerland , India , Japan , Australia , the Netherlands , Belgium , and Germany , promoting the aircraft for sale . Japan began negotiations towards licensed production of the Jaguar , but these plans failed in part because of the high royalty payments sought by SEPECAT . A proposal for Turkey to construct Jaguars under licence for their own air force also did not come to fruition . Attempts to export to Kuwait and Pakistan did not transfer into orders . Kuwait initially ordered 50 Jaguars and 16 Mirage 5s , but instead firmed up for F1s . Pakistan approached SEPECAT after the US refused to sell their aircraft of choice , the LTV A @-@ 7 Corsair II , due to an arms embargo ; Pakistan eventually opted for Mirage 5s .

Jaguars were successfully sold to a number of overseas countries , India being the most prolific operator . The Jaguar International was an export version which was sold to Ecuador , Nigeria and Oman . The Ecuadorian Air Force , the only Latin American export customer , purchased 10 single- and 2 two @-@ seat variants , officially designated Jaguars ES and EB , respectively . The first of twelve aircraft arrived in January 1977 . They were used mainly for ground attack roles and

occasionally for air superiority duties during the Cenepa War with Peru in 1995 , but the main part of the fleet was held in reserve in case of a wider conflict with the Peruvians . Nigeria ordered 13 single @-@ seat SN and 5 two @-@ seat BN variants ; SEPECAT delivered the first of these in May 1984 . A subsequent order for an 18 @-@ aircraft second batch was cancelled . Some of those in service were withdrawn from operations on the grounds of economy , with the remaining aircraft put up for re @-@ sale . The Royal Air Force of Oman , like Ecuador , ordered 10 single @-@ seat and 2 two @-@ seat variants , designated Jaguars OS and OB , respectively ; the first was delivered in March 1977 . A second identical 12 @-@ aircraft order was placed in the mid @-@ 1980s ; these were joined by two ex @-@ IAF and ex @-@ RAF examples . The last of the Omani aircraft were retired on 6 August 2014 .

= = Variants = =

#### Jaguar A

Single @-@ seat all @-@ weather tactical strike , ground @-@ attack fighter version for the French Air Force , two prototypes and 160 production aircraft built .

#### Jaguar B / Jaguar T2

Two @-@ seat training version for the Royal Air Force , one prototype and 38 production aircraft built . Capable of secondary role of strike and ground attack . Two flown by Empire Test Pilots School and one by Institute of Aviation Medicine . Equipped for inflight refuelling and with a single Aden cannon .

#### Jaguar T2A

Jaguar T2 upgrade similar to GR1A , 14 conversions from T2 .

#### Jaguar T2B

two Jaguar T2A aircraft given TIALD capability . An " unofficial " designation .

#### Jaguar T4

Jaguar T2A upgraded to Jaguar 96 standard .

#### Jaguar E

Two @-@ seat training version for the French Air Force , two prototypes and 40 production aircraft built .

#### Jaguar S / Jaguar GR1

Single @-@ seat all @-@ weather tactical strike , ground @-@ attack fighter version for the Royal Air Force , 165 built . Equipped with NAVigation And Weapon Aiming Sub @-@ System ( NAVWASS ) for attacking without use of radar . Ferranti " laser ranger and marked target seeker " added to nose during production Engines replaced by Adour Mk 104 from 1978 .

#### Jaguar GR1A

Jaguar GR1 with navigation ( NAVWASS II ) , chaff / flare , ECM and Sidewinder capability upgrades , 75 conversions from GR1 .

#### Jaguar GR1B

Ten GR1 aircraft modified to carry TIALD pods .

#### Jaguar GR3

Jaguar 96 avionics upgrade to GR1A .

#### Jaguar GR3A

Jaguar 97 avionics upgrade to GR1B / GR3 .

#### Jaguar M

Single @-@ seat naval strike prototype for the French Navy , one built .

#### Jaguar Active Control Technology

One Jaguar converted into a research aircraft .

#### Jaguar International

Export versions based on either the Jaguar S or Jaguar B.

#### Jaguar ES

Export version of the Jaguar S for the Ecuadorian Air Force , 10 built .

#### Jaguar EB



Export version of the Jaguar B for the Ecuadorian Air Force , two built .

Jaguar S ( O )

Export version of the Jaguar S for the Royal Air Force of Oman , 20 built .

Jaguar B ( O )

Export version of the Jaguar B for the Royal Air Force of Oman , four built .

Jaguar IS

Single @-@ seat all @-@ weather tactical strike , ground @-@ attack fighter for the Indian Air Force , 35 built by BAe and 89 built by HAL ( Shamser ) .

Jaguar IB

Two @-@ seat training version for the Indian Air Force , five built by BAe and 27 built by HAL .

Jaguar IM

Single @-@ seat maritime anti @-@ shipping aircraft for the Indian Air Force . Fitted with Agave radar and capable of carrying Sea Eagle anti @-@ ship missile , 12 built by HAL .

Jaguar SN

Export version of the Jaguar S for the Nigerian Air Force , 13 built .

Jaguar BN

Export version of the Jaguar B for the Nigerian Air Force , five built .

= = Operators = =

= = = Current = = =

India

Indian Air Force

No. 5 Squadron " Tuskers " , IAF Ambala with Direct Supply ( i.e. UK built ) Jaguar IS and IB from August 1981 .

No. 6 Squadron " Dragons " , ( Jaguar IM , IS , IB ) from 1987 .

No. 14 Squadron " Bulls " , IAF Ambala . Operational from September 1980 with loaned RAF Jaguar GR1s and T2s , and re @-@ equipped with Direct Supply Jaguar IS and IBs from March 1981 .

No. 16 Squadron " Cobras " . Equipped with Indian @-@ built Jaguar IS and IB from October 1986 .

No. 27 Squadron " Flaming Arrows " . Equipped with Indian @-@ built Jaguar IS and IB from June 1985 .

No.224 Squadron " Warlords " .

= = = Former operator = = =

Ecuador

Ecuadorian Air Force ? ordered 10 single @-@ seat EBs and 2 two @-@ seat ESs in 1974 , with the aircraft being delivered in 1977 . It purchased 3 ex @-@ RAF Jaguar GR.1s as attrition replacements in 1991.Escuadron de Combate 2111 " Aguilas " ( Eagles )

France

French Air Force ? all retired

Escadron de Chasse 3 / 3 " Ardennes " at Nancy ( 1977 ? 1987 )

Escadron de Chasse 1 / 7 " Provence " at St Dizier . Re @-@ equipped with Jaguars in May 1973 and declared operational September 1974 . It discarded the Jaguar in July 2005 , the last French squadron to operate the Jaguar .

Escadron de Chasse 2 / 7 " Argonne " at St Dizier . French Jaguar OCU . Formed October 1974 . It was disbanded in June 2001 .

Escadron de Chasse 3 / 7 " Languedoc " at St Dizier . Received first Jaguars in March 1974 and operational in July 1975 . Disbanded July 1997 .

Escadron de Chasse 4 / 7 " Limousin " . Formed April 1980 at St Dizier , but soon moved to Istres . Disbanded July 1989 .

Escadron de Chasse 1 / 11 " Roussillon " at Toul . Operational March 1976 . Disbanded June 1994 .

Escadron de Chasse 2 / 11 " Vosges " at Toul . Operational June 1977 . Disbanded July 1996 .

Escadron de Chasse 3 / 11 " Corse " at Toul . Received Jaguars February 1975 . Disbanded July 1997 .

Escadron de Chasse 4 / 11 " Jura " at Bordeaux @-@ Mérignac . Formed August 1978 , disbanded June 1992 .

Nigeria

Nigerian Air Force ordered 13 Jaguar SNs & 5 Jaguar BNs in 1983 , with delivery from 1984 , being operated by a squadron at Makurdi . Withdrawn from use in 1991 as an economy measure .

Oman

Royal Air Force of Oman purchased 10 Jaguar OSs and two Jaguar OBs in 1974 , with an identical order following in 1980 , supplementing these aircraft by an ex @-@ RAF Jaguar T2 and GR1 in 1982 and 1986 respectively . Oman 's Jaguars were brought to full GR3A standards during the 1990s . Oman 's last four operational Jaguars were retired on 6 August 2014.No. 8 Squadron RAFO at RAFO Thumrait .

No. 20 Squadron RAFO at RAFO Thumrait .

United Kingdom

Royal Air Force ? all retired

No. 2 Squadron . Jaguars replaced 2 Squadron 's Phantoms at RAF Laarbruch , Germany in 1976 , with a main role of tactical reconnaissance . It re @-@ equipped with Tornado GR1As in 1988 .

No. 6 Squadron formed at RAF Lossiemouth in October 1974 , moving to RAF Coltishall in November 1974 , serving in the attack role . It moved to RAF Coningsby in April 2006 , disbanding in May 2007 .

No. 14 Squadron replaced its Phantoms with Jaguars in 1974 , based at RAF Bruggen in Germany . Its Jaguars were replaced by Tornados in 1985 .

No. 16 ( Reserve ) Squadron , the OCU was formed at RAF Lossiemouth by renumbering 226 OCU , later moving Coltishall and finally disbanding in March 2005 .

No. 17 Squadron at RAF Bruggen replaced its Phantoms in the strike role with Jaguars from 1975 to 1976 , and re @-@ equipped with Tornados in 1984 ? 85 .

No. 20 Squadron formed at RAF Bruggen in February 1977 in the strike role , disbanding in June 1984 .

No. 31 Squadron based at RAF Bruggen replaced its Phantoms in 1976 in the strike role . Its Jaguars were replaced by Tornados in 1984 .

No. 41 Squadron formed at RAF Coltishall in 1976 in the reconnaissance role . It disbanded in April 2006 .

No. 54 Squadron formed at RAF Lossiemouth in March 1974 in the attack role , moving to RAF Coltishall in August 1974 . It disbanded in March 2005 .

No. 226 OCU ( Operational Conversion Unit ) formed at RAF Lossiemouth in October 1974 and was redesignated No. 16 ( Reserve ) Squadron in September 1991 .

Jaguar Conversion Team at RAF Lossiemouth ( initial OCU ) .

Empire Test Pilots ' School .

= = Specifications ( Jaguar A ) = =

Data from Jane 's All The World 's Aircraft 1980 ? 81 , Air Force Tac Recce Aircraft : NATO and Non @-@ aligned Western European Air Force Tactical Reconnaissance Aircraft of the Cold War

General characteristics

Crew : One

Length : 16 @.@ 83 m ( 55 ft 2 ½ in )

Wingspan : 8 @.@ 68 m ( 28 ft 6 in )

Height : 4 @ 89 m ( 16 ft 0 ½ in )

Wing area : 24 @ 18 m<sup>2</sup> ( 260 @ 27 ft<sup>2</sup> )

Aspect ratio : 3 @ 12 : 1

Empty weight : 7 @, 000 kg ( 15 @, 432 lb )

Loaded weight : 10 @, 954 kg ( 24 @, 149 lb )

Max. takeoff weight : 15 @, 700 kg ( 34 @, 612 lb )

Powerplant : 2 × Rolls @-@ Royce / Turbomeca Adour Mk 102 turbofans

Dry thrust : 22 @. 75 kN ( 5 @, 115 lbf ) each

Thrust with afterburner : 32 @. 5 kN ( 7 @, 305 lbf ) each

#### Performance

Maximum speed : Mach 1 @. 6 ( 1 @, 699 km / h , 917 knots , 1 @, 056 mph ) at 11 @, 000 m ( 36 @, 000 ft )

Combat radius : 908 km ( 490 nmi , 564 mi ) ( lo @-@ lo @-@ lo , external fuel )

Ferry range : 3 @, 524 km ( 1 @, 902 nmi , 2 @, 190 mi )

Service ceiling : 14 @, 000 m ( 45 @, 900 ft )

Climb to 9 @, 145 m ( 30 @, 000 ft ) : 1 min 30 sec

#### Armament

Guns : 2 × 30 mm ( 1 @. 18 in ) DEFA cannons , 150 rounds / gun

Hardpoints : 5 total : 4 × under @-@ wing ( Twin Inner pylon Fore & Aft ) and Single Outer Pylon ( For 'd only ) ) and 1 × center @-@ line pylon stations Fore & Aft plus 1 in the centre of the pylon for Special Weapons. with a capacity of 10 @, 000 lb ( 4 @, 500 kg ) and provisions to carry combinations of :

Rockets : 8 × Matra rocket pods with 18 × SNEB 68 mm rockets each

Missiles : AS.37 Martel anti @-@ radar missiles or

AS @-@ 30L laser guided air @-@ to @-@ ground missiles .

2 × R550 Magic air @-@ to @-@ air missiles on underwing pylons

Bombs : various unguided or laser @-@ guided bombs or

2 × WE177A nuclear bombs

1 × AN @-@ 52 nuclear bomb

Other : ECM protection pods , Reconnaissance Pod , ATLIS laser / electro @-@ optical targeting pod , external drop tanks for extended range / loitering time