

MODERN SOVIET WARPLANES

STRIKE AIRCRAFTS & ATTACK HELICOPTERS

by Steven J. Zaloga



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This book is a survey of recent Soviet attack aircraft, bombers and attack helicopters, with a special emphasis on detail views useful to aircraft modelers. This book is not intended to be a comprehensive survey of all the various types of these aircraft in Soviet service, but rather it focuses on more recent variants of well known types such as the Su-17 Flanker and MiG-27, and on newer aircraft such as the Su-25 and Mi-28. This book is intended to complement another book in the Concord series covering fighters and interceptors.

The Soviet Air Force (VVS) conceives its strike aircraft in a different fashion than the American practice. In the US armed forces, the attack helicopters are under the control of the Army, while fixed wing attack aircraft are under Air Force control. In the Soviet armed forces, all strike aircraft, including attack helicopters, are under the control of the Soviet Air Force or VVS in Russian.

This book begins by examining Soviet strike fighter bombers including the Su-17 Flanker and Su-25. The Su-17 and Su-25 are both high speed performance, and were developed in the fighter role. In the early 1970s, the Soviet design bureau challenged this conception, arguing for the development of an aircraft similar to the American A-10 Thunderbolt II with greater emphasis on low altitude performance, survivability and maneuverability in the field. Independent of a VVS requirement, they began developing the Su-25. The Su-25 (Frogfoot) and Su-26 (Frogfoot 2) were developed in the early 1970s. The Su-25 was designed for low altitude performance, survivability and maneuverability in the field. The Su-25 proved to be a most effective fixed wing attack aircraft, and was widely used in the Soviet invasion of Czechoslovakia in 1968, and in the Soviet invasion of Afghanistan in 1979. The Su-25 proved to be a most effective fixed wing attack aircraft, and was widely used in the Soviet invasion of Czechoslovakia in 1968, and in the Soviet invasion of Afghanistan in 1979.

This is the first book to cover Soviet strike aircraft, and is a new title in the Concord series.

The most potent strike aircraft in the current Soviet inventory is the Su-24 Flanker, similar in concept and design to the American F-111. The Su-24 is not normally allotted to the tactical aviation assault regiments, but rather is hoisted by the operational bomber regiments. These formations have the task of carrying out deep penetration raids with a special emphasis on airbase attack and the elimination of high value targets in the enemy rear. The Su-24 bridges the gap between the strike fighter and the conventional heavy bomber.

In the area of heavy bombers, the Soviets have recently acquired three types. The Tu-22M Backfire is oriented towards two missions, naval and shipping, under Navy command, and continental strike missions under Air Force command. The Tu-22M is an operational strategic bomber, in the US sense it is called a peripheral attack bomber. Rather surprisingly, the Backfire has been in the US inventory since the early 1980s, but it was not until the early 1980s that a new cruise missile was developed for the Tu-22M. The Tu-22M is armed with the AS-4 Khrono air-launched cruise missile. It is being slowly supplemented by the Tu-160 Blackjack, similar in conception and size to the American B-2 bomber.

In the area of attack helicopters, the Soviets have recently acquired three types. The Mi-24 Hind is a multipurpose helicopter, designed for both attack and transport. The Mi-28 is a dedicated attack helicopter, designed for low altitude attack. The Mi-28 is a dedicated attack helicopter, designed for low altitude attack. The Mi-28 is a dedicated attack helicopter, designed for low altitude attack.

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Front Cover

An Mi-24V Gorbach (Hind E) attack helicopter of the Czechoslovak 11th
Edvard Benes Helicopter Regiment in Plzen. This variant of the Mi-24 can be
armed with the Shturm-V (AT-6 Spiral) radio command guided anti-tank missile,
though in this case, the missiles themselves are not fitted. (Yves Debay)

Back Cover

The Tu-160 Blackjack is larger and heavier than its closest American
counterpart, the B-1A bomber, though they are similar in shape and configuration.
(Sovfoto)

INTRODUCTION

This book aims to provide a photographic survey of recent Soviet attack aircraft, bombers and attack helicopters, with a special emphasis on detail views useful to aircraft modelers. This book is not intended to be a comprehensive survey of all the various types of these aircraft in Soviet service, but rather it focuses on more recent variants of well known types such as the Su-17 Fitter and MIG-27, and on newer aircraft such as the Su-25 and Mi-28. This book is intended to complement another book in the Concord series covering fighters and interceptors.

The Soviet Air Force (VVS) organizes its strike aircraft in a different fashion than the American practice. In the US armed forces, the attack helicopters are under the control of the Army, while fixed wing aircraft are under Air Force control. In the Soviet armed forces, all strike aircraft, including attack helicopters, are under the control of the Soviet Air Force, or VVS in Russian.

This book begins by examining Soviet strike fighters including the Su-17M4, MIG-27KR, and Su-25K. The Su-17M4 and MIG-27KR are traditional fighter bombers, with an accent on high speed performance, and some capability in the fighter role. In the early 1970s, the Sukhoi design bureau challenged this conception, arguing for the development of an aircraft similar to the American A-10 Thunderbolt II with greater emphasis on low altitude performance, survivability and maintainability in the field. Independent of a VVS requirement, they began developing the Su-25 Grach (Frogfoot), and managed to convince the VVS bureaucracy of its utility. Soviet pilots appreciated their initiative at the time of the Afghan war. The Su-25 proved to be the most effective fixed wing attack aircraft, and was the only fixed wing aircraft respected by the mujihadeen who nicknamed it "the German jet." The Soviet Navy operates its own

specialized fighter bomber, the Yak-38 Forger. It is the first dedicated naval fixed wing attack aircraft, and will eventually be replaced by the new Yak-41.

The most potent strike aircraft in the current Soviet inventory is the Su-24MK Fencer, similar in concept and design to the American F-111. The Su-24 is not normally allotted to the tactical aviation assault regiments, but rather is hoarded by the operational bomber regiments. These formations have the task of carrying out deep penetration raids, with a special emphasis on airbase attack and the elimination of high value targets in the enemy rear areas. The Su-24 bridges the gap between the strike fighters and the conventional heavy bombers.

In the area of heavy bombers, the Soviets have recently acquired three types. The Tu-22M Backfire is oriented towards two missions, naval anti-shipping (under Navy control) and continental strike missions in Europe and Asia (under Air Force control). The Soviets term this type of aircraft as an operational-strategic bomber, while in the US jargon, it is called a peripheral attack bomber. Rather surprisingly, the production line for the Tu-142 Bear was restarted in the early 1980s to turn out a new cruise-missile carrying version, the Tu-142MK Bear H, armed with the AS-15 Kent air-launched cruise missile. It is being slowly supplemented by a new intercontinental bomber, the Tu-160 Blackjack, similar in conception and size to the American B-1A bomber.

In the Soviet armed forces, the helicopters are treated as part of the spectrum of air support aircraft. The Mi-24 Hind helicopter is classified as an Assault-Transport helicopter, even though it is used primarily in the attack role. This book covers the more recent versions of the Hind, but focuses mainly on its new successor, the Mi-28 Havoc. The Havoc follows the more traditional lines of attack helicopters, and lacks a troop transport bay as on the Mi-24.

The author would like to thank a number of friends for their help in preparing this book, including Nick Cook for his unique photos of the 1989 Khodynka Air Show, Christopher Foss for his photos of the Iraqi Air Force, Hans-Heiri Stapfer for photos of the Su-24 and friends in the USSR. Thanks also go to Vika Edwards of Sovfoto/Eastfoto for help in obtaining photos from Soviet sources.

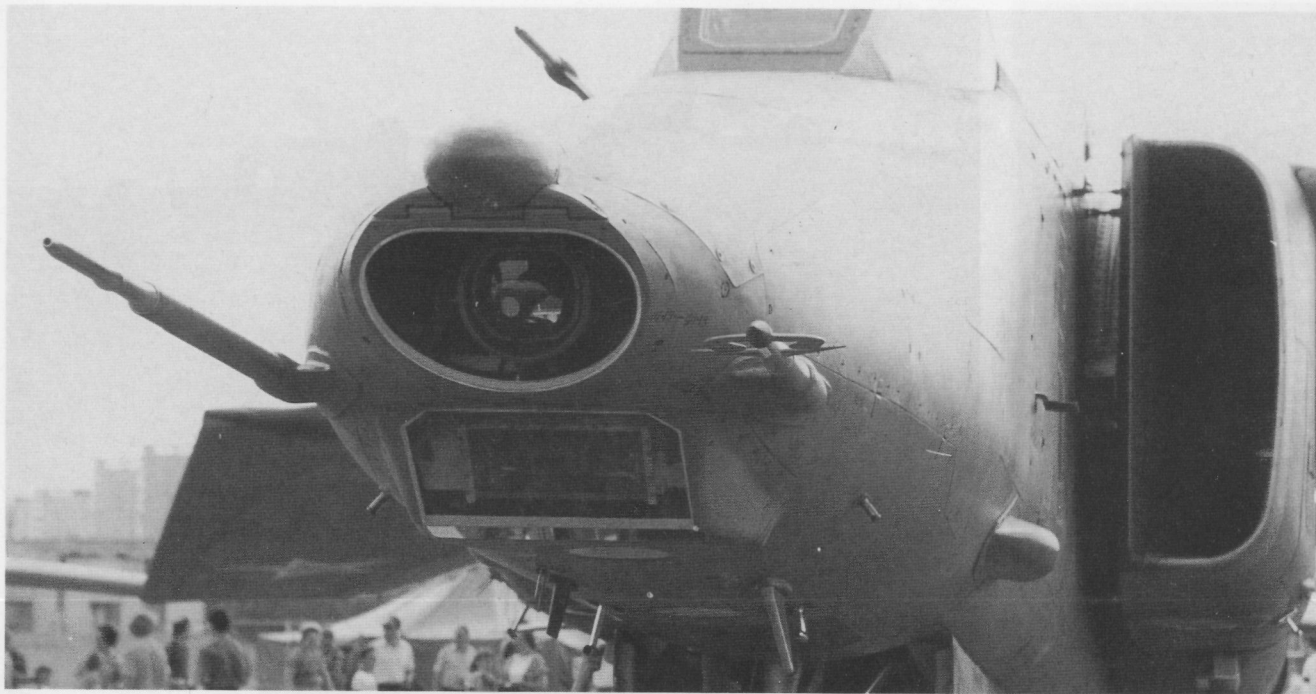


The MIG-27KR is the latest attack version of the Flogger family. It is most readily distinguishable by its longer nose and the oval optical port at its tip. This particular aircraft was exhibited at the Central Frunze Air Base at Khodynka in August 1989.



A close up of the nose of the MIG-27KR. The two optical ports contain a trainable laser designator for guiding laserguided bombs and missiles and an electro-optical sight for night attack missions.

A rear view of the MIG-27KR. It is armed with a typical load of four FAB-500 Kaira 500kg bombs and two UB-32 rocket pods. This particular aircraft was finished in the typical scheme of tactical ground attack aircraft, medium and dark green with small elements of sand. (Nick Cook)



◀ Another detail shot of the distinctive nose of the MIG-27KR (Flogger J). The dimple on the nose is a ranging radar. The antenna on the left is a pitot tube, and that on the right is for the instrumented landing system (ILS). The bulge further down the fuselage is a forward-pointing radar-warning receiver. The blade antenna is an advanced version of the Khrom-Nikel (Odd Rods) IFF system.

▼◀ A clear view of the ASO flare countermeasures launcher on the MIG-27KR. (Nick Cook)

▼ This close-up view of the rear of a MIG-27KR shows several interesting points such as the rear fuselage bomb shackles. The strake on the fuselage contains an ASO flare dispenser, used to decoy enemy surface-to-air anti-aircraft missiles such as the Strela or Stinger. (Nick Cook)

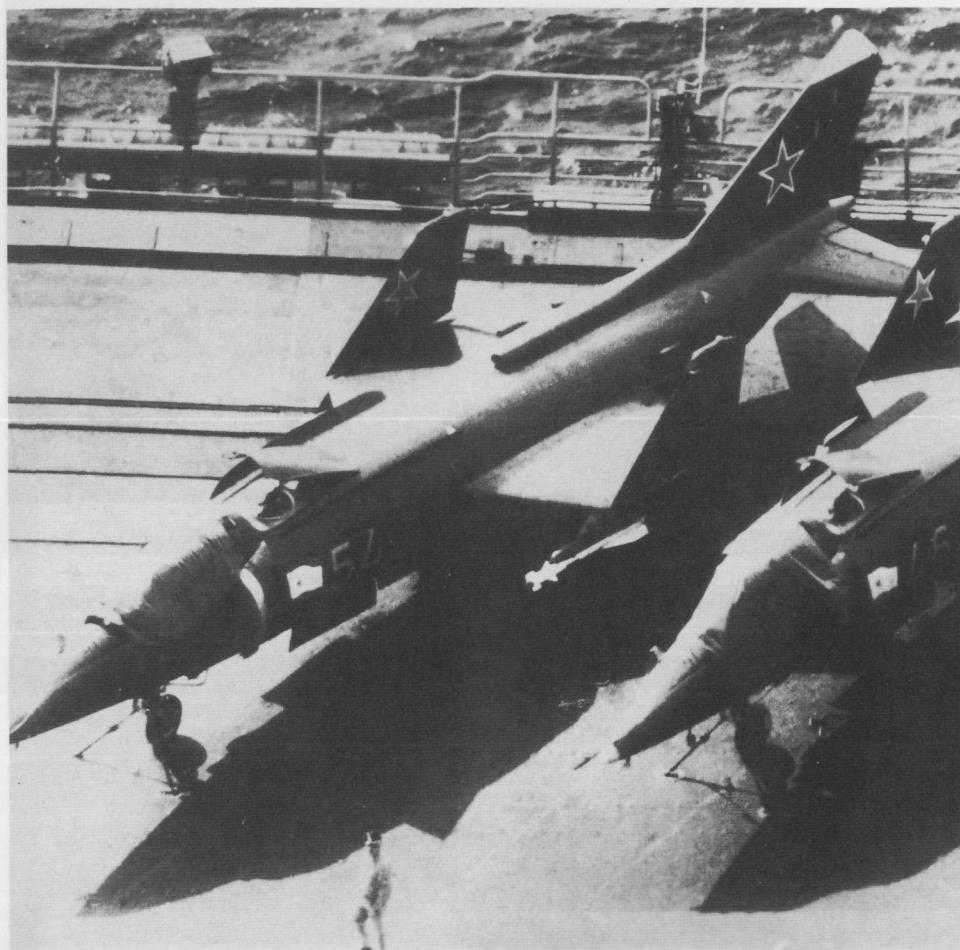




▲◀ Although the Yak-38 Forger is usually thought of as a fighter, the Soviet Navy considers it to be a ground attack aircraft. This particular aircraft is practising take-offs onboard the carrier Novorossisk.

▲ A view over the side of the carrier Novorossisk (Kiev class) showing a line-up of Yak-38 attack aircraft. Number 85 to the right is armed with an R-60MK (AA-8 Aphid) air-to-air missile, used for self-defense.

◀ A line-up of three Yak-38 fighters onboard the Novorossisk in 1988. The aircraft nearest the camera has a UPK-23 gun-pod under the left wing. The Yak-38 does not carry an internal gun, and relies on such gunpods if strafing is required.



An overhead view of a pair of Yak-38s with their wing-tips folded. Number 54 is armed with an R-60MK air-to-air missile on its wing hardpoint. The Forger has four wing-mounted hardpoints and can carry up to 2000kg of ordnance.

A rear view of the Yak-38 at Khodynka. As strange as it may seem, the Yak-38 was experimentally committed to combat in Afghanistan in 1980-81 in small numbers, but was replaced by the Su-25 Grach due to its meagre payload and high accident rate. (Nick Cook)

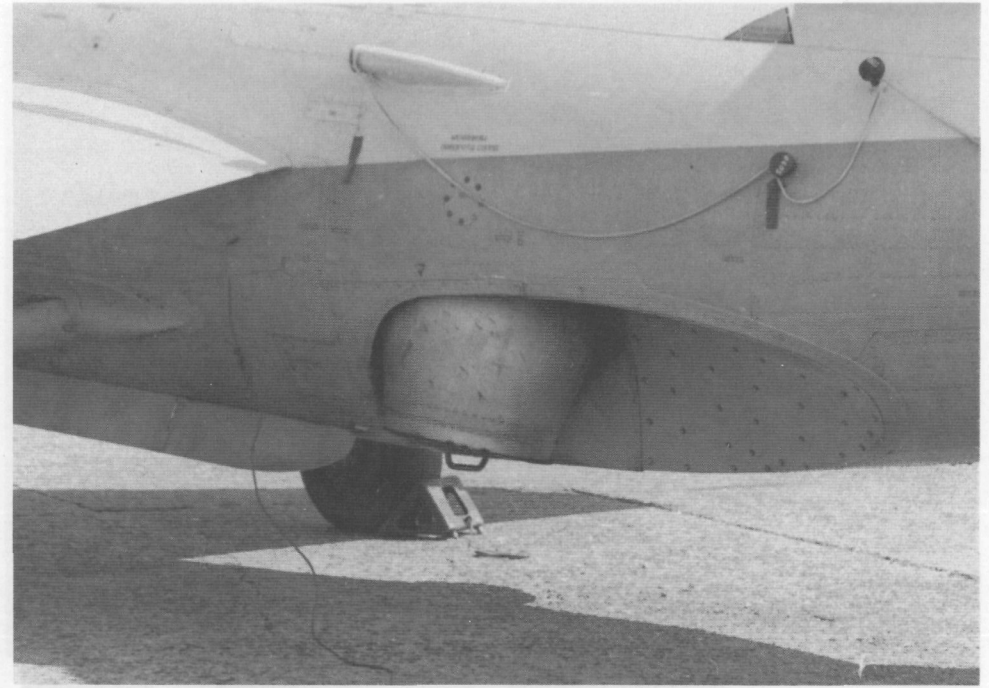


This Yak-38 displayed at Khodynka in 1989 carries the new naval paint scheme. The earlier scheme consisted of dark blue upper surfaces and dark green anti-corrosion paint on the undersides. The new scheme consists of light grey upper surfaces and the standard dark green undersides. (Nick Cook)





A detail view of the Yak-38 upper rear fuselage showing the two wing pylons in the foreground. (Nick Cook)



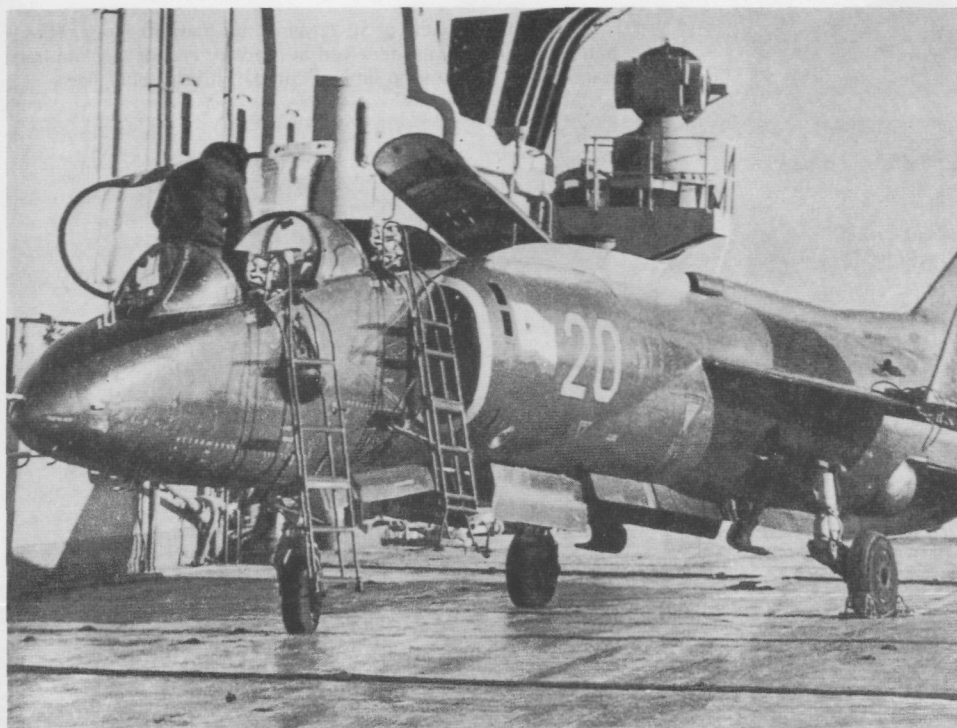
A detail view of the engine exhaust on the Yak-38's Tumansky R-27V engine. (Nick Cook)



A close-up of the nose of the Yak-38. The warning markings are in red. Although the Yak-38 resembles the Harrier, the engine configuration does not permit thrust vectoring. The Yak-38 is not a popular aircraft in service due to its high accident rate. (Nick Cook)



A detail view of the left side of the Yak-38. The antenna in front of the cockpit is the new style Khrom-Nikel IFF. (Nick Cook)



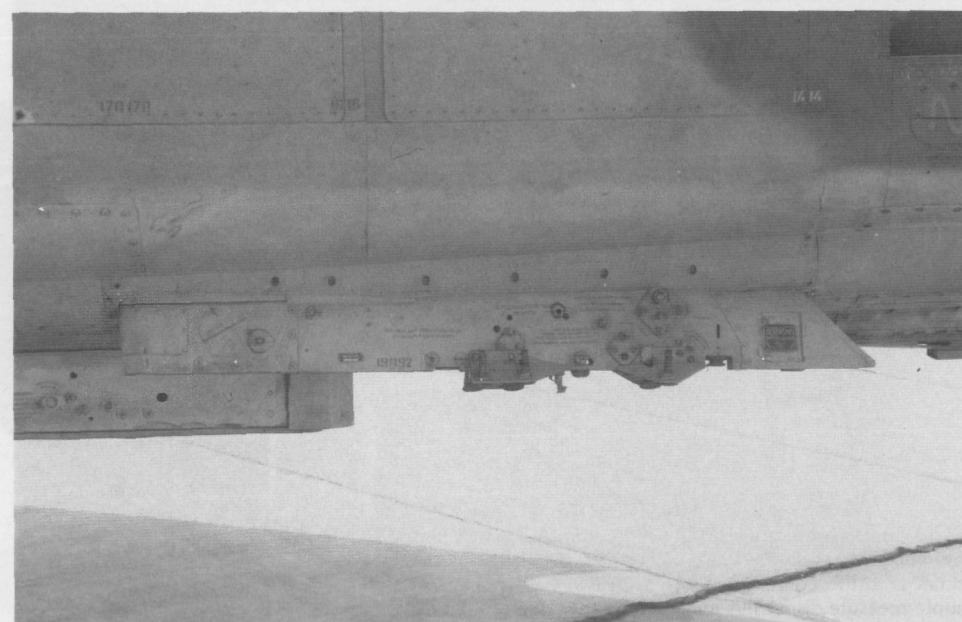
A two seat training version of the Forger, Yak-38U, is used aboard the carriers. One of the variations in its markings is the painting of the strake over the air intake in yellow rather than in blue camouflage.



Usually each carrier has a single Yak-38U trainer onboard.



A view of the nose of the Su-22M4. The air intake cone is silver with a green-dielectric plastic tip. The small optical port on the lower side of the cone contains a laser range-finder. The large probe over the intake has an angle-of-attack sensor and the antennas for an instrumented landing system. (Christopher Foss)



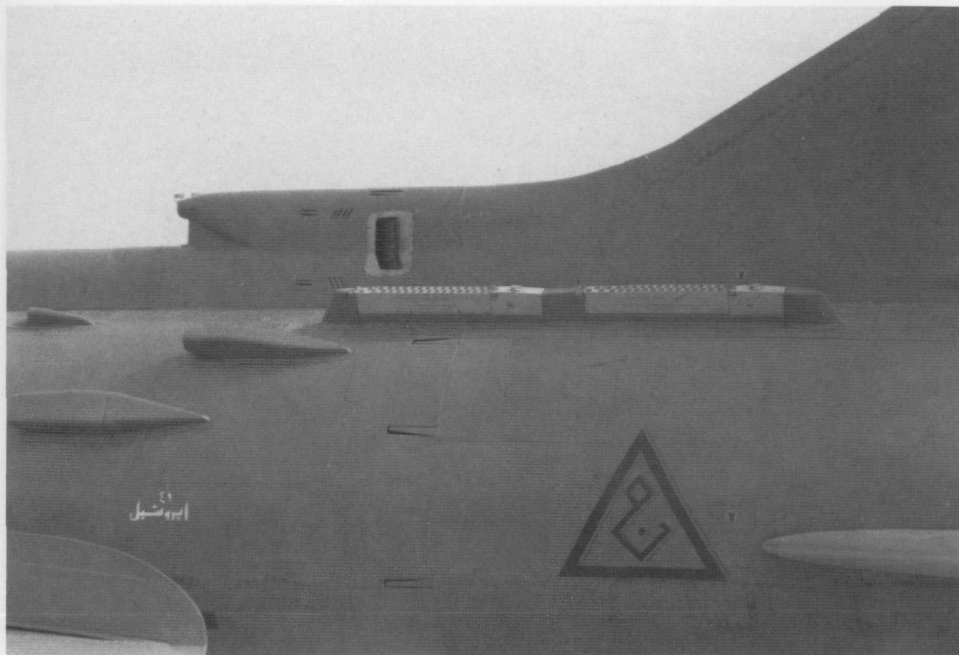
A detail shot of the undersurface pylon on the Su-22M4. This particular pylon can be fitted with either a missile launcher or a set of bomb shackles. (Christopher Foss)



A right side view of Su-22M4 of the Iraqi Air Force. These particular aircraft were received at the very end of the Iran-Iraq war, and may have seen limited combat. (Christopher Foss)



A Su-22M4, number 22564, of the Iraqi Air Force's Support Command, photographed near Baghdad in 1989. This particular aircraft is in the contemporary fit with two banks of ASO flare countermeasure dispensers located on either side of the fuselage spine. In Iraqi service, the Su-22M4 are finished in a two-tone tan and dark brown camouflage scheme with pale blue undersurfaces. (Christopher Foss)



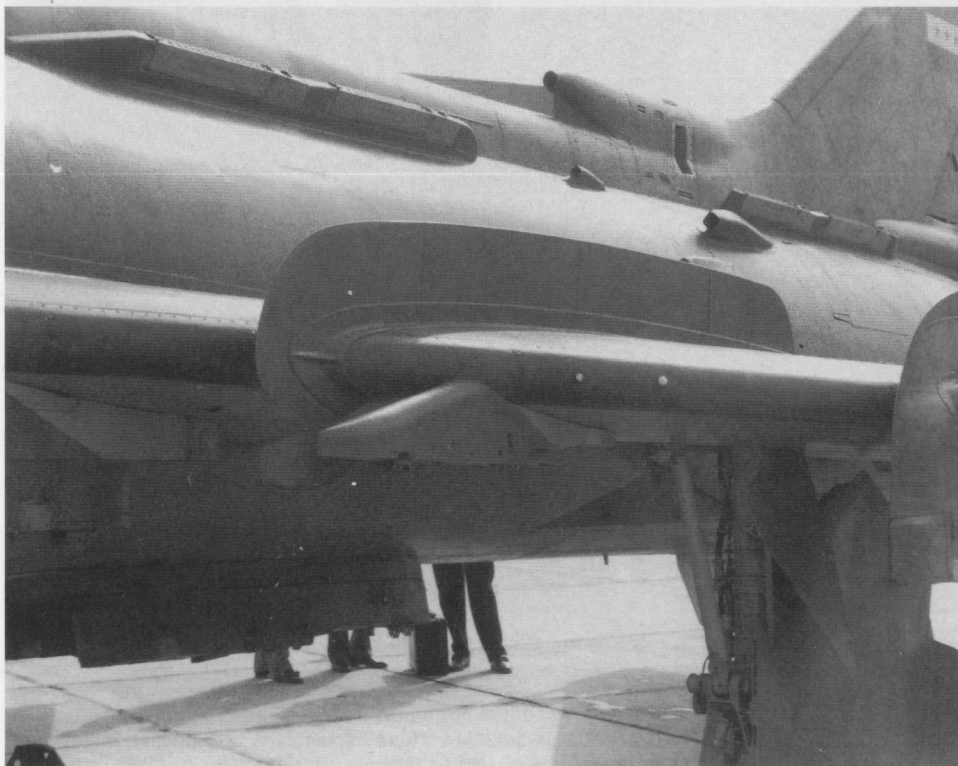
A close-up of the rear fuselage, clearly showing the ASO countermeasure flare dispenser. The small air intake at the root of the fin is the distinguishing feature between the M4 variant and earlier models of the Su-17/22 family. Also evident in this view is the Iraqi Air Force insignia. Most of the instruction stencilling on the aircraft is in English, but some has been repainted in Arabic as is evident here. (Christopher Foss)



A detail view of the nose of the Su-22M4. At the front corners of the landing gear door are two landing searchlights. Forward of these is a dark green dielectric panel for the radar altimeter, preceded by two unidentified antennas and a Khrom-Nikel IFF blade antenna. (Christopher Foss)



A close-up of the nose of Czechoslovak Su-22M4. These aircraft carry a distinctive yellow-red-black warning area around the air intake.



A close-up of the left wing, also showing details of the undercarriage. (Christopher Foss)

◀▲ An interesting view of the prominent wing fences on the Su-22M4. On the Fitter, the ASO flare dispensers are both mounted externally; on the Su-25, one set is mounted internally. (Christopher Foss)

▲ A view of the pylons on the Su-22M4. The underbelly pylons are frequently used for external fuel tanks (rear) and unguided rockets or guided missiles (forward). The outer and inner wing pylons are usually used for bombs or other ordnance, while the smaller inner pylon is frequently reserved for the R-60MK (AA-8 Aphid) self-defense missile. (Christopher Foss)

◀ A close-up of the left wing, also showing details of the undercarriage. (Christopher Foss)



A close-up of the nose markings on the Iraqi Su-22. The shield insignia above the angle-of-attack sensor (in the same colors as the national flag-green, white, red and black) is occasionally seen on Air Force aircraft. The aircraft number, painted in black, is in Arabic: 22564. (Christopher Foss)



One of the less common versions of the Fitter family is the Su-20 Fitter C, seen here operating with a Polish Su-20 regiment near Pila. This aircraft was an evolutionary bridge between the fixed wing Su-7 and the latter variable geometry wing Fitters. (Wojciech Luczak)



A view of the rear of the Su-22M4 fuselage, showing the exhaust pipe of the Lyulka/Saturn AL-21F3 engine. (Christopher Foss)



▲ An amusing (and rare) variation on a Soviet Su-17M3 is the transformation of the air intake warning on the nose into a set of jaws!

▲◀ The Su-25K Frogfoot was the most successful fixed wing ground attack aircraft in Afghanistan. It's semi-official nickname especially amongst ground troops, is *Grach* (meaning rook, a type of Russian crow) due to its appearance with its wingtip dive brakes open. However, amongst its crew, it is more popularly called *Cheburashka*, "Little Critter". This particular aircraft, blue 04, is with a Soviet regiment near Chojny in Poland. It appears to be painted with sprayed bands of sand over the usual temperate mid-dark green/sand scheme. Also evident are the Exemplary aircraft insignia in red on the nose and the white and pale blue Sukhoi marking on the tail. The armament is also unusual, apparently the new 320mm unguided rocket, with a pair of R-60MK (AA-8 Aphid) self defense missiles.

◀ A Su-25K of the Support Command of the Iraqi Air Force. This aircraft, numbered 25590, is finished in a standard desert scheme of tan and dark brown with pale blue undersurfaces. (Christopher Foss)

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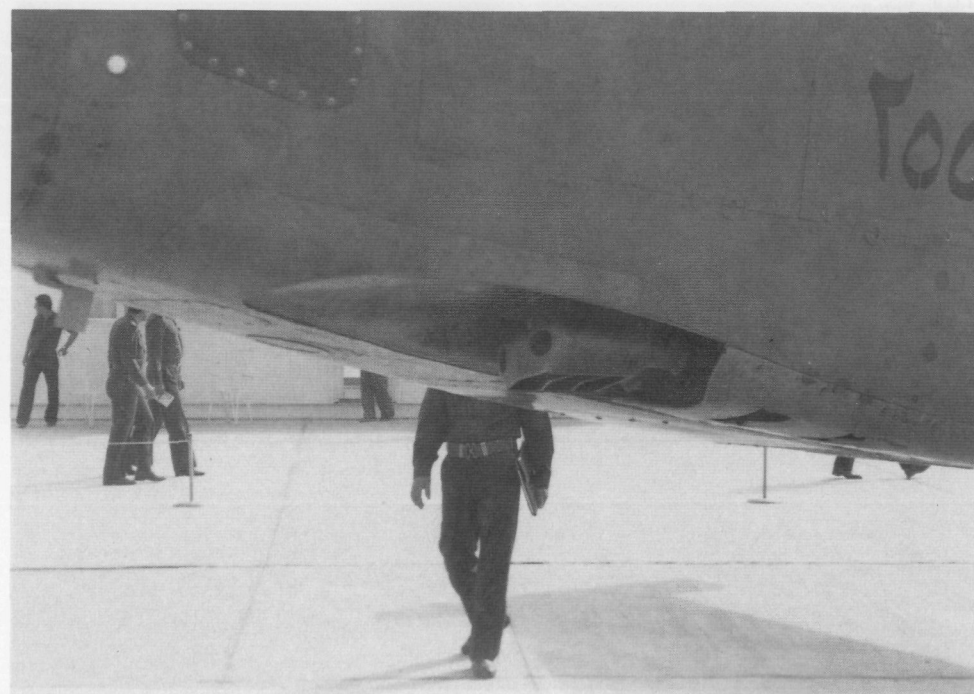
Another view, of the left side, of an Iraqi Su-25K. The national insignia consists of the Air Force insignia on the rear fuselage and the national flag on the tail. (Christopher Foss)



This view better illustrates the national insignia on this aircraft. It also highlights the fact that this aircraft lacks the additional ASO flare container mounted on Soviet aircraft in 1988.



A Czechoslovak Su-25K during landing roll with its parachute deployed.



A close-up detail view of the 30mm cannon station on the Iraqi Su-25K. (Christopher Foss)



A close-up shot of the nose probes on the Su-25K. At the top of the nose is the Khrom Nickel IFF blade antenna.



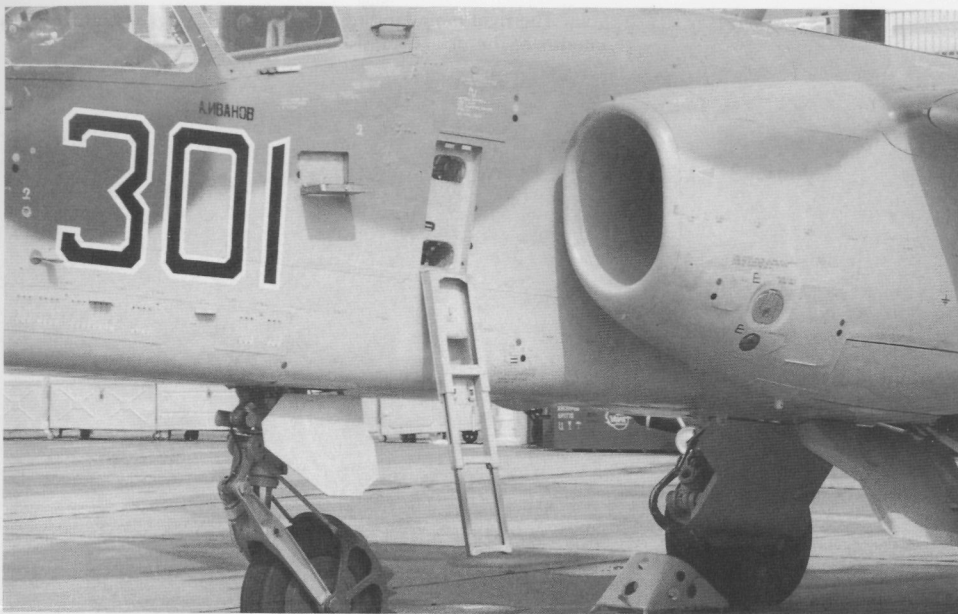
A close-up of the Su-25K canopy. The Su-25 has a much smaller gun sight than the HUDs fitted to contemporary Soviet fighters, and so has better vision from the canopy.



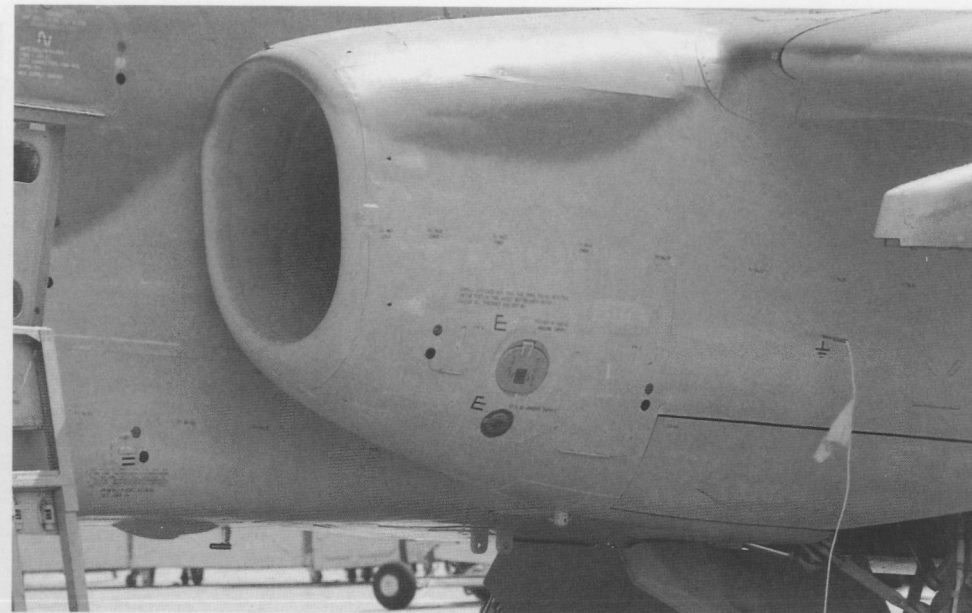
A close-up of the opened canopy. Prominent on the crest of the canopy is a small periscope, positioned to allow the pilot a view over the rear of the aircraft to watch for enemy fighters.



A view of the right fuselage nose with the canopy open.



A detail shot of the self-contained ladder for the pilot. The interior of these panels is a pale green color.



A close-up of the left air intake showing the extensive stencilling and maintenance information, painted in yellow, red and dark blue.



A detail view of the front wheel from the left side of the aircraft.



A rear view of the landing gear from the right, showing details of the anti-FOD debris catcher.



The right main landing gear. The landing gear itself and the interior of the doors is finished in the undersurface color.



Another detail view of the landing gear showing the hydraulic lines feeding the wheel brakes.

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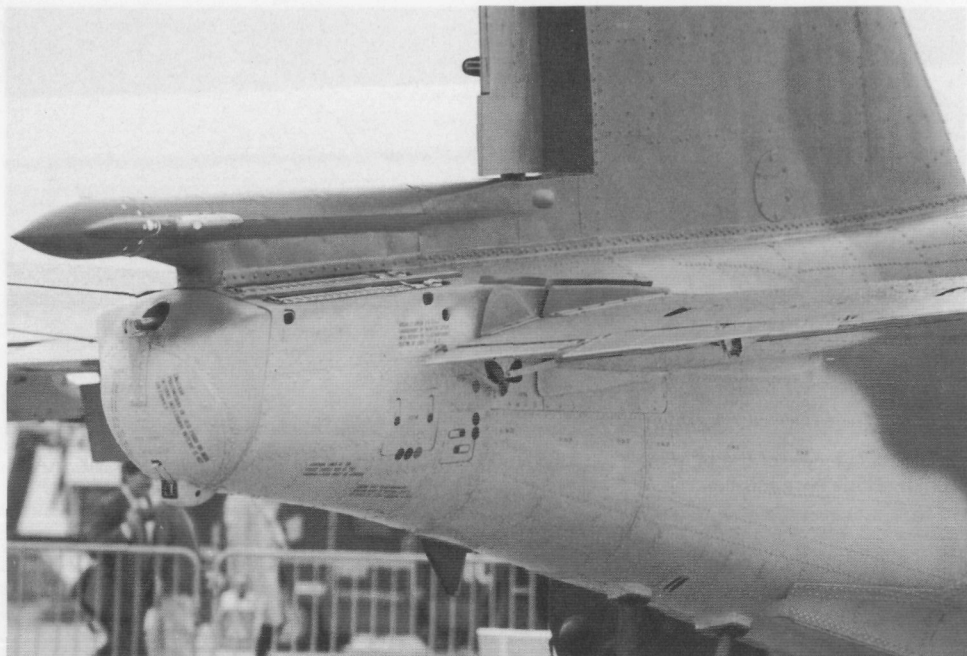


▲ A close-up view of the front landing gear. The anti-FOD debris catcher at the rear of the wheel is finished in dark green, as is the wheel hub.

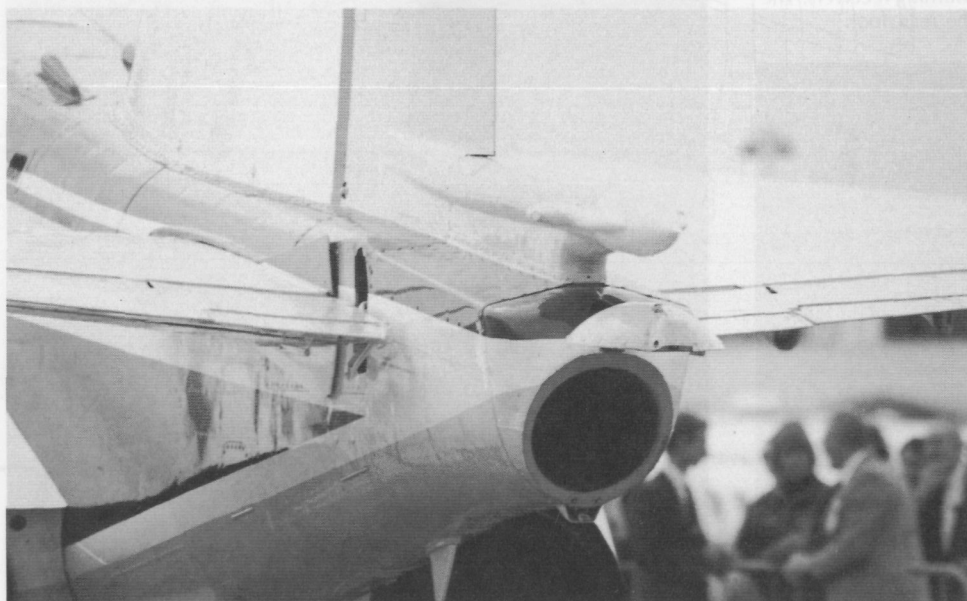
▲► A detail view of the flaps at full extension, on the unarmed Su-28 trainer.

► An overhead shot of the rear of the aircraft, giving an idea of the positioning of the ASO flare dispensers over the rear engines.

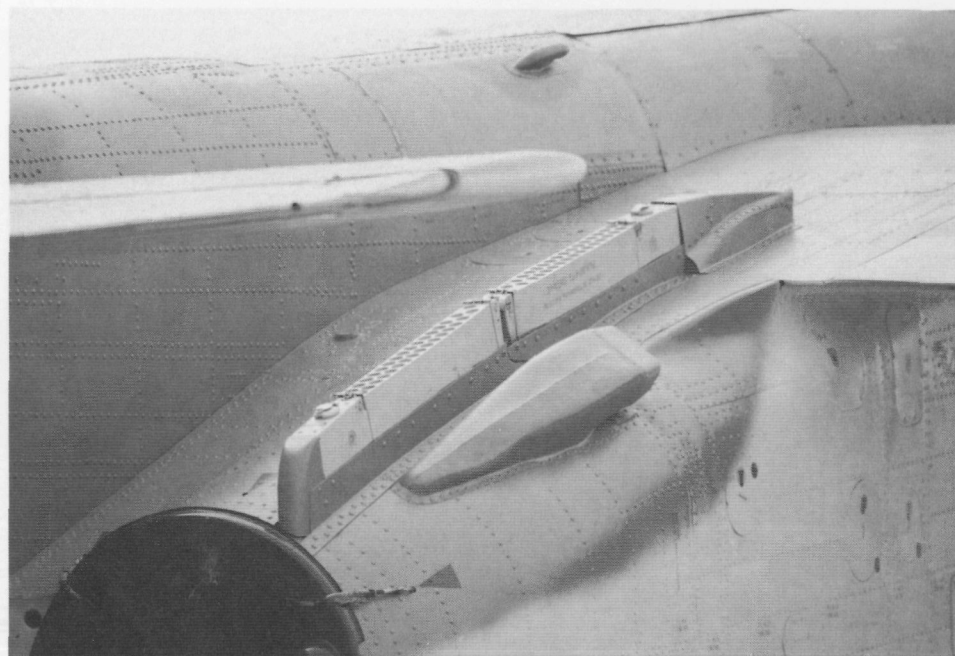




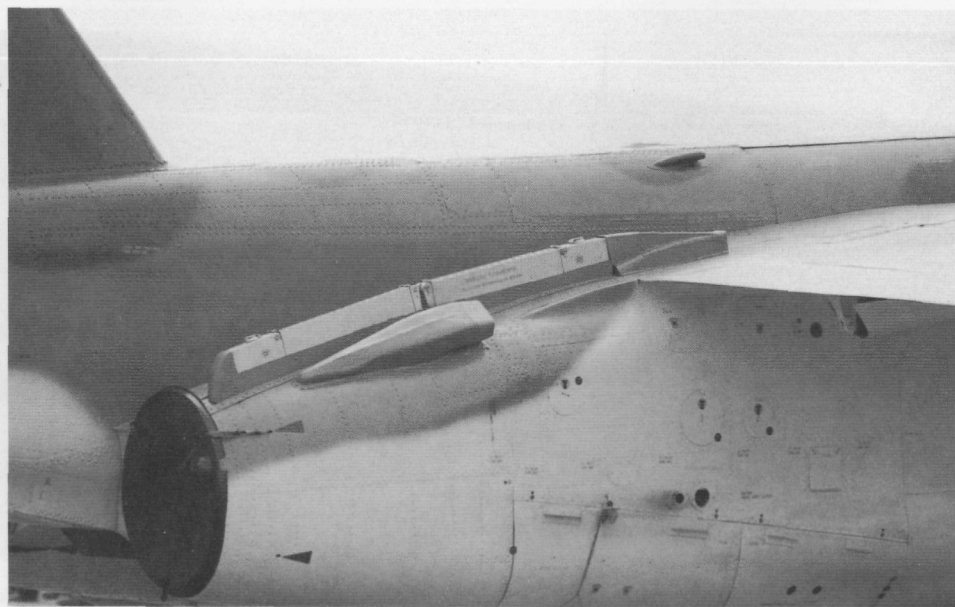
This view of the tail also shows the two rows of ASO flare dispensers mounted flush in the fuselage. These flare dispensers were a standard fit in the mid-1980's, prior to the Afghanistan mod program of 1988.



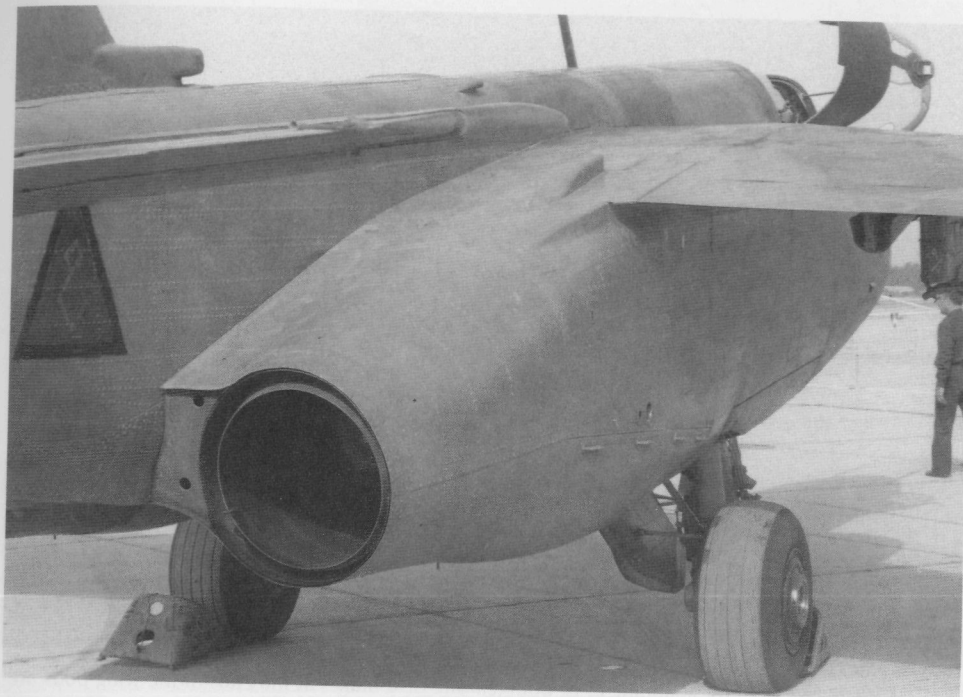
An interesting view of the tail of an Su-28 displayed at Le Bouget with the parachute brake housing open.



A close-up of the definitive version of the Su-25K with the 1988 Afghanistan mods. A large air intake was added to bleed cooling air into the exhaust wash. In addition, two racks of ASO flares were added over the engine. The main change of the 1988 mods was the addition of an internal armor partition between the two engines to prevent fires from spreading from one side to the other, a major cause of Grach losses in Afghanistan.



A view of the modified engine on the Su-25K also showing the extensive stencilling.



This photo of an Iraqi Su-25K clearly shows the differences with the modified Afghanistan aircraft. Note the lack of the air intake and ASO flare dispensers. (Christopher Foss)



Besides the unarmed Su-28, a combat capable version of the Su-25K is also manufactured, the Su-25UB. Like the fighter, it carries the 30mm cannon, evident in this view of a Czechoslovak aircraft.

A close-up of the canopy of the Su-25UB. Note that there is protective armored glass panels between the front and rear crew stations.



The Su-28 is an unarmed trainer version of the Su-25, and is also sometimes called the Su-25UT. It is intended to replace L-39 Albatross trainers in DOSAAF flight schools. The scheme here is for the DOSAAF schools.



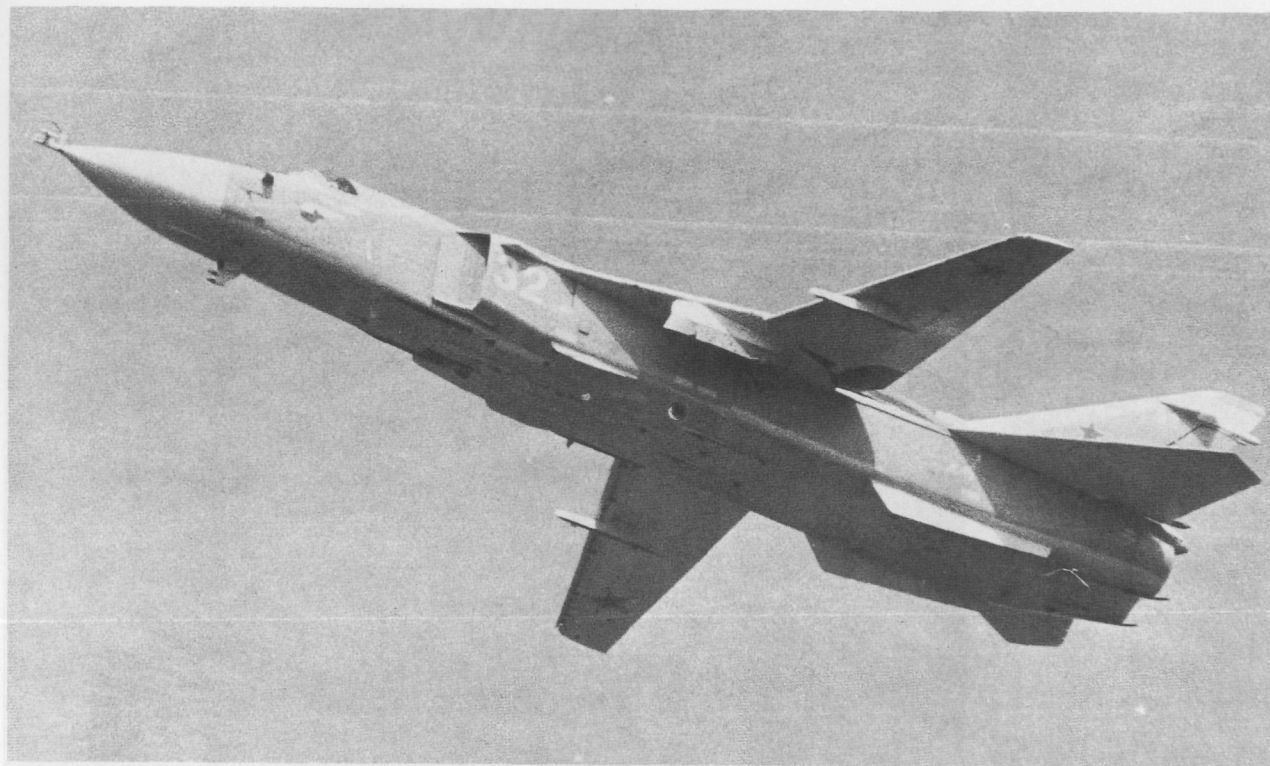
A Su-28 comes in for a landing at Le Bourget. The dive brakes at the ends of the wing pods are extended to bleed off speed.



The Su-28 training scheme is overall white with pale grey undersides, decorated with blue and red trim.

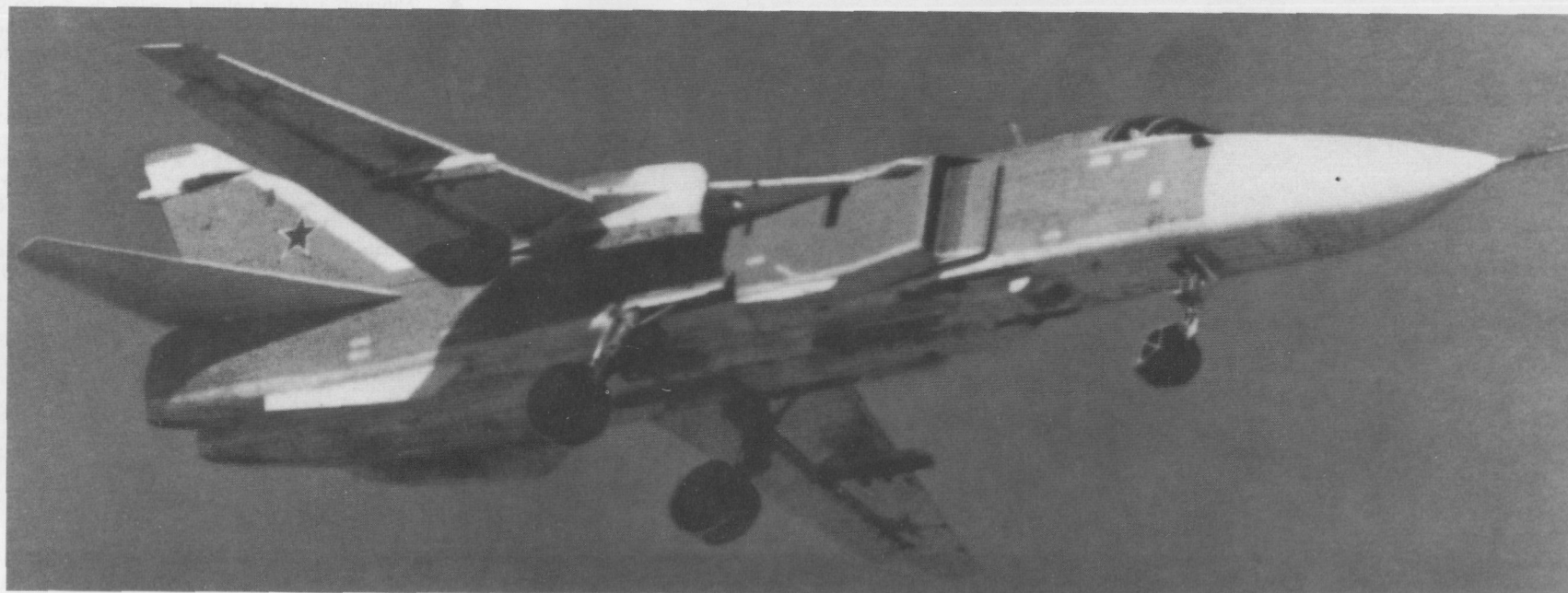


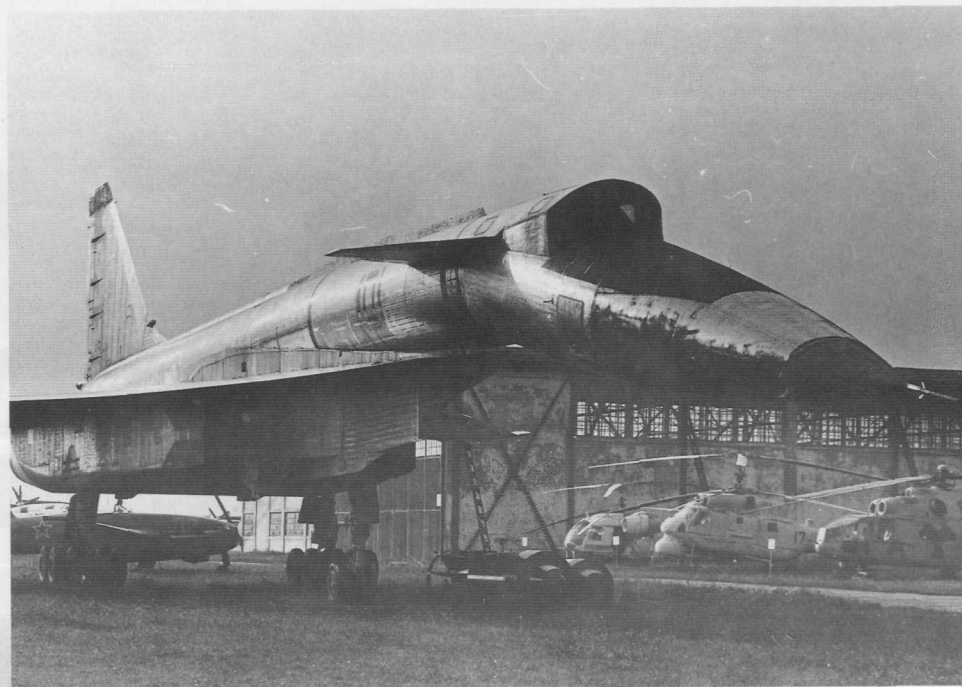
A close-up of the nose of the Su-28. The insignia in front of the fuselage number is associated with Sukhoi aircraft, and is apparently a variant company emblem.



The most capable of the Soviet strike aircraft is the Su-24 Fencer, seen here in the Su-24 Fencer C variant. This version has the short nose, but carries the improved electronic warfare suite with the RWR receivers on the engine air intake and on the tail.

The standard production variant of the Su-24 today is the Su-24M Fencer D. It incorporates a more sophisticated attack/navigation system, including an improved terrain following radar under a new, elongated nose.





▲ Although it never entered service, the Su-100 Sotka was one of the most advanced Soviet bombers of its day and the first Soviet aircraft to use fly-by-wire flight controls. Also called the T.100, it was a competitor to the Su-24 design, and was armed with two Sukhoi-designed air-to-surface nuclear missiles. The Su-24 was selected instead of the Su-100 since it was more versatile in the strike role.

▲▲ A Su-24M showing a complete range of weapons underneath it. The aircraft itself is carrying FAB-100 bombs on a multiple ejector rack, and AS-11 Kilter anti-radar missiles. The underbelly pod is an unusual addition and may be an ESM type.

◀ A pair of Su-24M. For training, the UB-32 rocket pod is a standard fitting. The carrying capacity of the Su-24 permits a double-pod pylon to be carried at the inner wing station. (Hans-Heri Stapfer)

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An Su-24M at Khodynka in 1989. This particular aircraft differed from earlier Su-24Ms in that it lacked the large wing fence usually found on this type and is intended for export. (Nick Cook)



An Su-24M Fencer D on a peacetime training mission armed with S-5 57mm rocket pods. These pods are commonly used in peacetime training, though in combat, the Su-24 would more commonly be used with more sophisticated ordnance. (Sovfoto)



A pair of Yak-38 naval strike aircraft aboard the light carrier Novorossisk. The Yak-38 is considered to be an attack aircraft, rather than a fighter by the Soviet Navy. (Sovfoto)



The rear deck of the Novorossisk is laden with Yak-38 fighters. The high attrition rates of the Yak-38 have led to a situation where the Soviet Navy has been having difficulty fielding full squadrons onboard the Kiev class carriers. (Sovfoto)



A Soviet Air Force Su-25K Grach landing with its braking parachutes fully extended. This particular aircraft has blue "bort" numbers. (Sovfoto)



An overhead view of a Czechoslovak Su-25K Grach of the 30th Air Assault Regiment, showing its multi-tone camouflage scheme. This scheme appears to be a local Czechoslovak variant. (Yves Debay)



A pair of Su-25K on a practice mission. The aircraft uses subdued "bort" numbers, simply a hollow white stencil with no interior color. (Sovfoto)



An Su-25K Grach (Frogfoot A) of the Czechoslovak 30th Air Assault Regiment in Pardubce, sitting in front of a hardened aircraft shelter. (Yves Debay)



The Su-25K Grach displayed at the Paris Air Salon in 1989. This particular aircraft had been flown by one of the most decorated pilots of the Afghanistan war, Col. A. Rutskoï. Rutskoï was shot down twice, once over Pakistan. This particular aircraft narrowly missed being downed over Pakistan by an F-16 firing Sidewinder missile, but had to be heavily re-built before being placed back in service.



The Su-25K is fitted with a Severin K-36 ejection seat (as in the MIG-29 and Su-27). However, it is fitted with a panel of protective armor over the headrest for additional protection.



This photo of the mid-section of the aircraft shows the large bay doors over the engine, developed to allow the aircraft to be easily serviced in the field.



A close-up of the nose of Rutskoï's Grach. The front laser-ranger panel is covered by a protective green cover. This view shows the twin-barrel 30mm cannon to the right. The two nose probes are the ILS antenna to the left of the picture and the pitot to the right. Under the fuselage is a glossy dark green radar altimeter panel.



The Su-25K at Farnborough was in an unusual scheme which may have been special for the show. It consisted mainly of medium brown/dark brown, with patches of dark green. The more common scheme in Soviet service is medium green/dark green, with patches of sand (medium brown). The cockpit inscription in blue is A. Ivanov, the Sukhoi test pilot.



The weapon's systems officer of a Plzen 11th Helicopter Regiment Mi-24V boards his helicopter. His left foot is on the radio-command guidance antenna pod used to control the Shturm-V anti-tank missile. The sub pylon behind the cockpit area is for a missile-warning sensor, sometimes dubbed "the Natasha device". (Yves Debay)



An Mi-24D Hind D of the 51st Helicopter Regiment in Prostějov. This older variant of the Mi-24 is characterised by the rail-launchers for the older Falanga-P (AT-2 Swatter) anti-tank missiles.



A nose view of a Czechoslovak Mi-24V of the 11th Helicopter Regiment. The nose stencilling reads: Zaryadka ChSPU-24, indicating the reloading point for the nose YaKB-12.7 machine gun. (Yves Debay)

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The Mi-28 Havoc may be amongst the most effective of combat helicopters, but its gargoyleish face is also amongst the ugliest! This is a view of the third prototype of the Mi-28, displayed at the Paris Air Salon at Le Bourget in 1989.



The 2A42 cannon on the Mi-28 has large silver sights on either side of the turret assembly.



A view of the interior of the gunner's cabin. The interior seen here is finished almost entirely in black.



The principal anti-tank armament of the Mi-28 is a total of 16 Shturm (AT-6 Spiral) radio-command guided anti-tank missiles. Behind them is a 20 round launcher for the new S-8 80mm rocket launcher.



◄▲ The latest Soviet strategic bomber is the Tu-160 Blackjack which entered operational service in 1988.

▲ A Tu-160 Blackjack strategic bomber in flight. This aircraft is also called a *raketnosets* by the Soviets since its main armament is RK-55 cruise missiles or AS-16 Kickback penetration-aid missiles. (Sovfoto)

◄ This view of the third prototype of the Mi-28 Havoc shows it in the new configuration from winter 1989-1990 trials. It has a slightly reconfigured stub winglet compared to the configuration at Le Bourget in 1989. A sensor rod is fitted to the 2A42 30mm autocannon during the trials. (Sovfoto)



The primary armament of the Tu-22M2 Backfire B is a standoff missile, often the AS-4 Kitchen as seen in this view.



A pair of Tu-22M3 Backfire Cs on a peacetime exercise, armed with K-26 missiles. This type of aircraft is categorized by the Soviets as a *Raketnosets*-Missile-carrier, rather than as a bomber. (Sovfoto)



A side view of a Tu-22M3 Backfire C bomber armed with a K-26 air-to-surface cruise missile. (Sovfoto)



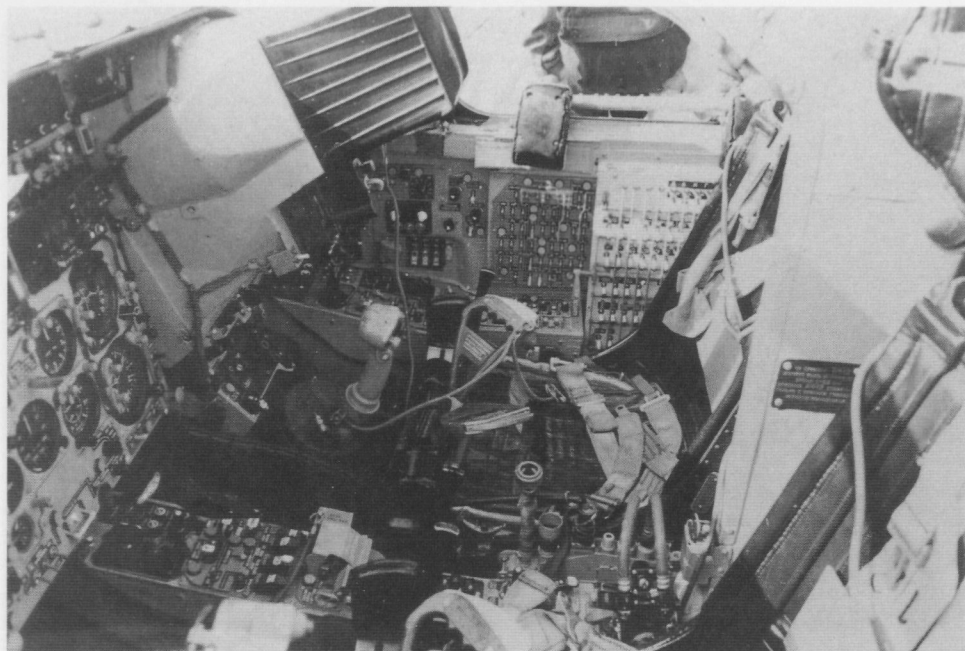
A nose-on view of a Tu-22M3 Backfire C bomber showing the characteristic features of this variant: the high speed air intakes and new nose. (Sovfoto)



◀◀ An unusual set of markings for pair of Su-24M. The extensive white bands and trim are probably in use during wargames to represent aircraft of the "aggressor force". (Hans-Heiri Stapfer)

◀ This view provides a good look at the typical antenna array of the tail as well as the parachute brake housing. (Nick Cook)

▲ A Soviet crew prepares a Su-24M for flight. The nose gear configuration of the -M is slightly different than on earlier models of the Su-24, the principal difference being the forward door which now splits. (Hans-Heiri Stapfer)



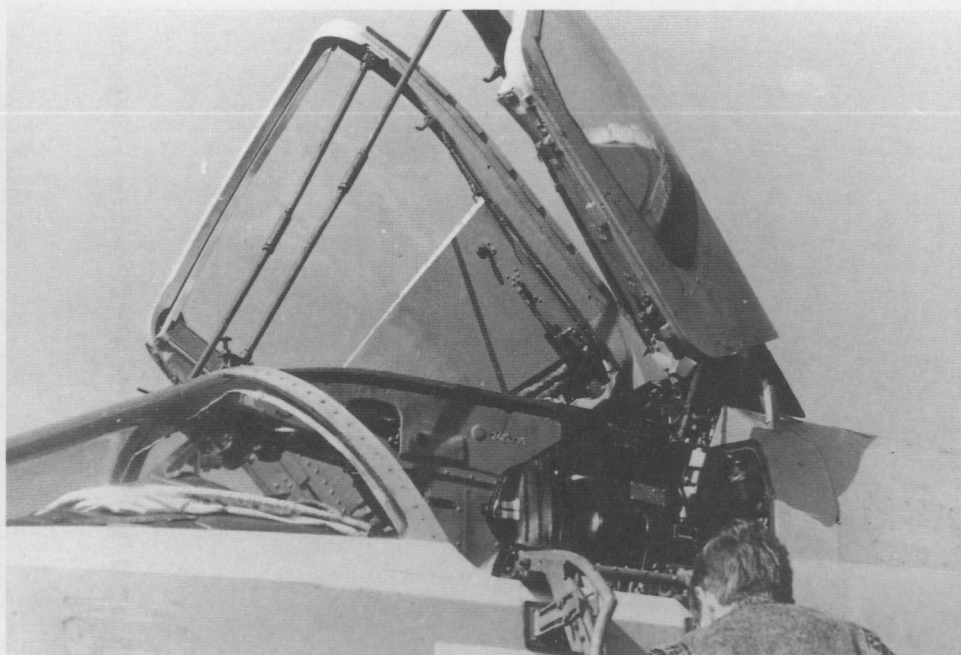
A view towards the right side of the Su-24M cockpit, showing the *shтурман* station. The most noticeable element is the hood for the *shтурман* which contains the display for the terrain following radar.



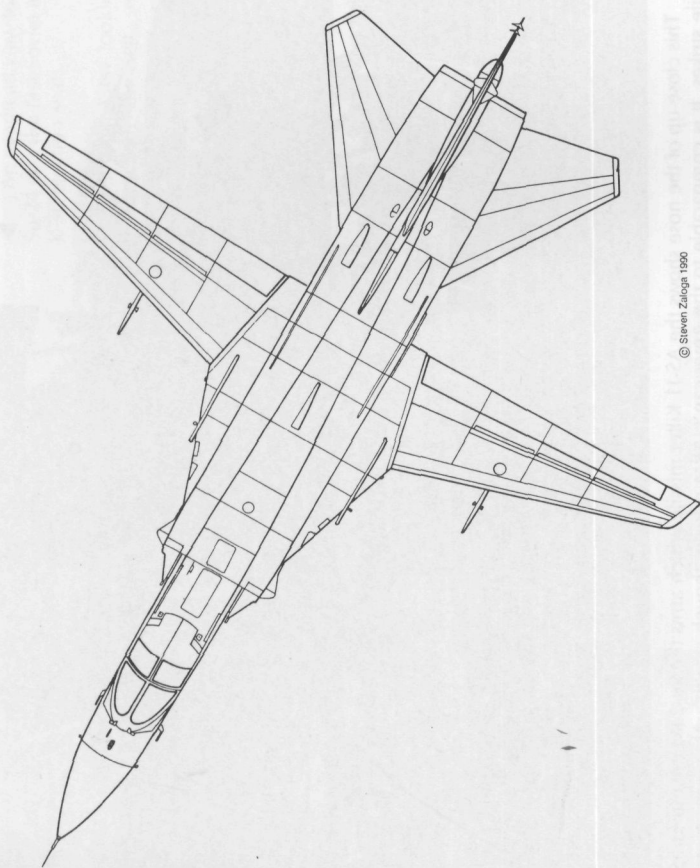
A detail view under the belly of an Su-24M.



A cockpit interior view of the Su-24M Fencer D. This view shows the left side where the pilot sits.

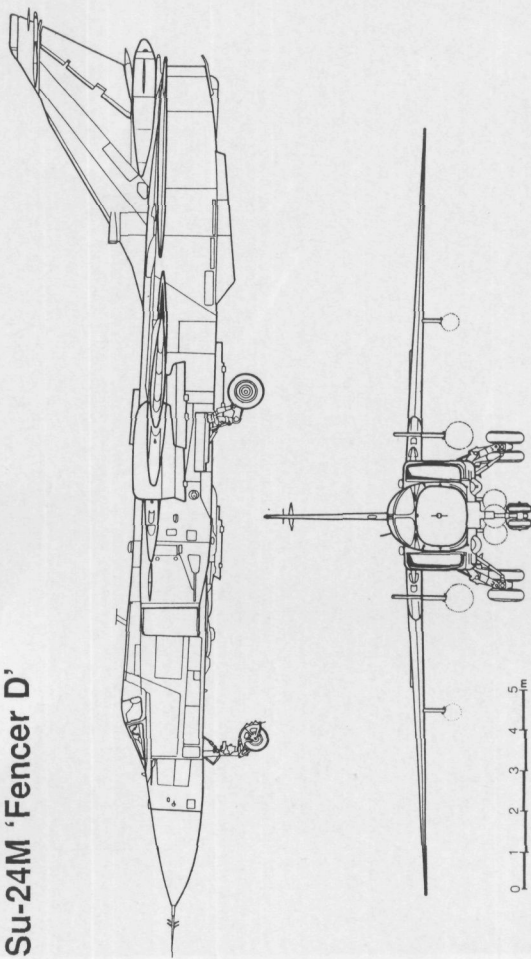
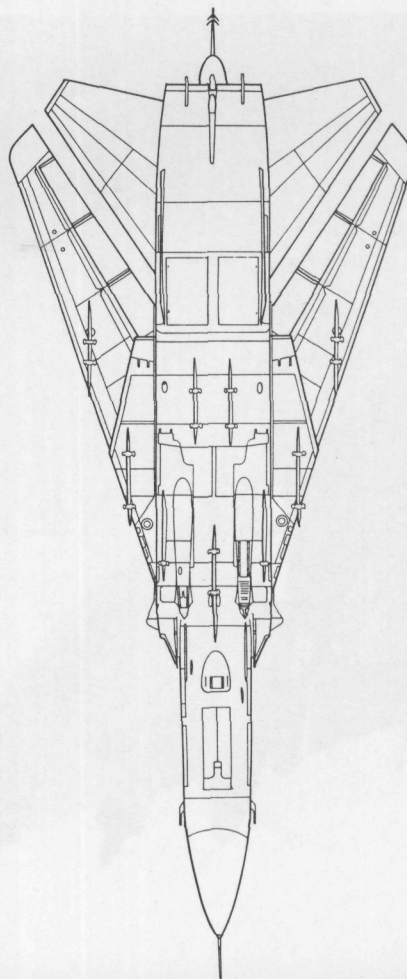


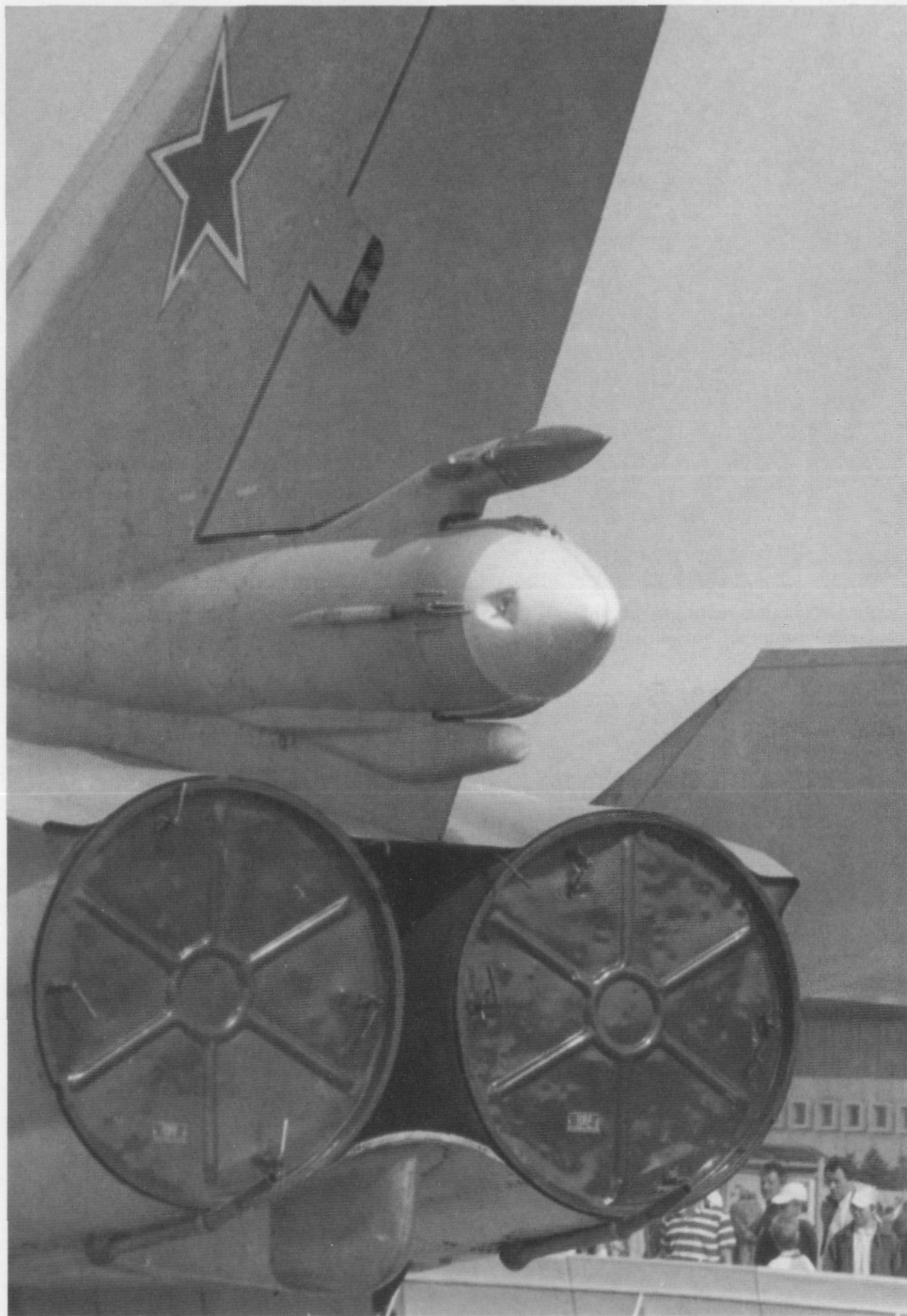
A view of the Su-24M cockpit with the canopy open.



© Steven Zaloga 1990

Su-24M 'Fencer D'





A detail view of the tail fairing which contains the braking parachute. The engine exhausts are covered with typical metal covers, usually painted bright red. (Nick Cook)



This close-up of the nose shows the AS-11 Kilter missile which arms the Su-24M on anti-radiation missile strikes. It is comparable to the American HARM missile, though significantly larger. Note the Sukhoi production insignia under the cockpit. (Nick Cook)



A view of the tail tip on the Khodynka Su-24M. The prominent fairings above the number 38 were first seen on the Fencer C variant and contain rearward pointing radar warning antennas. (Nick Cook)



◀ An overhead view looking into the cockpit of the Su-24. The Su-24 was the first Soviet aircraft to use the new universal Severin K-36 ejection seats.

▶ Another view looking into the cockpit of the Su-24. The *shturman* in the left seat has a large hooded display for attack/navigation radar.

▼ This overhead shot of a lineup of Su-24M show the longer nose of this variant.



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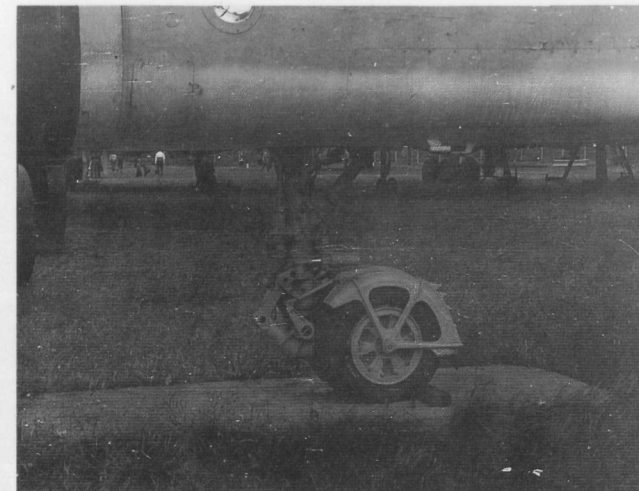
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The Su-24MP Fencer F, an electronic warfare variant of the Su-24 series. It is identifiable by the antenna under the nose and the sickle shaped antenna barely evident under the number (17) on the lower edge of the fuselage side.



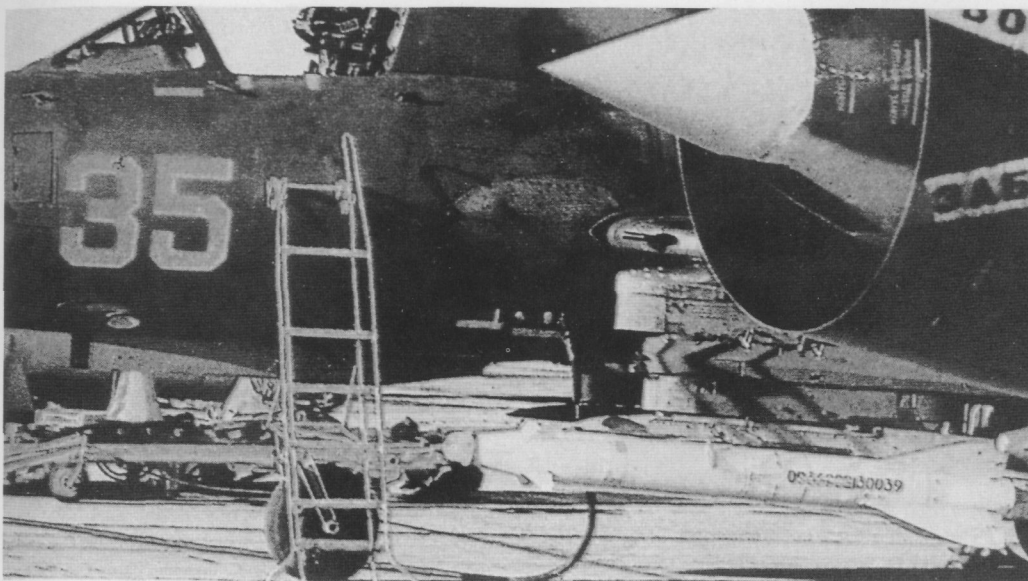
When armed with conventional bombs, the Su-24M often uses retarded bombs with ballutes. This rare photo shows the ballute retarded bombs in use.



A close-up of the anti-FOD cover on the front nose wheel of the T-6 prototype at Monino, but essentially similar to that fitted to the standard Su-24.

Another detail view of the anti-FOD device on the T-6 prototype at Monino, and similar to that on the current production aircraft.



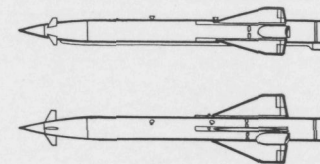


▲ The AS-10 Karen (Soviet designation: Izdeliye 69) is a small laser-guided air-to-surface missile which is replacing the earlier S-7 Kerry. Here is seen on a Soviet Su-17 Fitter.

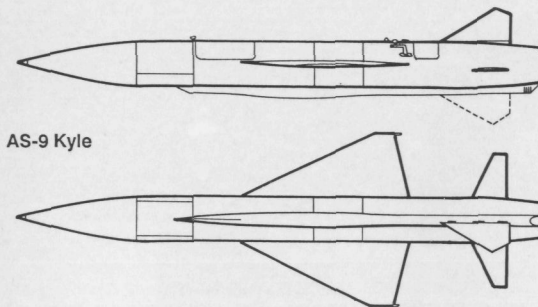
▼ A close-up view of an AS-11 Kilter anti-radar missile as displayed at Khodynka under an Su-24. Above the missile can be seen the electro-optical guidance station added to the Su-24M Fencer D series for guiding advanced precision-guided missiles and bombs. (Nick Cook)



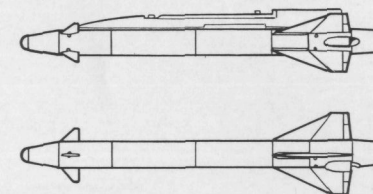
AS-7 Kerry



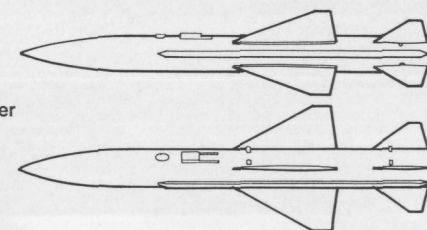
AS-9 Kyle



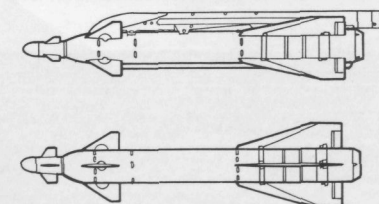
AS-10 Karen



AS-11 Kilter



AS-14 Kedge



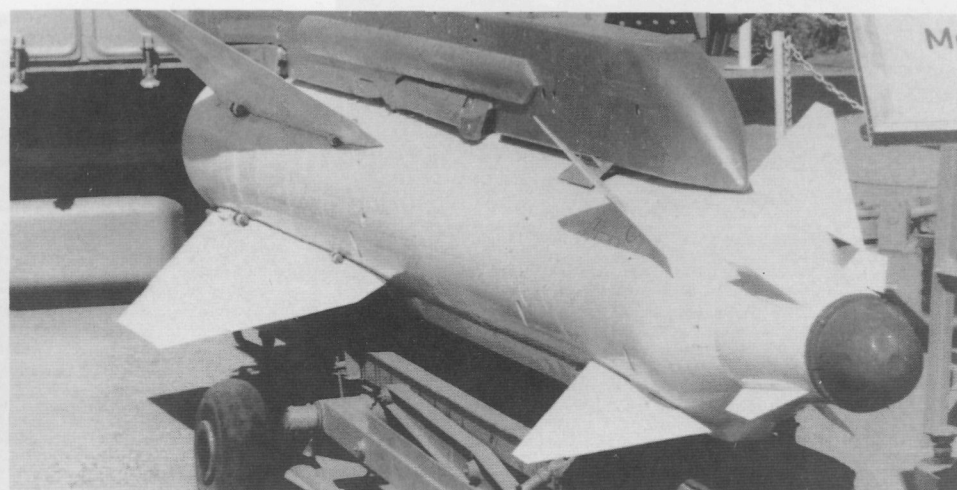
Soviet Tactical
Air-to-Surface Missiles



© Steven Zaloga 1990



The S-24 is a large 240mm diameter unguided rocket fired from Soviet attack aircraft. This view shows a pair of S-24 of Iraqi manufacture, called the Nasser 240. (Christopher Foss)



The AS-14 (Soviet designation: Kh-29L and Izdeliye 64) is a laser guided missile similar in size to the American Maverick air to surface missile. It is typically carried by larger strike aircraft such as the Su-24.



The FAB-500 is a typical Soviet unguided high explosive bomb, seen here fitted to the rear station of a MIG-27KR. It is popularly called the Kaira by Soviet pilots, named after a type of bird found over the North Sea.

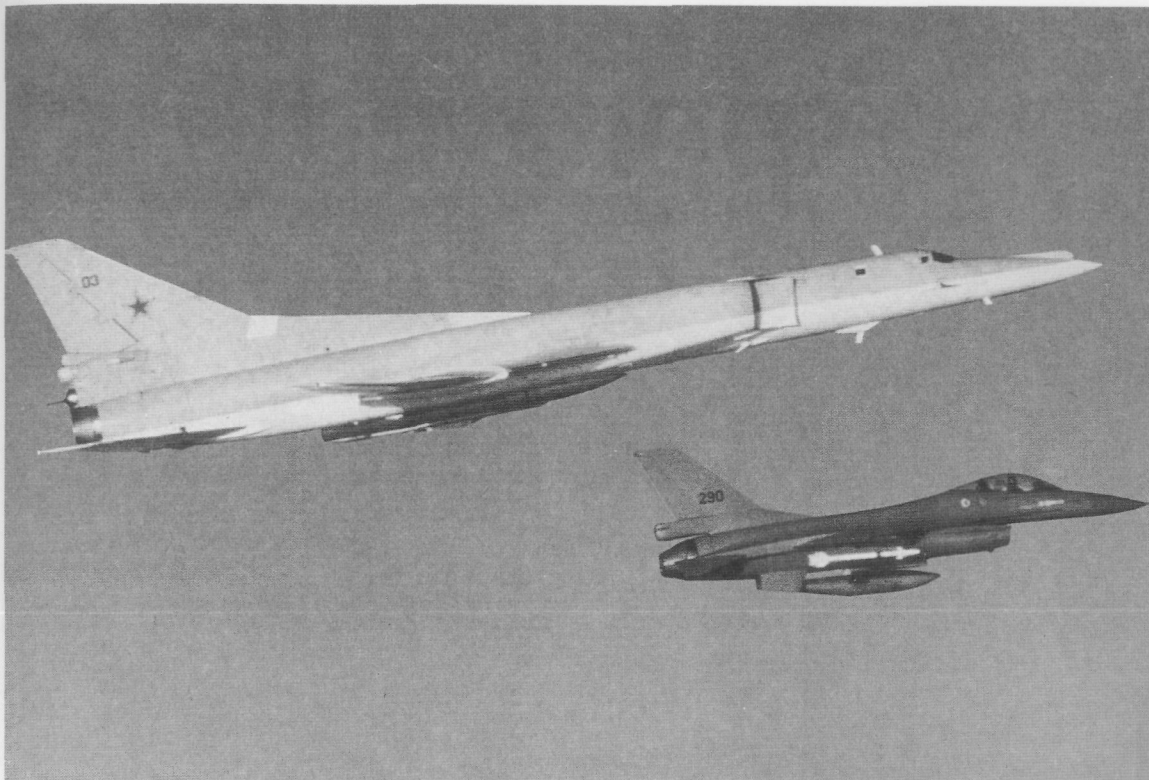
The AS-9 Kyle is a large anti-radiation missile fired from Soviet bomber aircraft against air defense radars. This particular example is in Iraqi service.

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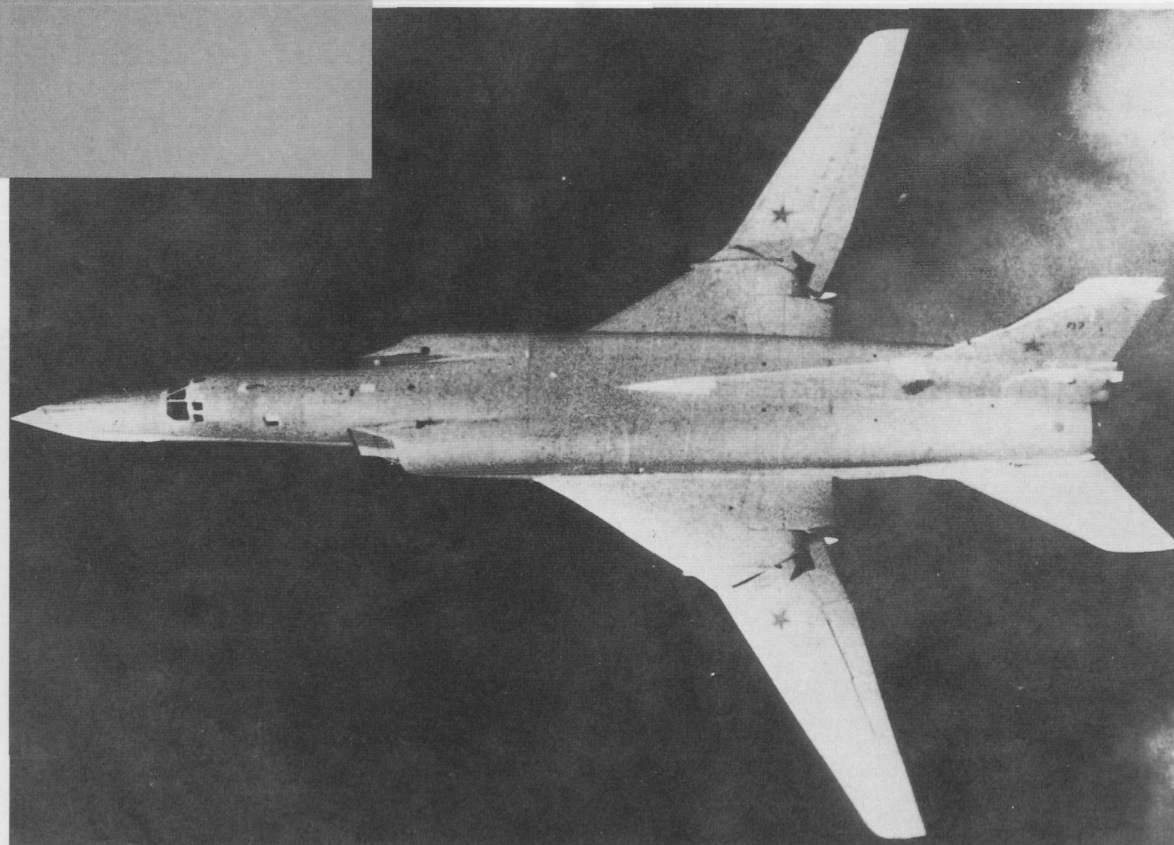
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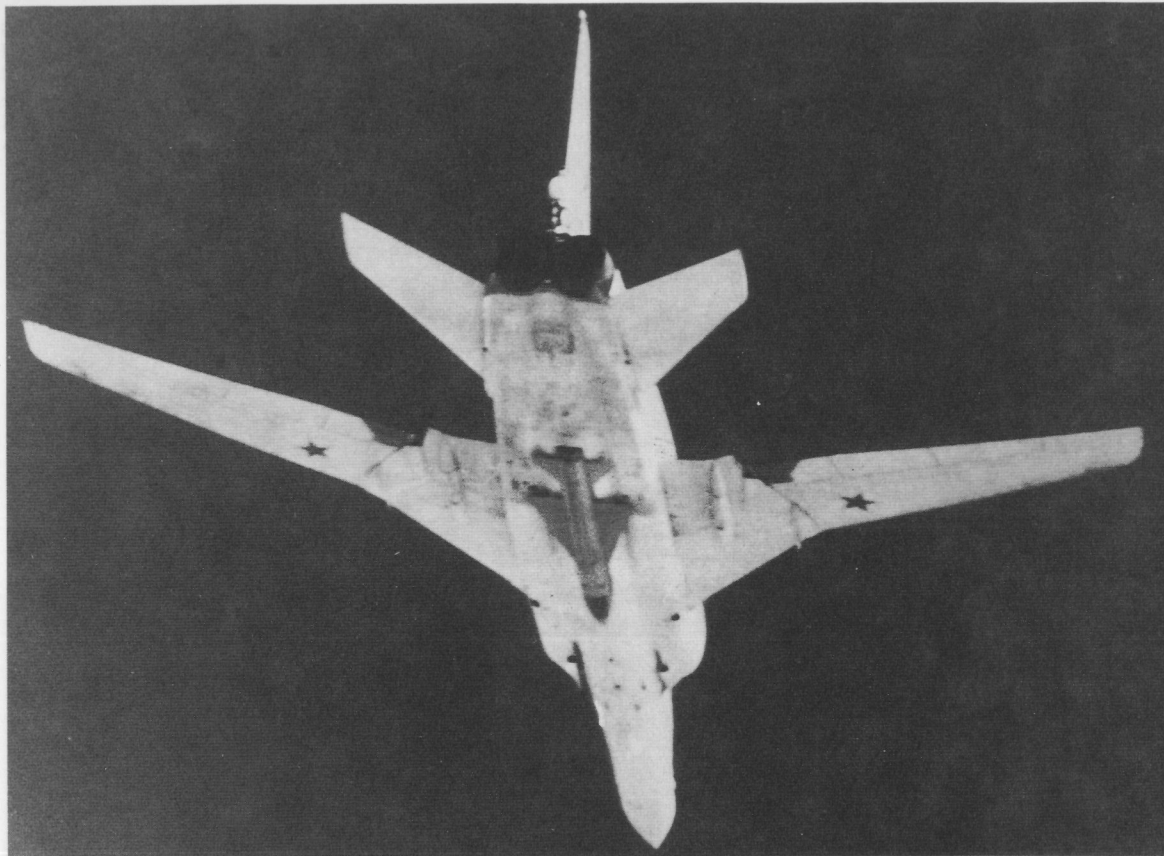


aircraft has a new attack/navigation radar as is evident from the change in the nose
exhaust. It also uses chisel exhausts similar in shape to those on the MiG-25
fighter. This particular aircraft has twin missile pylons for the AS-4 Kitchen.

An overhead view of the Tu-22M2 Backfire B bomber. The Soviets publicly designate this aircraft the Tu-22M, though its relationship to the Tu-22 Blinder bomber is only superficial. The Tu-22M2 is used both by the Long range Aviation regiments of the air force, and by the Soviet Navy for the anti-shipping role.



The Tu-22M2 Backfire B is the most common version of this long-range bomber. The Backfire has been the source of interminable wrangling with the United States during arms control negotiations, with the US arguing it is a strategic bomber and the Soviets arguing it is not. Both sides reached a compromise, and the Soviets agreed to delete the nose refueling probe, evident here by the truncated fairing on the upper nose.



Another view of Tu-22M2 Backfire B showing the location of the AS-4 Kitchen missile.



The most recent version of the Backfire is the Tu-22M3 Backfire C. This aircraft has a new attack/navigation radar as is evident from the change in the nose contours. It also uses chisel exhausts, similar in shape to those on the MIG-25 fighter. This particular aircraft has twin missile pylons for the AS-4 Kitchen.



The prototype of the Tu-22M1 Backfire A differed from the production Tu-22M2 Backfire B in a number of details including the larger rear brake fairing on the tail and the under-nose attack sensor. The prototype was designated Tu-126, which has led to the Backfire sometimes being mislabeled as the Tu-26.



The typical armament of the naval Tu-22M2 is the AS-4 Kitchen (Soviet designation: K-26) anti-ship missile. It can carry one in a recessed bomb bay as seen here, or two on outer wing pylons. Land attack versions of the missile are also employed.

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▲ Surprisingly, the Tu-142 Bear production line was reopened in the early 1980s to produce the new Tu-142MK Bear H. This variant of the Bear is intended as a cruise missile carrier, armed with the RK-55 (AS-15 Kent) air launched cruise missile. One is seen here off the Canadian Arctic coast, intercepted by a CF-18 Hornet.

► The Tu-142MK is based out of Dolon in Central Asia, but flies long patrol missions out over the Bering Sea near the Alaskan coast, here being intercepted by an Alaskan-based F-15 Eagle.

▲► The latest Soviet strategic bomber is the Tu-160 Blackjack. Although similar in appearance to the American B-1A bomber, it is significantly larger and heavier.

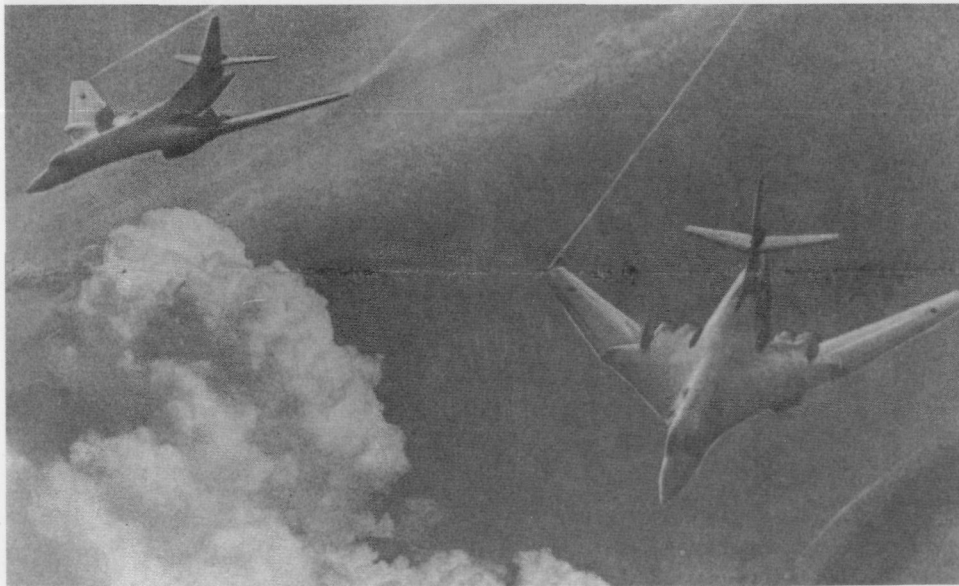




A stylish view of a Tu-160 bomber accenting its long nose. The aircraft is blandly finished in overall white.



A view of the fly-over of a Tu-160 at the Khodynka airshow in 1989.

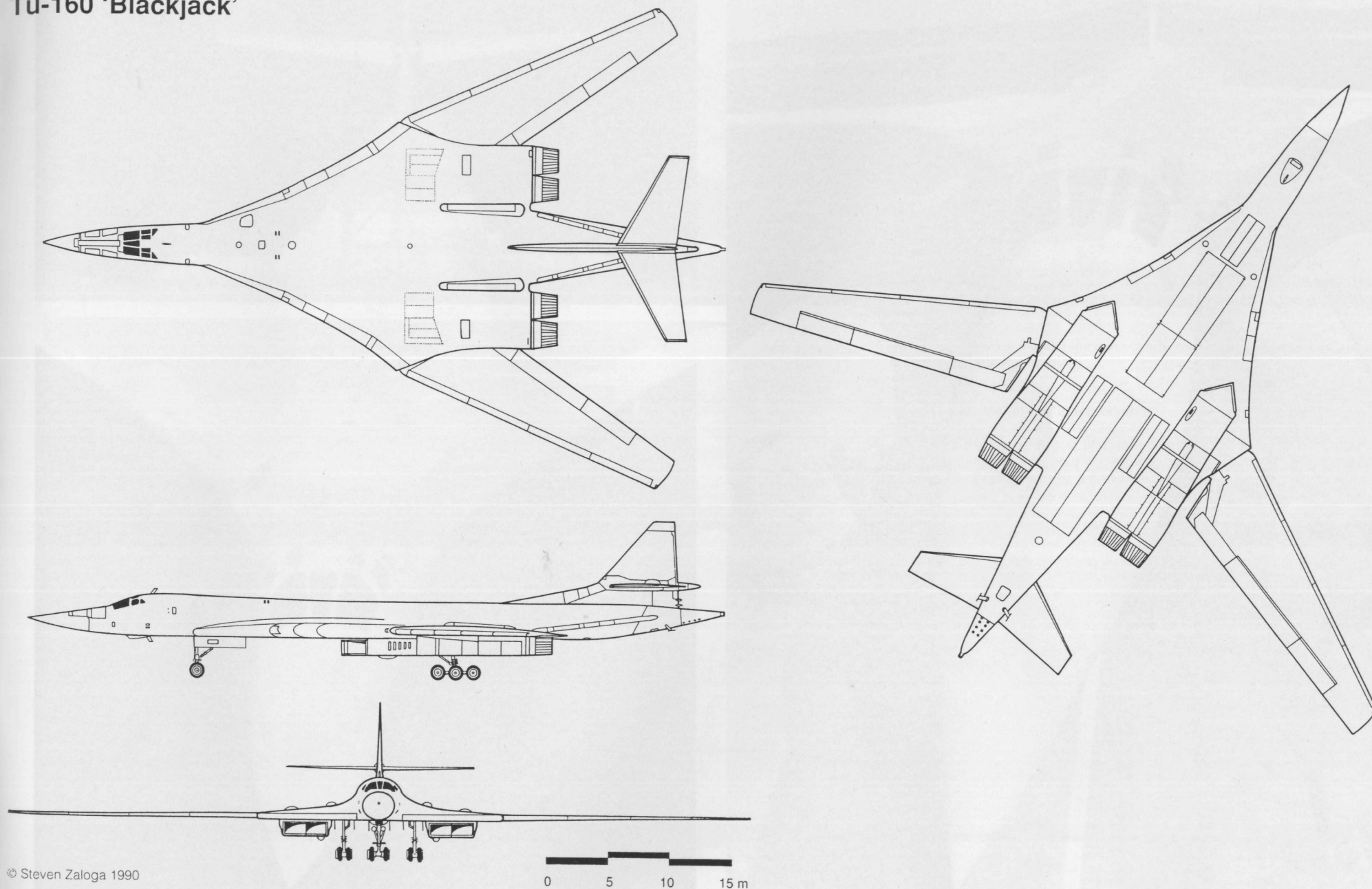


A pair of Tu-160 Blackjack bombers. Although not of the best quality, this photo illustrates the large wing-fences that have been seen on some Blackjack bombers.

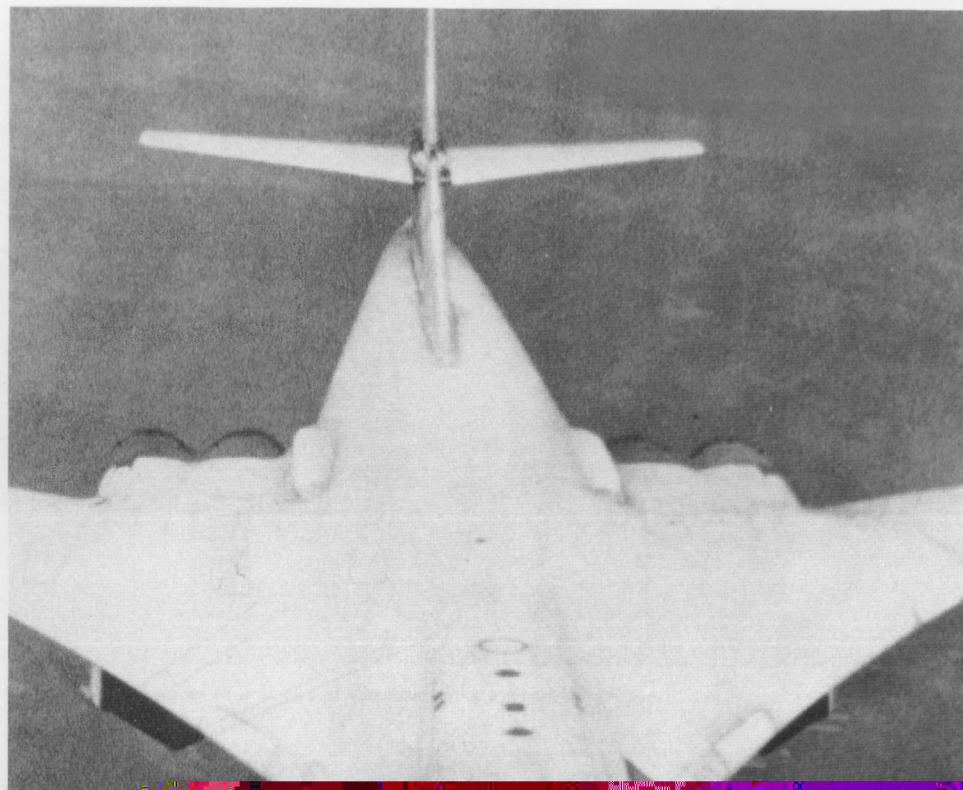
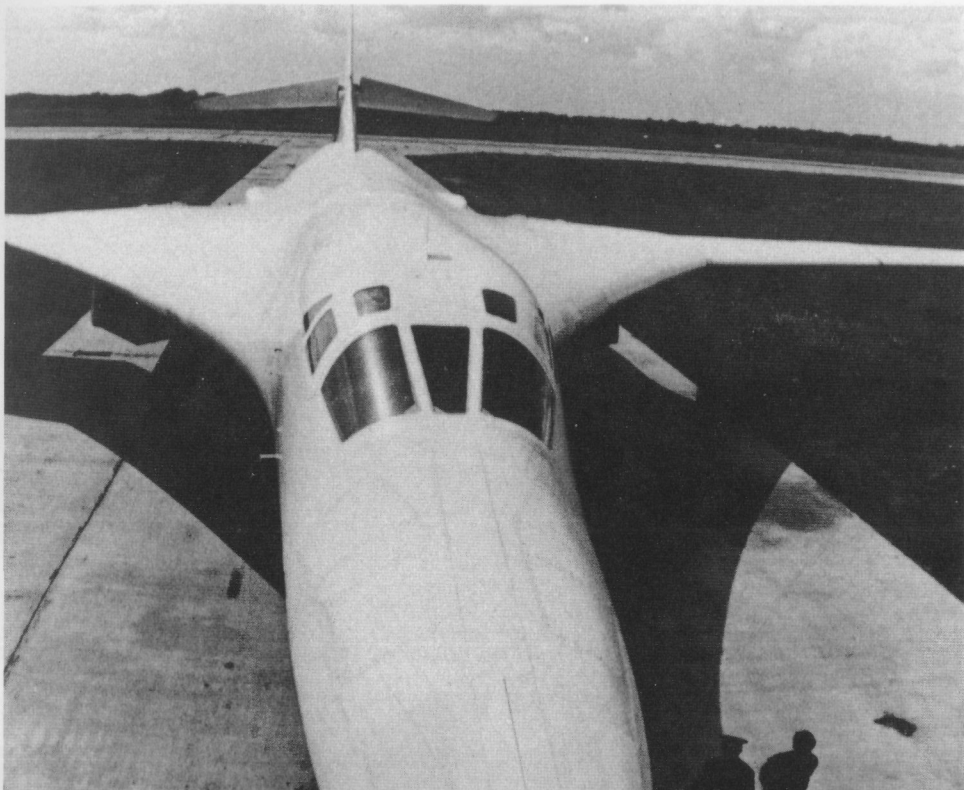


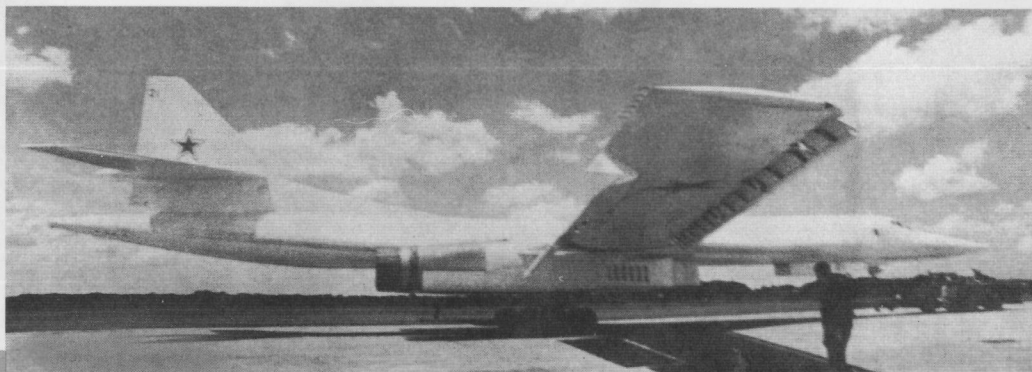
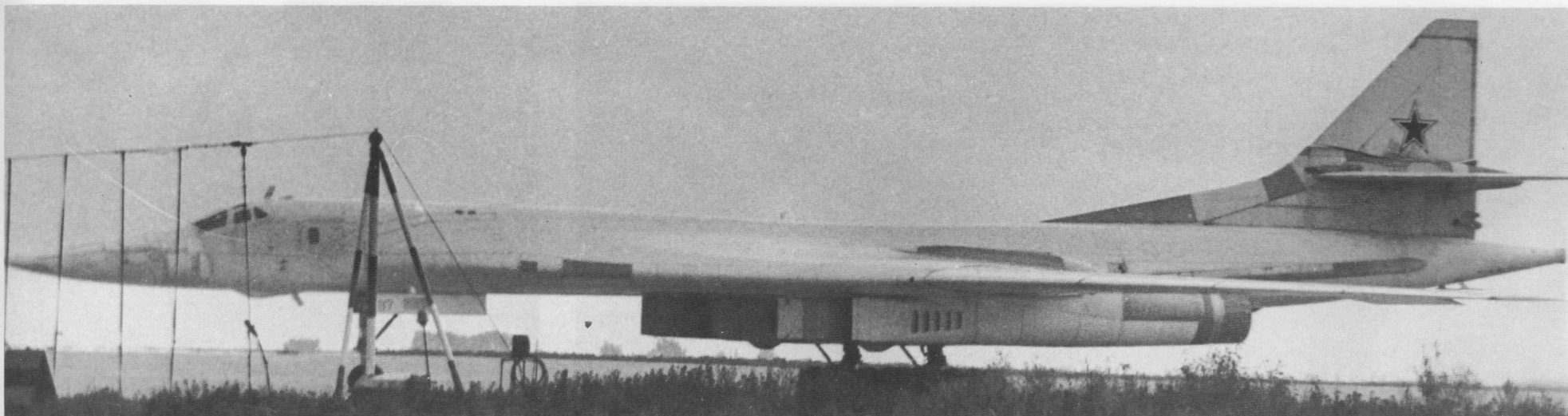
Although an elegant aircraft in the air, crews of the Tu-160 have complained about the lack of adequate maintenance equipment and training simulators.

Tu-160 'Blackjack'



© Steven Zaloga 1990

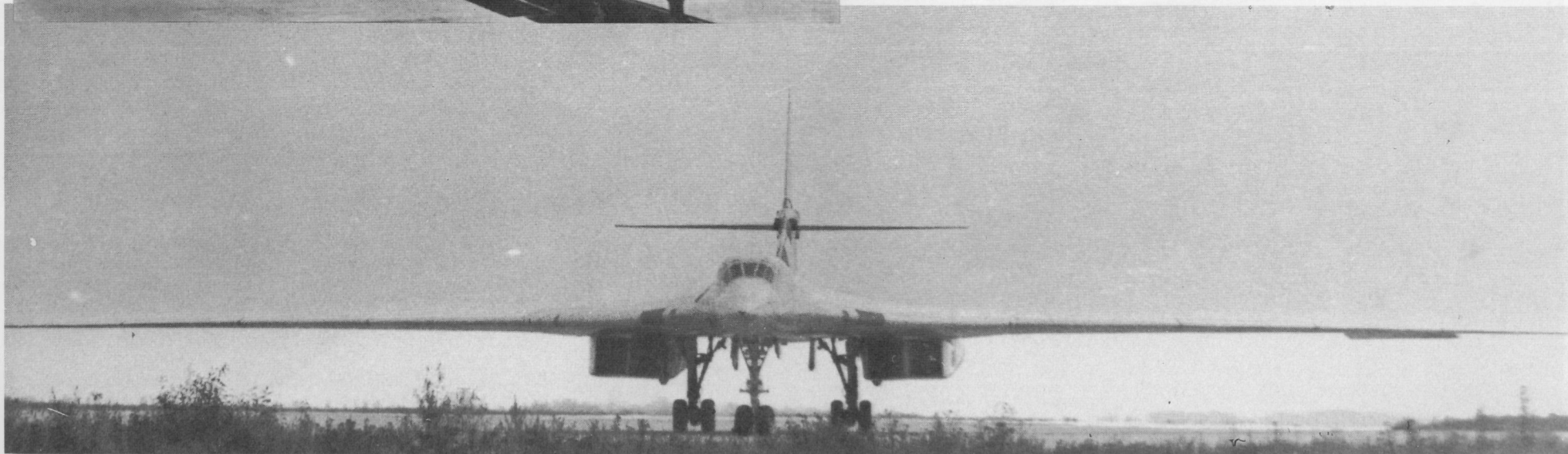




◀ An interesting view under the wing of a Tu-160, accenting its long profile and displaying the leading edge slats.

▼ A head-on view of the Tu-160 bomber.

▲ A side view of the Tu-160 Blackjack bomber. Although basically painted white overall, there are a number of dielectric panels left in a pale grey color, and elements of the engine housing left in bare metal.





An interesting view of a Tu-160 overhead showing the flaps fully extended.

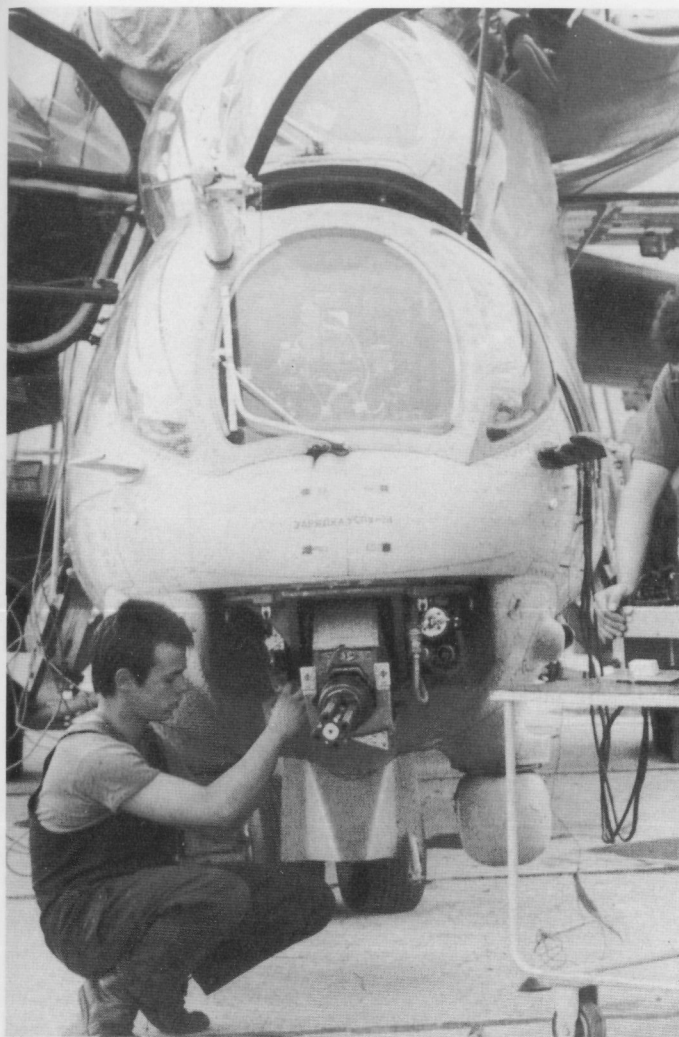
A view of a Tu-160 Backfire A approaching for a landing.



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▲ The nose armament system of the Mi-24D Hind D is designated the USPU-24. It is armed with a YakB-12.7 four-barrel heavy machine gun, developed by P. Yakushev and B. Borzov.

▲► Among the current users of the Mi-24 Hind is India, which flies the Mi-25 Hind D export variant.

► The Mi-24 Hind E from a Pacific based regiment. The Hind E is armed with four 9M114 Shturm (AT-6 Spiral) radio-command guided anti-tank missiles which has necessitated the addition of a new guidance antenna under the nose.





The latest armament variation on the Mi-24 family is the Mi-24P, armed with a twin GSh-30-2 30mm cannon in place of the usual YakB-12.7.



A close-up of the barrel of the YakB-12.7 machine gun on the nose of the Mi-24D.



The combat experience in Afghanistan against heat-seeking anti-aircraft missiles has led to a number of antimissile countermeasures. This Mi-24VE has the later ASO-3 configuration, with the flare dispensers mounted on the fuselage side (behind the star). On the fuselage spine behind the rotor is the prominent "Hot Brick" system, used to confuse the sensor in heat-seeking missiles. This aircraft is not fitted with the usual hot-gas diffuser normally fitted over the exhaust pipes.



The 9M114 Shturm/AT-6 Spiral anti-tank missile requires a different command guidance antenna than earlier models, and is seen here in close-up.



The Mi-35P displayed at Helitech in Britain in 1989. This is an export version of the Soviet Mi-24P and is armed with a pair of 30mm cannon in place of the usual turret armament. (Peter Wernli)



A rear view of the Mi-35P Hind helicopter. It is armed with the Shturm (AT-6 Spiral) missiles. (Peter Wernli)



This overhead view of a Mi-24R Hind G shows the stub winglet attachment points which characterize this variant, and also show the uncommon 350 liter drop tanks.



The most mysterious version of the Hind is the Mi-24R Hind G. It is basically similar to the Hind D, but lacks the missile armament on the stub winglets. It was originally believed to be chemical detection variant, but is now believed to be an electronic warfare type. The devices on the wing-tip may be configured for this role.



The Mi-28 has undergone evolution during its development, this view showing the first prototype with a different exhaust diffuser, different electro-optical nose sensor package and modified gun package.



The side profile of the Mi-28 is considerably sleeker than the older Mi-24 since it lacks a center troop compartment.



Another view of the nose of the Mi-28. This view emphasizes the 30mm 2A42 cannon, the S-8 80mm rockets and the eight Shturm (AT-6 Spiral) anti-tank missiles.



At Le Bourget, the Mi-28 was painted in a three-color camouflage scheme not seen on other attack helicopters, and possibly developed for the show. The H-390 tail code is also for show purposes only.



A right side view of the Mi-28. The pilot sits in the upper rear station, the gunner in the lower forward station.



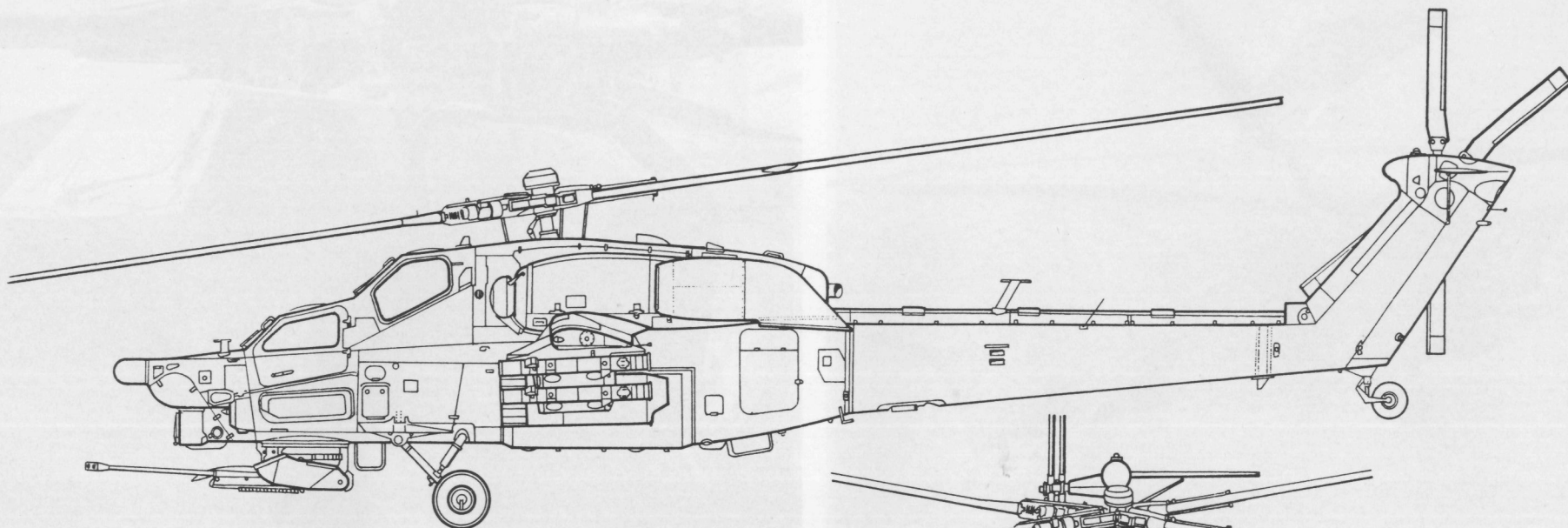
A view of the pilot's station with the armored door open. The panel at the front of the door is armor, a reminder of the lessons of the Afghanistan war.



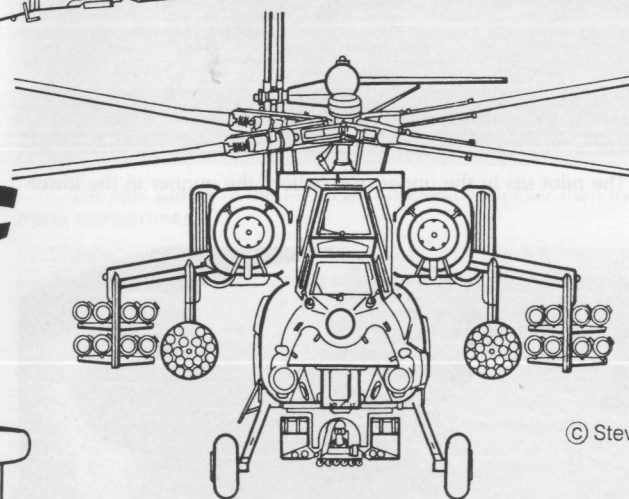
A close-up view of the nose of the Mi-28 Havoc. The production program of the Mi-28 has been delayed by slow development of thermal imaging night sights for the aircraft. As a result, the cheek mounted sights were blanked over at Le Bourget. The sight in the center turret is a daylight only sight for the gunner. The black nose dimple is the antenna cover for the guidance system of the Shturm missile.



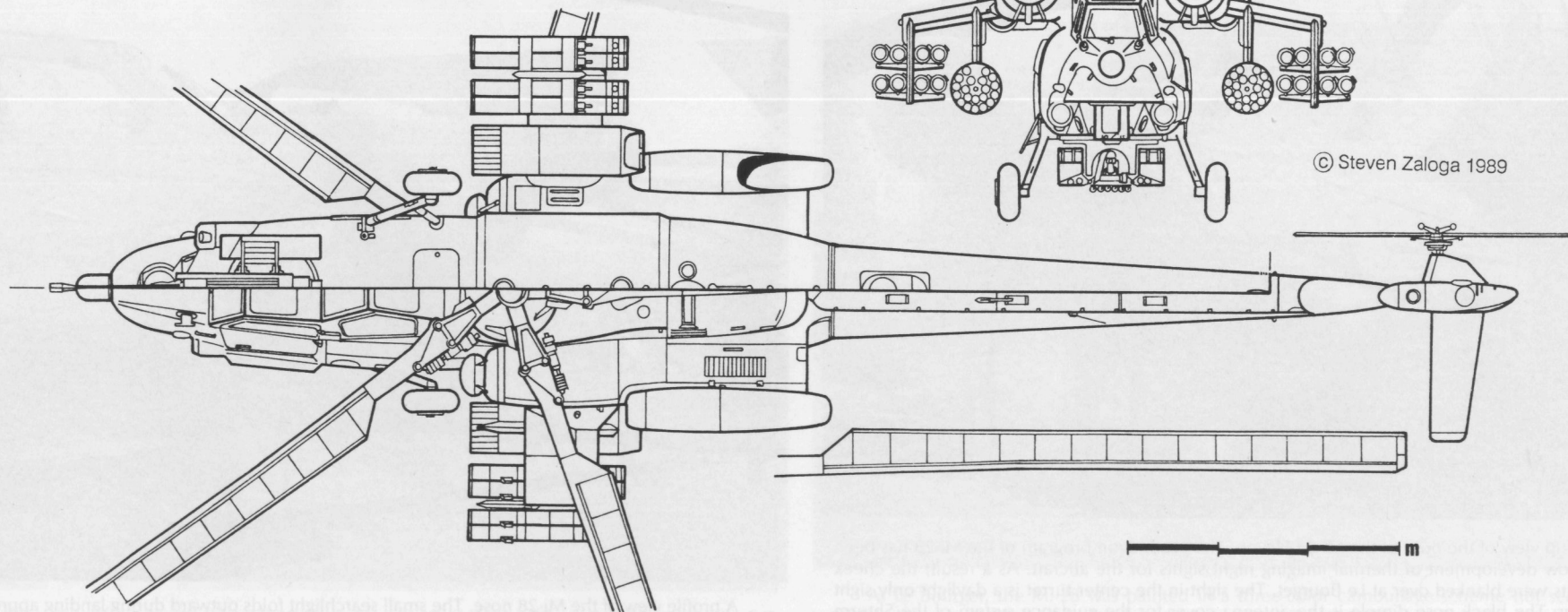
A profile view of the Mi-28 nose. The small searchlight folds outward during landing approaches. The 2A42 30mm cannon is a derivative of the weapons used on the BMP2 armored vehicle.



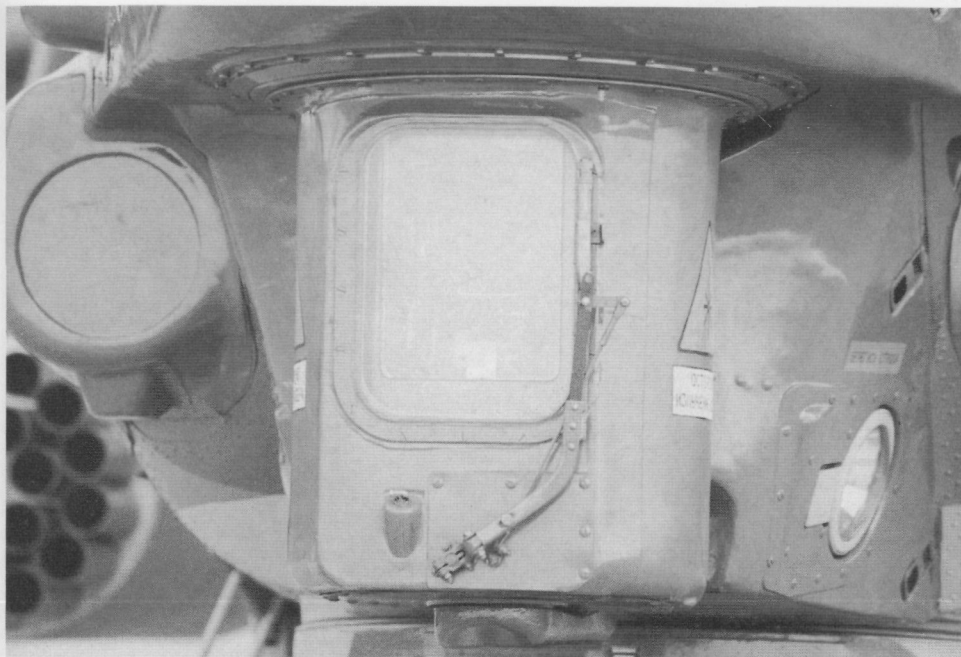
Mi-28 Havoc



© Steven Zaloga 1989

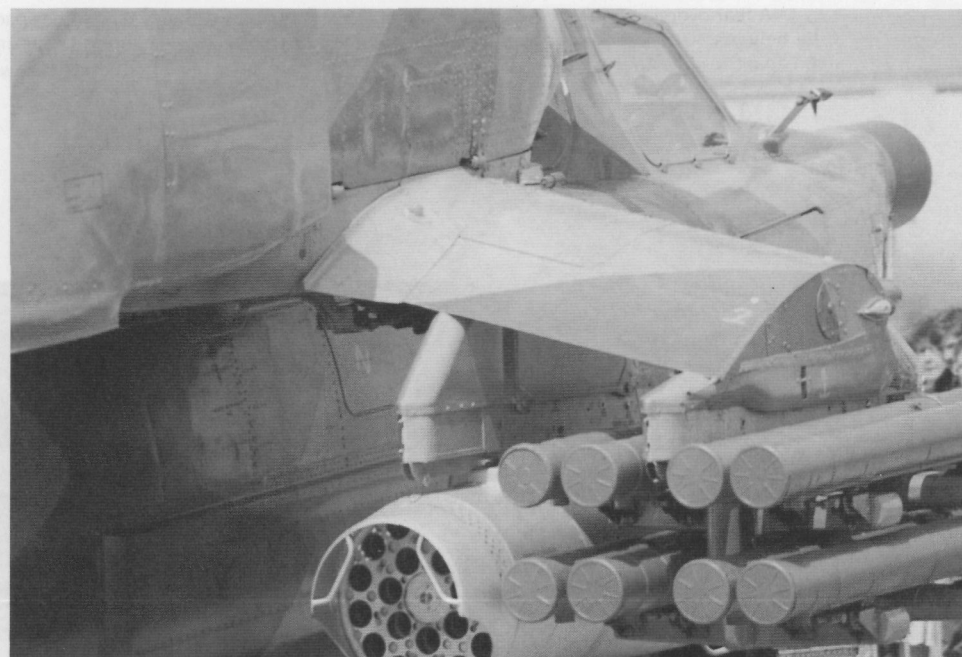


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A close-up of the electro-optical sight used by the gunner for aiming the 2A42 cannon.

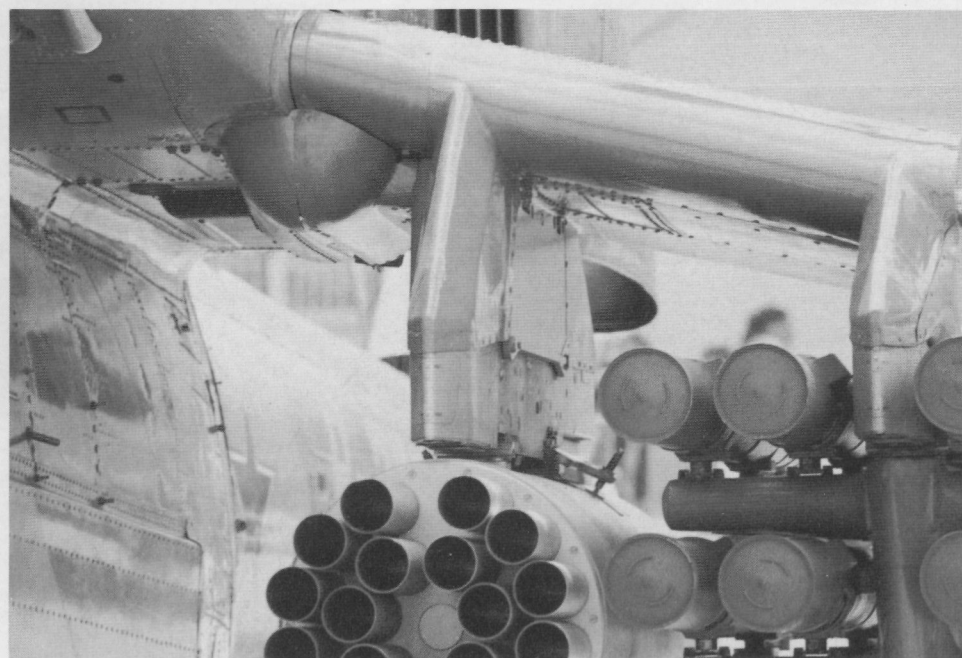
Based on experiences of Mi-28 strikes in Afghanistan.



A detail view of the stub-winglet used to carry weapons on the Mi-28.



This gun configuration is peculiar to the third prototype. Earlier prototypes had a slightly different configuration with a ballistic housing over the gun.

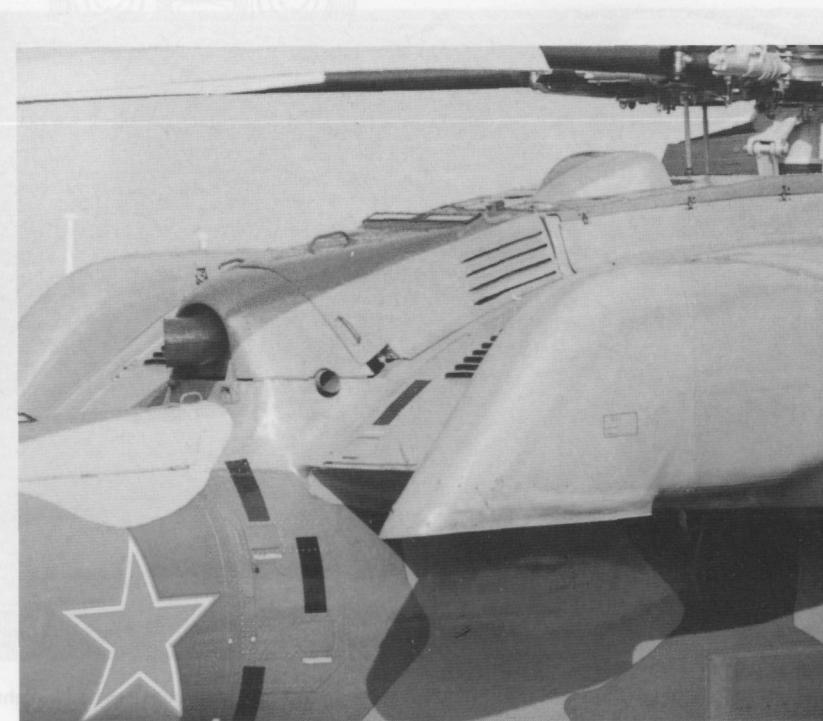


A close-up under the stub winglet showing the hard point for the rocket pod. Although seldom practised, these pods can also carry 250kg bombs.

A rear overview of the Mi-28 at Le Bourget. This view accents the considerable spacing between the helicopter's twin engines, intentionally configured to reduce the likelihood of fire in one engine spreading to the other.



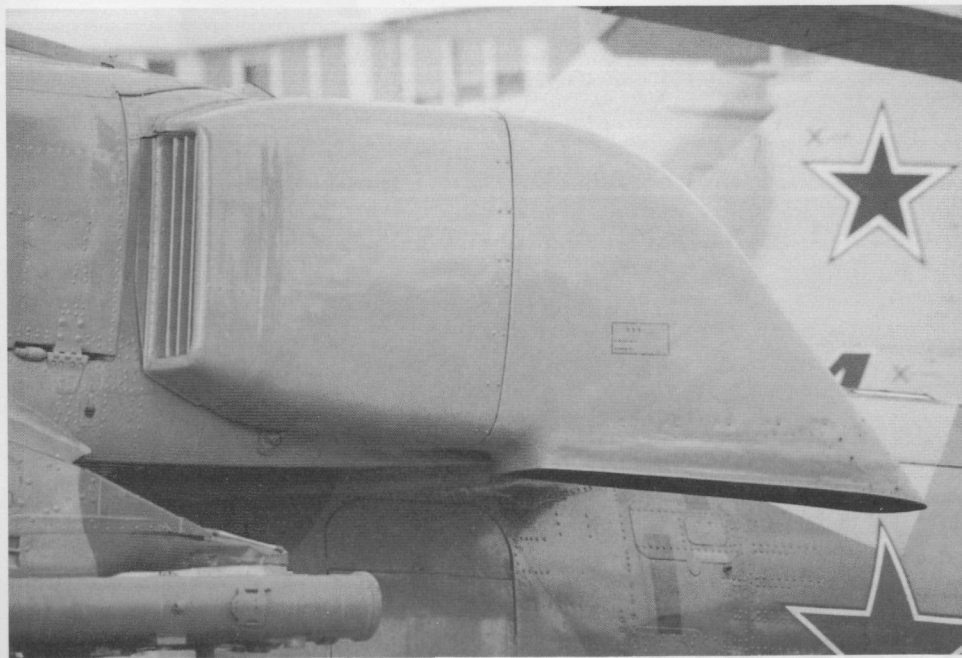
A close-up over the spine of the Mi-28 showing the rotor assembly and engine covers.



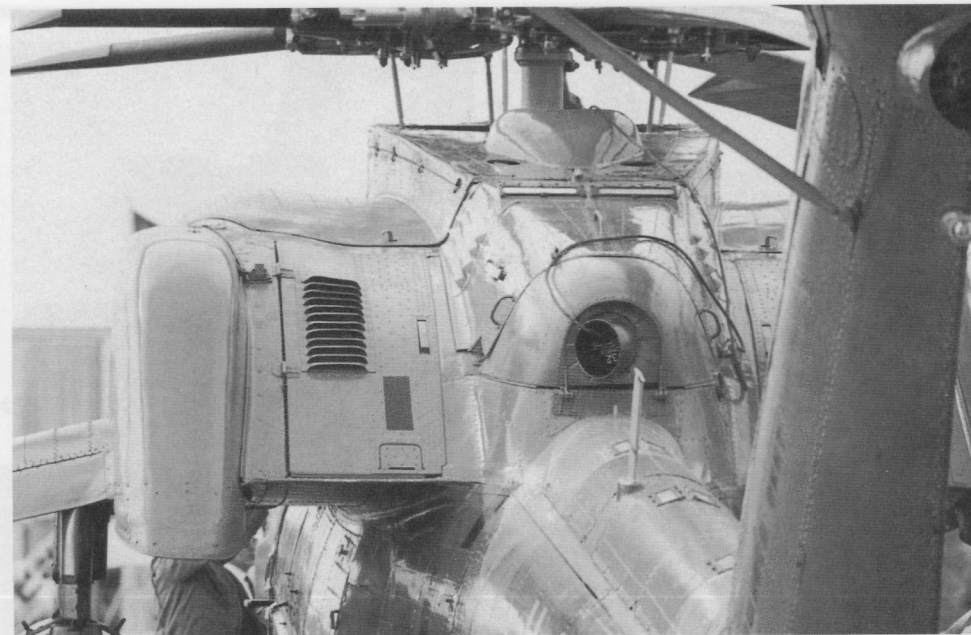
A close-up of the exhaust diffusers on the Mi-28. The exhaust port for the auxiliary power unit (APU) can be seen in the center of engine area.



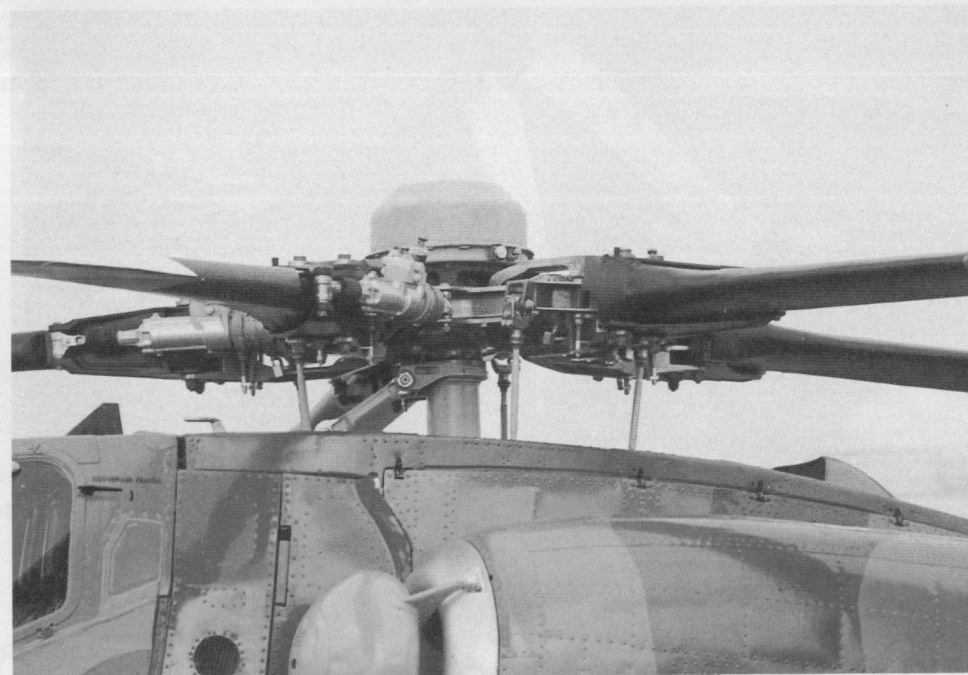
A close-up of the landing gear. The Mi-28 gear has been designed to withstand crash shocks, based on experiences of Mi-24 crashes in Afghanistan.



A detail close-up of the engine exhaust diffusers. This system makes the exhaust less visible to the heat-seeking sensors of anti-aircraft missiles like the Stinger.



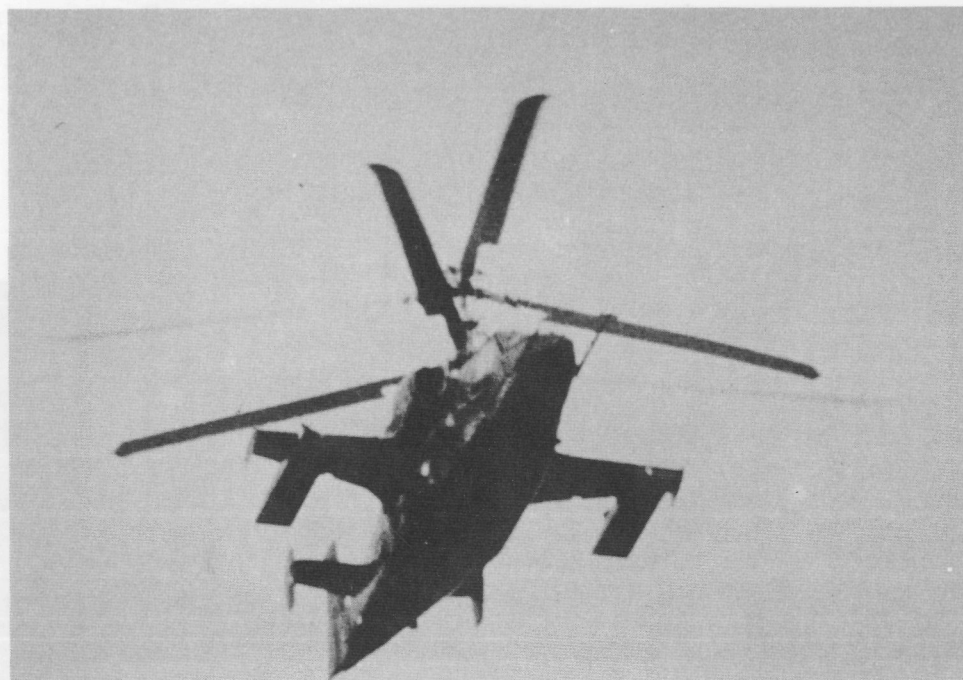
A rear view of the engine compartment on the Mi-28. The engine has been configured around an elaborate infrared reduction system, to make the helicopter far less sensitive to heat-seeking anti-helicopter missiles such as the American Stinger or Soviet Strela.



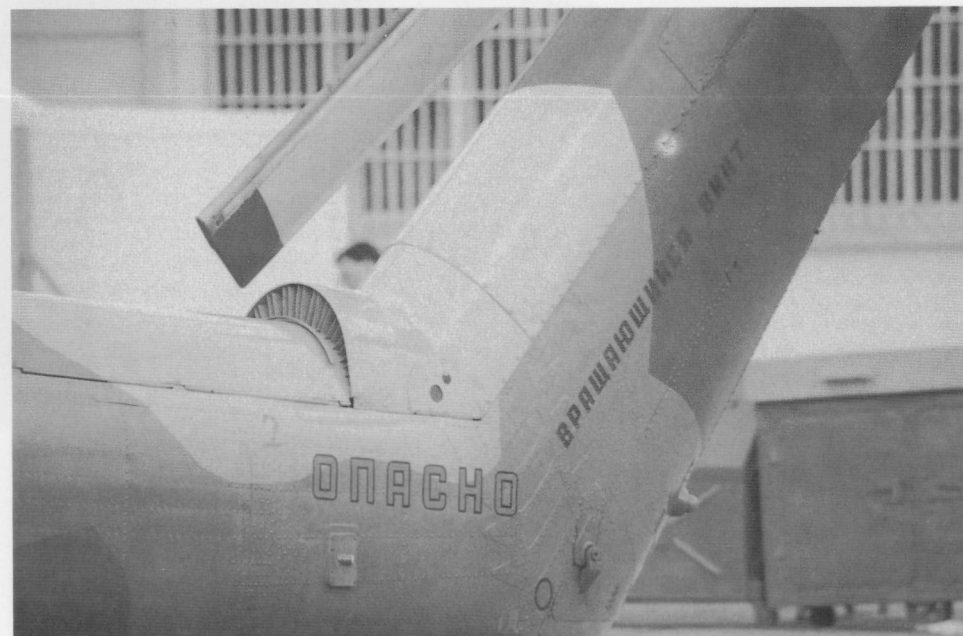
A close-up view of the rotor head assembly on the Mi-28.



A detail shot of the rear tail rotor assembly of the Mi-28. This is in overall grey with red tips and black leading edges.

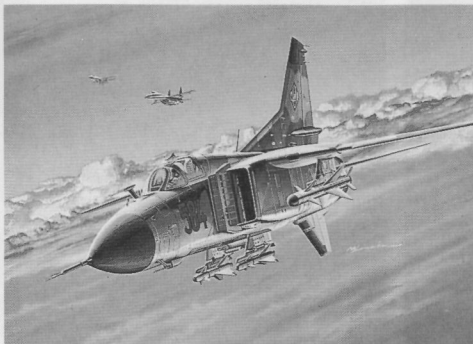


The Kamov Ka-41 is a naval attack helicopter, being proposed for the support of Soviet Naval Infantry in lieu of the Mi-28. It is being developed from components of the Ka-29/Ka-32 Helix family.



A close up of the tail warning markings. The lower marking in yellow with black trim is "OPASNO" (Danger) and the other in red is *Vrashchayushchiyoya vint* (Rotating blade).

1:144 Air Superiority Series



4507 MIG-23MF FLOGGER B
'EAST GERMAN INTERCEPTOR'



4508 MIG-27 FLOGGER D
'SOVIET FIGHTER-BOMBER'



4509 SU-22M-4 FITTER K



4510 SU-22M-3 FITTER H



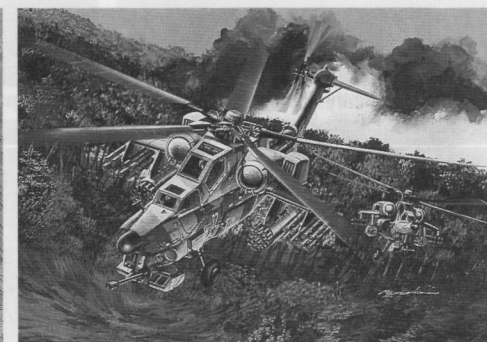
4514 MIG-29 FULCRUM
'SOVIET DOGFIGHTER'



4517 MI-24G HIND F
'SOVIET GUNSHIP'



4528 SU-27 FLANKER
'SOVIET INTERCEPTOR'



4531 MI-28 HAVOC
'SOVIET ATTACK HELICOPTER'



4539 MIG-27 FLOGGER J



4542 SU-27 NAVAL FLANKER
'TBILISI AIR WING'

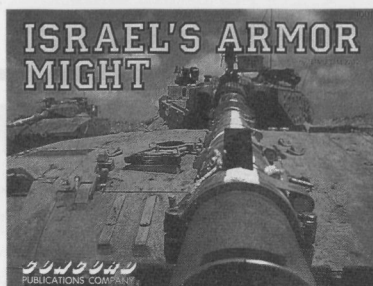


4543 MI-24 HIND D
'IRAQI GUNSHIP'

Accurate solo models of the world's top combat aircraft and attack helicopter featuring the latest in weapons and paint schemes. Pilot figures are included. Detail is unparalleled in this scale.

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PLASTIC MODEL KITS

"STEPS AHEAD.....ALWAYS!"



1001 Israel's Armor Might



1002 Reforger



1003 Battleground Lebanon



1004 T-72 Soviet Main Battle Tank



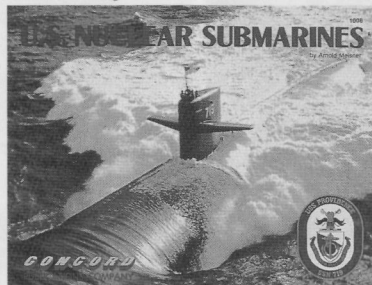
1005 Israel's Cutting Edge



1006 BMP Infantry Combat Vehicle



1007 Leopard 1 & 2



1008 U.S. Nuclear Submarines



1009 The War in Afghanistan 1979-89



1010 M2/M3 Bradley



1011 USMC Firepower



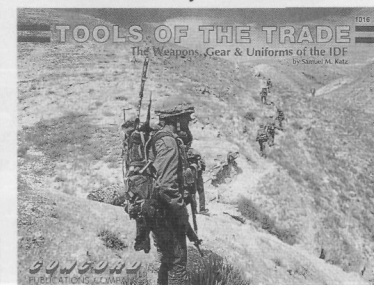
1012 British Army of the Rhine



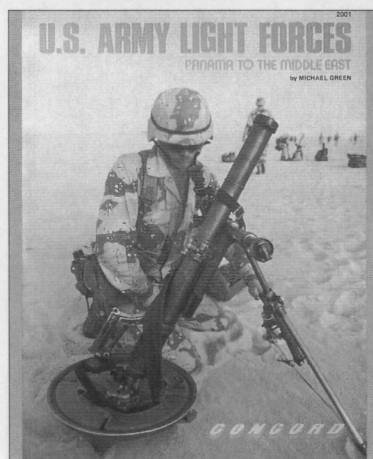
1013 Soviet Wheeled Armored Vehicles



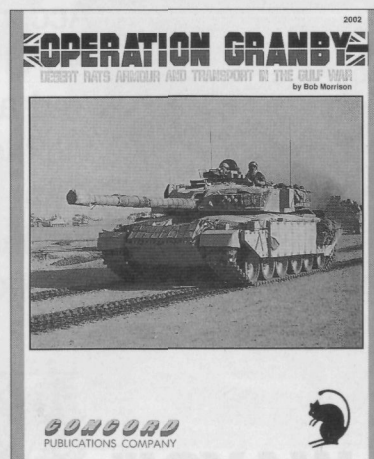
1014 Modern Soviet Warplanes 1



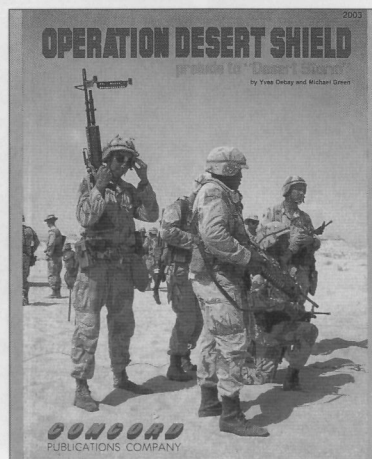
1016 Tools of the Trade



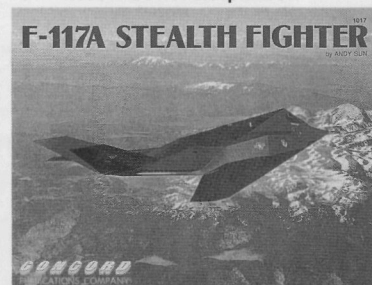
2001 U.S. Army Light Forces: Panama to the Middle East



2002 Operation Granby :Desert Rats Armor & Transport in the Gulf War



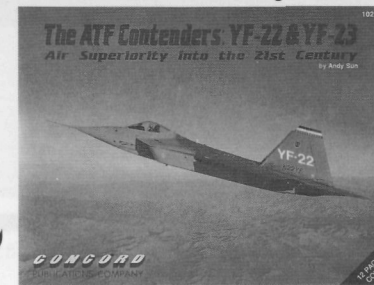
2003 Operation Desert Shield : Prelude to Desert Storm



1017 F-117A Stealth Fighter



1018 Modern German Panzergrenadiers



1020 The ATF Contenders: YF-22 & YF23

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