

# **FlightPlan**

A VOLUNTEER NEWSLETTER BY VOLUNTEERS



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**EVERGREEN**  
AVIATION & SPACE  
MUSEUM



VOLUME 13  
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MARCH 2026

**BILL KOLB**

FLIGHTPLAN EDITOR, MONDAY DOCENT

Welcome to this month’s edition of The FlightPlan. Last month, we delved into the groundbreaking Century series of U.S. fighter jets, showcasing America’s mid-20th-century aerial prowess. This month, we turn our gaze eastward to the Soviet Union’s formidable response: the legendary MiG fighters.

Our lead article offers an overview, tracing the MiG’s evolution from its post-World War II origins through the Cold War’s intense rivalries. Following this foundational piece, we spotlight each MiG in our collection with dedicated articles: the agile MiG-15, the refined MiG-17, the supersonic MiG-21, the variable-geometry MiG-23, and the advanced MiG-29. We’re proud to house this impressive lineup. Only one U.S. museum boasts more MiGs than Evergreen, and that is the National Museum of the United States Air Force.

Please enjoy this MiG-focused edition. Looking ahead, next month’s spotlight will be on the shadowy world of Stealth technology. ➤

**MONTHLY THEMES**

We are assigning themes to each month of the FlightPlan. These are not exclusive of other topics, but perhaps they may motivate you to make a contribution.

MARCH .....SOVIET MiGS

MAY .....THE EARLY DAYS OF AVIATION

APRIL.....STEALTH

JUNE .....THE EARLY DAYS OF SPACE  
EXPLORATION

**GUIDELINES FOR SUBMITTING ARTICLES TO FLIGHTPLAN**

1. The FlightPlan (FP) is published on the 1<sup>st</sup> of each month
2. Stories for the next issue can be filed up to the 10<sup>th</sup> of the prior month
3. Articles should be associated with an artifact at the Museum
4. Sources for specific information in the article should be provided
5. Stories should be approximately 500 words long
6. If appropriate, include one or two photos for publication with the article
7. Include name, day, and title at the bottom of each article submitted
8. Email articles to: [flightplan@evergreenmuseum.org](mailto:flightplan@evergreenmuseum.org)
9. Feedback is encouraged; submit to [flightplan@evergreenmuseum.org](mailto:flightplan@evergreenmuseum.org)

## CAPTAINS CORNER

### JERRY SAUTER

TUESDAY DAY CAPTAIN

February 2026 BOC meeting. Topics are presented below; to avoid a multi-page report, anyone with further questions regarding the discussions can contact their Day Captain.

#### Scot Laney – Chief Executive Officer

- Announced that the Board of Directors has two new members. The new Board Members are, Paul Martin, a past director of the Lockheed Skunk Works, and Paul Schweizer, past owner of Schweizer Aircraft.
- The restoration of the F-117 will follow the completion of the work on the C-47. Work on the F-117 will continue in the Titan Pavilion and final work will be completed in the Hercules Pavilion.
- Announced the Museum will have a name change. The new name will be decided soon. The new name will reflect the vision of founder Michael King Smith.
- Day Captains are tasked with ensuring the break rooms are straightened up and cleaned at the end of each day.
- Day Captains will manage the Goose Tour. The 20-minute tours and up to six guests remain the optimal goal. As summer approaches, we will need to tighten this up to make sure we optimize the revenue.
- The GBU-57 “Bunker Buster” bomb will arrive February 6 and will be on display in the Titan Pavilion.
- The local Police agencies will be conducting emergency vehicle operation training in the east parking lot beginning February 7th. This training will occur on 3 consecutive Saturdays in February.
- A Restoration Manager will be hired in early March.
- The “Collections” department has been renamed “Archives” to better reflect its function.

#### Training Officer Report:

- Ron Williamson presented the Training year-end report for 2025. EASM retained 67% of its volunteers for 2025 compared to 65% for non-profit organizations across Oregon. A suggestion, the four-hour orientation session count as a part of a new docent’s 50 hours of training was reviewed and voted down.

#### Old Business:

- Volunteer Handbook Update: A Summary document of proposed changes was reviewed by the board. The Volunteer Handbook Committee will reconvene, make the appropriate changes and present a final draft to EASM Executive Management and the BOC.
- The board discussed completion of discrepancy forms used for exhibits/artifacts and facilities. The forms are located in the binder labeled “Volunteer Leader’s Continuity Book” which is located at each Admissions desk in the Hercules and Titan Pavilion.

#### New Business:

- Barry Brown is retiring as the Monday Day Captain effective February 28th. Mike Tilrico was unanimously elected to the Monday Day Captain position effective March 1.
- Outreach opportunity: The Oregon Veterans Home in Lebanon, Oregon has requested EASM join them during

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## CAPTAINS CORNER

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their “Spring Fling”, Saturday, April 25, 2026, from 10:00 am to 2:00 pm. We have a golden opportunity to bring the Museum to them. Interested? Please contact your Day Captain/Lead.

### Upcoming Events:

- Celebration of Life ceremony for Paul Gelinas will take place in the Lodge Saturday, March 28, 2pm.

The meeting was adjourned at 11:48 am. ✈





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## SCOT LANEY

MUSEUM CEO

The topic of this issue is Mikoyan-Gurevich and the series of aircraft from the Mikoyan design bureau that, for ease of use, we collectively call MiGs. Way less of a mouthful and considerably easier to spell.

What fascinates me when I look at our stellar collection of MiG fighters (we have one of the best) is how abjectly Soviet they are in both form and function. Terribly robust in some ways, oddly simplistic in other ways, but also very functional. They are an as-built testimony to Soviet design and manufacturing.

I swear, if the Soviets designed a human face, they would attach a weird bulbous nose to a set of terribly thin lip a couple of eyebrows as thick as mooring ropes, two beady eyeballs capable of looking in several directions at once, and ears that look like they came from a rusty pile of Mack truck parts. Yet somehow it would end up being a pretty handsome face.

That's the Soviet way.

I wish we had a solid example of a Russian Kirovets or Rostselmash farm tractor and a Lada GAZ or VAZ automobile to exhibit alongside our MiG aircraft to further my point, because they would all illustrate a simple fact:

Russian design is always over-built yet somehow simultaneously under-built, produced like there is never a shortage of welding rod but not an extra ounce of chrome plating to be had, and, no surprise, curiously familiar in final for

Put a Kirovets K-7M tractor and a Case IH 400 Magnum tractor next to each other in a field; from a distance, it would be hard to tell the difference; they are even the same color. A GAZ and a Volvo sedan set up the same way, same result.

F-14 next to a MiG-29? Go take a look, and you tell me. Although the MiG-29 has gills, which is pretty cool. ➤

# The History of the MiG

## From MiG Alley to Mach 4 Dreams



MiG-21s

### BILL KOLB

MONDAY DOCENT

The Mikoyan-Gurevich (MiG) design bureau was established on December 8, 1939, as the Pilot Design Department of Aviation Plant #1 in Moscow by Soviet engineers Artem Mikoyan and Mikhail Gurevich. The name “MiG” combines the initials of its founders with the Russian word for “and” (и). Initially focused on propeller-driven fighters during World War II, the bureau produced the MiG-1 and MiG-3, which saw moderate use but were generally outclassed by other Soviet designs such as the Yakovlev Yak series and Lavochkin LaGG fighters.

The true beginning of MiG’s jet program came with the MiG-9, the Soviet Union’s first operational jet fighter, which first flew in April 1946. Powered by twin reverse-engineered German BMW 003 turbojets, it was an early experiment in jet propulsion but suffered from limited performance and poor engine reliability. In December 1947, the bureau unveiled the MiG-15 (NATO reporting name “Fagot”), a revolutionary swept-wing jet fighter that incorporated 35-degree swept wings inspired by German wartime research and was initially powered by a copied British Rolls-Royce Nene engine, redesignated the Klimov RD-45 in Soviet service. The MiG-15 entered production in 1948 and became one of the first successful transonic jet fighters, capable of speeds up to Mach 0.92. More than 18,000 were eventually built, including licensed variants in China (J-2) and Poland.

The MiG-15 achieved legendary status during the Korean War (1950–1953), where it dramatically altered the air campaign. Introduced in November 1950 by Chinese and Soviet pilots (with the Soviet Union officially denying direct involvement), the MiG-15 quickly outmatched early UN straight-wing jets such as the F-80 Shooting Star and F-84 Thunderjet in speed, climb rate, and high-altitude performance. Operating from bases in Manchuria, MiGs dominated “MiG Alley” along the Yalu River, engaging in the world’s first large-scale jet-versus-jet dogfights. They forced the U.S. Air Force to curtail daytime B-29 Superfortress bombing raids, shifting them to nighttime operations after heavy losses. The arrival of the F-86 Sabre in December 1950 provided a capable counter, resulting in intense aerial battles where the MiG-15’s superior cannon armament and maneuverability clashed with the Sabre’s better avionics and gunsight. By war’s end, kill ratios were debated, but most analyses favor the UN forces due to differences in pilot training and tactics.

In the Vietnam War (1955–1975), the MiG program evolved significantly with the MiG-17 (“Fresco”) and MiG-21 (“Fishbed”) playing central roles for North Vietnam. The MiG-17, an advanced derivative of the MiG-15 with an afterburning engine and improved aerodynamics, first flew in 1950 but entered widespread service after Korea. Supplied by the Soviet Union from the early 1960s, it proved surprisingly effective against

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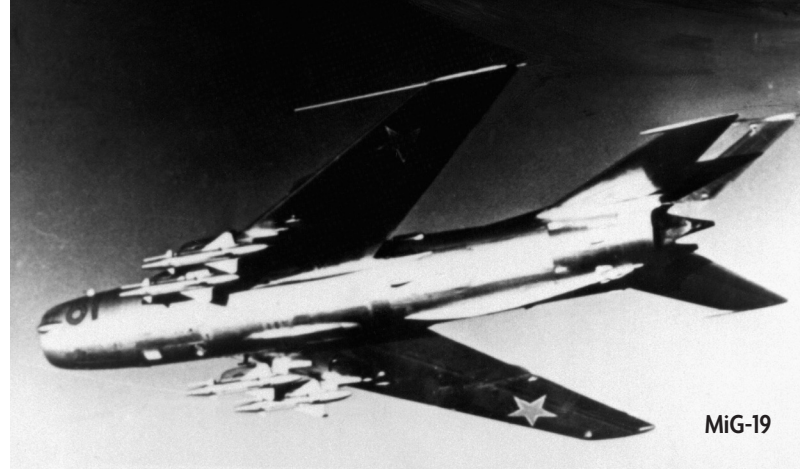
# The History of the MiG

## From MiG Alley to Mach 4 Dreams

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more advanced U.S. aircraft such as the F-4 Phantom and F-105 Thunderchief during Operations Rolling Thunder and Linebacker. North Vietnamese pilots, often trained in the USSR or China, exploited the MiG-17's exceptional low-speed maneuverability and heavy cannon armament for hit-and-run tactics, downing dozens of U.S. aircraft despite technological disadvantages. The MiG-21, introduced in 1958 as a supersonic interceptor capable of Mach 2+, became North Vietnam's primary air superiority fighter from 1966 onward. With over 10,000 built worldwide, it featured delta wings, radar-guided missiles, and high speed, posing a serious challenge to U.S. forces in dogfights and intercept missions. Together, these MiGs contributed to significant U.S. aircraft losses, forcing adaptations in American tactics, training, and technology, including the creation of the Navy's Top Gun school. During the Cold War, MiG continued to innovate, producing several influential designs: the MiG-19 (1953, the first Soviet supersonic fighter), MiG-23 (1967, with variable-geometry wings), MiG-25 (1964, a Mach 3+ high-speed interceptor), MiG-29 (1982, a twin-engine air superiority fighter with over 1,600 produced), and MiG-31 (1981, a long-range interceptor emphasizing radar and missile capabilities). These aircraft saw combat in conflicts such as the Arab-Israeli wars, the Iran-Iraq War, and the Gulf War, where MiG-21s and MiG-29s faced Western aircraft with mixed results, often limited by inferior pilot training and maintenance.

The post-Soviet era brought major challenges, including severe funding shortages and competition from the Sukhoi bureau. In 1995, MiG merged with production facilities to form the Moscow Aviation Production Association "MiG" (MAPO-MiG). In the 1990s and early 2000s, it developed the Mikoyan Project 1.44, a fifth-generation fighter prototype that first flew in 2000 but was ultimately canceled due to financial constraints. In 2006, by presidential decree, MiG was incorporated into the newly formed United Aircraft Corporation (UAC) alongside other Russian aerospace firms, including

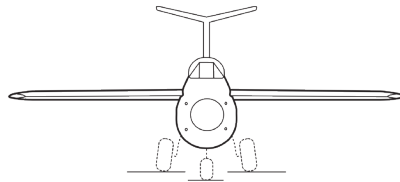
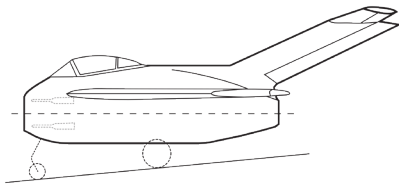


MiG-19

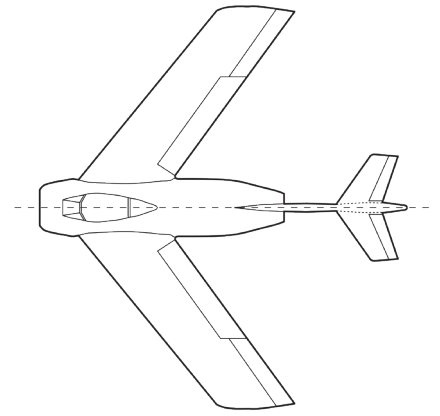
Sukhoi, Tupolev, Ilyushin, and Yakovlev. By 2017, facing order shortages, MiG laid off employees and focused mainly on upgraded MiG-29 variants.

As of the mid-2020s, MiG operates as part of PJSC United Aircraft Corporation under JSC RSK MiG. Recent efforts have focused on restarting MiG-35 production in 2026—a 4++-generation multirole fighter derived from the MiG-29, capable of Mach 2.23 and compatible with advanced weapons, including laser systems—to help replace Russian Aerospace Forces losses. The MiG-41 (PAK DP), a proposed sixth-generation stealth interceptor intended to succeed the MiG-31, entered development in 2021 with ambitions for Mach 4+ speeds, hypersonic weapons, and AI integration; however, progress has been slow due to economic and technical challenges, with prototype timelines now likely pushed into the mid-2030s.

MiG aircraft continue to serve in modern conflicts and remain in service or under upgrade programs in countries such as India, Syria, Egypt, and Algeria, underscoring the bureau's enduring legacy in global military aviation despite ongoing economic and geopolitical difficulties. ✈



Focke-Wulf Ta 183



# Origins of the MiG-15

**ALLYN VANNOY**

*WEDNESDAY ARCHIVIST & SUNDAY DOCENT*

The Soviet MiG-15 bears a striking resemblance to the German Ta 183, sharing a high tailplane and a nose-mounted intake, although the aircraft differ in structure and proportions.

The early designs, such as the MiG-9, featured a mid-mounted, 35°-swept wing with slight anhedral and a tailplane mounted on the swept tail. Analysts noted that it strongly resembled Kurt Tank's Focke-Wulf Ta 183, a later design than the Me 262 that never progressed beyond the design stage.

Early production examples of the MiG-15 tended to roll left or right due to manufacturing variations, so aerodynamic trimmers were fitted to correct this.



MiG-15



MiG-9

Kurt Tank (February 24, 1898-June 5, 1983) was a German aeronautical engineer and test pilot who led the design department at Focke-Wulf from 1931 to 1945. He was responsible for the creation of several Luftwaffe aircraft during the war, including the Fw 190 fighter, the Ta 152 high-altitude interceptor, and the Fw 200 Condor airliner.

While most Focke-Wulf engineers were captured by Western armies, the Soviets captured plans and wind-tunnel models of the Ta 183.

The MiG-15 was originally intended to intercept American bombers like the B-29. It was evaluated in mock air-to-air combat trials with a captured US B-29. To take on such a large aircraft, the MiG-15 was armed with two 23mm cannons and a 37mm cannon. These weapons provided tremendous punch in the interceptor role, but their limited rate of fire and relatively low velocity made it more difficult to score hits in air-to-air combat against fighter aircraft.

Despite its armament shortcomings, the MiG-15's simplicity, ruggedness, and the absence of fuel tanks in its wings made it a formidable adversary.

The first production example flew in December 1948 and entered service in 1949. ➤



# The MiG-15

## The Early Days of the Jet Age

**ALLYN VANNOY**

WEDNESDAY ARCHIVIST & SUNDAY DOCENT

Upon their entry into the Korean War, the Chinese sought to avoid a war of attrition, since they could not compete with the US industrial strength in an air war. Instead, their plan was to build a force of jet fighters and then launch them in large formations of 100 or more aircraft to inflict heavy losses on UN aircraft in a small number of large air battles. They hoped that such losses would have a political impact on the UN Command, prompting it to withdraw its assets.

Initially, the PLAAF (People's Liberation Army Air Force) was largely composed of World War II aircraft. As a result, Stalin sought to provide jet fighter interceptors and Soviet pilots to train Chinese and North Korean pilots.

Many Soviet pilots were World War II veterans who had fought the Luftwaffe in aerial combat.

The aircraft was designed as an interceptor, capable of rapidly climbing to altitude, penetrating enemy fighter-escort screens, and attacking enemy bombers. Accordingly, its armament consisted of one 37mm and two 23mm cannons.

Soviet commitment of the MiGs radically changed the equation in the early air war over Korea.

The MiG-15 had an advantage over UN propeller aircraft and an edge against straight-wing fighters such as the F-80, F-84, and Gloucester Meteor. Its main mission was

as a bomber destroyer, not a dogfighter, and it soon began to threaten the B-29's.

In response, the USAF reinforced its Far East Air Force with the new F-86 Sabres. Fighter battles ensued, with the area over northwest North Korea becoming known as "MiG Alley." The MiG had the advantage of superior maneuverability at high altitudes, though it sometimes showed instability, as it tended to stall in sharp turns. A typical tactic was to fly at high altitude, dive to attack bomber formations, then use speed and its climbing ability to evade fighter escorts.

The MiGs were piloted by North Korean, Chinese, as well as Soviet pilots. The attacks by MiG-15s on bomber formations eventually led to the withdrawal of B-29s from daylight operations in late 1950.

The use of proven tactics, better aircraft, and experienced pilots turned the air war in the UN's favor. However, the MiGs were critical because they imposed limits on the UN aircraft's ability to operate freely over the north.

### The History of Our Aircraft

The MiG-15 in the Evergreen Museum's collection is a MiG-15 UTI, a 2-seat trainer, built in China by the Shenyang Aircraft Factory. The Mikoyan-Gurevich MiG-15 was one of the first successful jet fighters to incorporate a swept wing design to achieve high transonic speeds. ➤

# The MiG-17 Fresco

## The Gunfighter That Defied Supersonic



**BILL KOLB**

*MONDAY DOCENT*

The MiG-17, NATO reporting name Fresco, is a Soviet high-subsonic/transonic jet fighter developed by the Mikoyan-Gurevich (MiG) design bureau as an advanced evolution of the MiG-15 from the Korean War. First flown in January 1950 (prototype I-330), it entered service in 1952–1953. Production ran from 1952 to 1958 in the USSR, with licensed copies built in Poland (PZL-Mielec Lim-5/Lim-6) and China (Shenyang J-5). Total production exceeded 10,000 units (approximately 8,000 in the USSR and over 2,600 licensed), making it one of the most widely produced jet fighters of the early Cold War era.

The MiG-17 featured a longer fuselage (~3 ft extension), thinner wings with greater sweep (45°), three wing fences for better high-speed airflow, and improved high-speed stability over the MiG-15. It was designed primarily as a day fighter/interceptor against bombers but excelled in agile dogfighting. Though not intended for sustained supersonic flight, skilled pilots could briefly exceed Mach 1 in a shallow dive.

The MiG-17 saw extensive combat. It first saw action during the 1958 Taiwan Strait Crisis against Nationalist F-86s. In the Vietnam War (1965–1973), North Vietnamese MiG-17s (nicknamed “Silver Swallow”) scored heavily against U.S. aircraft like F-105

Thunderchiefs and F-4 Phantoms, claiming dozens of kills with guns in close-range dogfights despite being subsonic. U.S. forces downed ~105 MiG-17s, but the type’s maneuverability forced improved American training (NationalInterest.org). In Arab-Israeli wars, Egyptian and Syrian MiG-17s flew in the 1956 Suez Crisis, 1967 Six-Day War (heavy losses), 1973 Yom Kippur War (as fighter-bombers), and 1982 Lebanon invasion. Other conflicts included Nigeria’s civil war and various Middle Eastern/African skirmishes.

Following the Cold War, most operators retired the MiG-17 due to obsolescence and maintenance challenges. As of the mid-2020s, very few remain operational—primarily in North Korea (the largest remaining fleet, with J-5/FT-5 variants) and possibly isolated examples in places such as Guinea-Bissau or Madagascar, often in limited or training roles.

The MiG-17 was a rugged, agile, cannon-armed workhorse: simple, reliable, and deadly in skilled hands, proving that subsonic fighters could challenge supersonic foes through maneuverability and pilot tactics.

### History of Our Aircraft

Originally built in the Soviet Union, George Gould of Galveston, Texas, purchased this MiG-17A from the Bulgarian Air Force and donated it to the Museum in 2003. ✈

# The MiG-21 Fishbed

## The AK-47 of the Air



**BILL KOLB**

*MONDAY DOCENT*

The Mikoyan-Gurevich MiG-21, NATO reporting name “Fishbed”, stands as one of the most iconic and widely produced supersonic jet fighters of the Cold War era. Developed by the Soviet Union’s Mikoyan-Gurevich Design Bureau in the mid-1950s, the aircraft evolved from earlier MiG designs like the MiG-15, -17, and -19, incorporating lessons from jet combat and German delta-wing research. The program began with prototypes such as the Ye-2 and Ye-4, leading to the first flight in June 1956. The initial production variant, the MiG-21F (Fishbed-C), entered Soviet service in 1959 as a lightweight, high-speed day interceptor capable of Mach 2 performance.

Powered by the Tumansky R-11 turbojet (later upgraded in variants like the R-13 and R-25 engines), the MiG-21 featured a distinctive delta wing for excellent high-speed handling, a narrow “pencil” fuselage, and a single-seat cockpit. Early models relied on cannon armament (30mm NR-30 guns) and infrared-guided missiles like the K-13 (AA-2 Atoll), while later versions added radar (RP-21 or later) and improved avionics. Key specifications for the MiG-21bis (a major late variant) include a maximum speed of about Mach 2.05, a service ceiling over 17,000 meters, and a combat radius of roughly 660 km without external tanks. Its simplicity, low cost, and ease of maintenance made it ideal for mass production and export.

Over 10,000 MiG-21s were built in the USSR, with licensed production in India, China (as the J-7), and Czechoslovakia, making it the most-produced supersonic combat aircraft in history. It was deployed by

more than 60 air forces across four continents and saw extensive combat. In the Vietnam War (1965–1973), North Vietnamese MiG-21s, arriving in 1966 and operated by the 921st Fighter Regiment, became notorious for ground-controlled interception (GCI) tactics. Pilots used the aircraft’s speed and small radar signature for hit-and-run attacks, often launching K-13 missiles at U.S. F-105 Thunderchiefs and F-4 Phantoms before disengaging. Despite limitations like short range, limited missile load, and no internal gun in many variants, MiG-21s downed dozens of U.S. aircraft, forcing American adaptations, including the Navy’s Top Gun school. A single MiG-21 (serial 4324) was credited with 14 kills across multiple pilots.

The MiG-21 also fought in the Indo-Pakistani wars (where Indian examples achieved notable successes), Arab-Israeli conflicts, and the Iran-Iraq War, with mixed results often tied to pilot training and support. Its combat record highlighted strengths in agility and surprise, but weaknesses in endurance and beyond-visual-range capability relative to Western contemporaries such as the F-4.

Though largely retired from major powers by the 1990s–2000s due to age and obsolescence, upgraded variants continue limited service in some nations, underscoring its enduring legacy as a Cold War icon.

### The History of Our Aircraft

The Museum’s MiG-21 is painted to resemble a Red Eagles aircraft. Built for the Polish Air Force, it was brought to the U.S. by Oscar Vickery and donated by George Gould in 2008, later joining the Permanent Collection. ➤

# The MiG-23 Flogger

## The Swing-Wing Soviet Fury

**BILL KOLB**

MONDAY DOCENT

The MiG-23, NATO reporting name Flogger, is a Soviet third-generation supersonic fighter developed by the Mikoyan-Gurevich (MiG) design bureau as a successor to the MiG-21. It introduced variable-geometry (swing-wing) technology to balance low-speed handling and short-field performance with high-speed supersonic dashes. Development began in the mid-1960s, with the first prototype flying on June 10, 1967, and production starting in 1969. Over 5,000 units were built by 1985, making it the most produced variable-sweep aircraft in history.

The MiG-23's defining feature is its wings, which sweep from 16° (for takeoff, landing, and low-speed maneuverability) to 72° (for high-speed flight). This allows excellent versatility: short takeoff rolls, heavy weapon loads when spread, and Mach 2.35 dashes when swept. It features side intakes for improved engine performance and an early look-down/shoot-down radar (Sapfir-23 series), with beyond-visual-range missiles such as the R-23/R-24.

**Key specifications for later variants (e.g., MiG-23ML/MLD) include:**

**Crew:** 1 pilot

**Length:** 54 ft 9 in (16.7 m)

**Wingspan:** Spread 45 ft 10 in (14 m); Swept 25 ft 6 in (7.8 m)

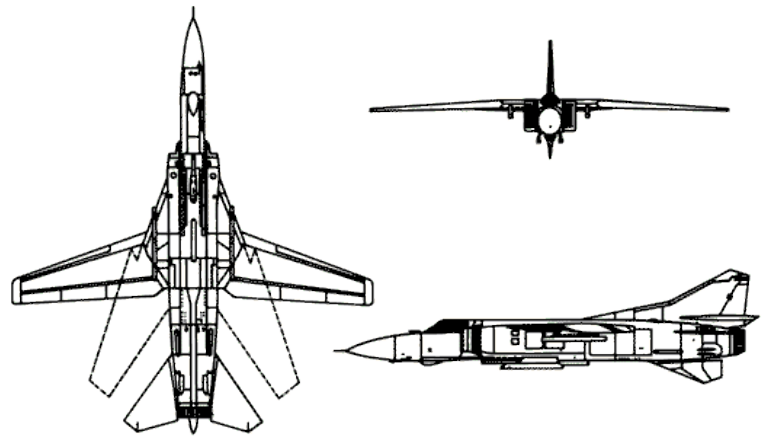
**Max Speed:** Mach 2.35 (~1,520 mph or 2,445 km/h at altitude)

**Service Ceiling:** Over 60,000 ft (~18,300 m)

**Engine:** Khatchaturov R-35-300 afterburning turbojet (~28,660 lb thrust with afterburner)

**Armament:** Internal 23 mm GSh-23L cannon; up to six air-to-air missiles (R-60 short-range, R-23/24 medium-range), bombs, rockets, and ground-attack stores on multiple pylons.

Variants evolved significantly. Early models like the MiG-23S and MiG-23M ("Flogger-A/B") introduced production radar and missiles. Export versions (MiG-23MS/



MF, "Flogger-E") were downgraded for allies. Improved fighter variants (MiG-23ML/MLA/MLD, "Flogger-G/K") featured lighter airframes, more powerful engines, enhanced radar, and aerodynamic modifications such as dogtooth leading edges for improved maneuverability. Ground-attack models (MiG-23B/BN, "Flogger-F/H") had redesigned noses. The two-seat MiG-23UB served as a trainer. It also gave rise to the dedicated MiG-27 ground-attack family.

The MiG-23 saw extensive combat with mixed results. Soviet forces used it in Afghanistan for escorts and strikes, often effectively with ground control. In the 1982 Lebanon War, Syrian export models suffered heavy losses to Israeli fighters due to inferior training and avionics. Iraqi MiG-23s performed better in the Iran-Iraq War, scoring kills against Iranian F-4s and F-5s in air-to-air and ground roles. Cuban-piloted Angolan MiG-23MLs achieved air superiority against South African Mirage F1s in 1987–88, contributing to regional ceasefires.

Following the Cold War, most operators retired the type due to maintenance demands and obsolescence. As of 2025, limited numbers remain active, primarily in North Korea (the largest fleet), Syria, Angola, Libya, and a few others—often in low-readiness states.

The MiG-23 represented a bold transitional design: fast, adaptable, and heavily armed, yet hampered by complexity and export limitations.

### The History of Our Aircraft

Our MiG-23ME is on loan from the National Museum of the U.S. Air Force. ➤



# The MiG-29 in Ukraine

## The Fulcrum That Refuses to Quit

**BILL KOLB**

MONDAY DOCENT

The MiG-29 (NATO: Fulcrum) has been a cornerstone of the Ukrainian Air Force since the 2022 Russian invasion, serving as the most numerous fighter type despite heavy attrition. Ukraine inherited dozens from Soviet stocks, entering the war with roughly 50 operational MiG-29s (various A/MU1 variants) in the 40th, 204th, and related brigades. The type's agility, twin-engine reliability, and short-field capability make it ideal for defensive operations over home territory, including air-to-air intercepts, drone hunting, and ground strikes.

### Key roles and performance in the conflict include:

- **Air defense:** MiG-29s intercept Russian cruise missiles, Shahed drones, and occasionally engage Su-34/35 bombers, often using R-27/R-73 missiles. Pilots rely on ground radar warnings due to limited onboard radar range against jamming.
- **Ground attack:** Adapted for standoff strikes with Western munitions like AGM-88 HARM anti-radiation missiles, JDAM-ER/GBU-62 glide bombs, and French AASM Hammer guided bombs. Notable examples include the destruction of bridges, command posts, ammunition depots, and UAV control points in Zaporizhzhia and on other fronts.
- **Innovative adaptations:** Ukrainian engineers integrate NATO-standard radios, GPS, commercial tablets for targeting, and extended-range weapons, turning the 1980s jet into a hybrid platform. Upgrades such as MiG-29MU1/MU2 enhance avionics, radar detection

(up to ~100 km for fighters), and compatibility with precision munitions.

**Losses and replenishment** have been severe. Open-source tracking reports more than 30 destroyed/damaged since 2022, with spikes, including 17 in a 10-day period in late 2023. Russian claims and reports suggest higher figures, including ground strikes and air combat. Attrition forced creative solutions:

- Restored stored airframes and overhauled units.
- Donations: Poland and Slovakia transferred ~27–33 MiG-29s (including upgraded G/AS variants) in 2023–2024. Three Azerbaijani MiG-29s repaired in Lviv were retained and returned to service in 2025.
- Ongoing talks: Poland plans to transfer up to 9–14 remaining MiG-29s (11 single-seat, 3 trainers) in 2026 as it retires them for F-35/FA-50, possibly in exchange for Ukrainian drone/missile tech.

As of early 2026, Ukraine fields approximately 40–50 MiG-29s (including trainers), spread across three brigades—still the most numerous despite the arrival of F-16s and Mirage 2000s. The fleet remains vital for austere operations, rapid deployment, and multirole tasks as Western jets integrate. Upgrades focus on import substitution (replacing Russian components) and compatibility with Western weapons to extend service life into the 2030s. The MiG-29 symbolizes Ukrainian resilience: a Soviet-era jet, heavily modified, sustaining a high-tempo war against superior numbers through ingenuity, donations, and pilot skill—buying time for advanced platforms like F-16s to take over frontline roles. ✈️

# The “Gills” on the MiG-29

## Auxiliary Air Intakes Explained

**BILL KOLB**

*MONDAY DOCENT*

The Mikoyan MiG-29, a twin-engine Soviet-era fighter jet developed in the 1970s and entering service in 1983, features a distinctive design element often colloquially referred to as “gills”. These are actually the aircraft’s auxiliary air intakes, also known as louvers or upper intake flaps, located on the upper surface of the Leading-Edge Root Extensions (LERX) above the wings near the fuselage root. They resemble gill-like slits due to their louvered, segmented appearance, which allows them to open and close as needed. This innovative system was a hallmark of Soviet aviation engineering, prioritizing operational flexibility in diverse and challenging environments.



The primary role of these gills is to provide an alternative airflow path to the MiG-29’s two Klimov RD-33 turbofan engines during ground operations, takeoff, and landing—particularly on rough or unprepared runways common in Soviet military doctrine. Unlike many Western fighters like the F-16, which rely solely on under-fuselage intakes vulnerable to sucking in debris (foreign object damage, or FOD), the MiG-29 employs a dual-mode intake system.



During taxiing or when operating on surfaces with loose gravel, dirt, or snow, the main under-fuselage intakes can be completely closed using armored flaps to prevent ingestion of ground debris that could damage the engines. At this point, the auxiliary gills automatically open, drawing in cleaner air from above the aircraft. This setup ensures the engines receive sufficient airflow to achieve full power, allowing the jet to take off even with the main intakes closed. Once airborne and at a safe speed (typically around 200-250 km/h), the system switches back: the gills close, and the main intakes reopen for optimal high-speed performance.

This feature was groundbreaking for its time, making the MiG-29 the world’s first production aircraft with such dual-mode intakes, enhancing its ability to operate from austere airfields without the need for extensive runway preparation. The gills consist of multiple louvered panels (usually 5-7 per side) on the dorsal LERX surfaces and integrate with the aircraft’s variable intake ramps, which adjust for supersonic flight. The aircraft’s systems automatically control operation based on parameters such as ground speed, weight on wheels, and engine demand, with no typical pilot intervention required.

While effective for FOD protection, the auxiliary mode slightly reduces engine efficiency due to a less direct

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# The “Gills” on the MiG-29 Auxiliary Air Intakes Explained

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airflow path, but it's sufficient for short durations such as takeoff rolls. Early models, such as the MiG-29A, heavily relied on this system. Later upgrades, including the MiG-29K naval variant, added auxiliary intakes in the main wheel wells for additional redundancy. The modern MiG-35 has replaced the dorsal gills with mesh screens over the main intakes, as on the Su-27, to improve reliability and reduce maintenance. Some specific variants, such as the Ukrainian-upgraded MiG-29 Sniper, have been observed to have non-functional gills in simulations or under certain configurations.

This design has proven robust in real-world use, contributing to the MiG-29's reputation for ruggedness across more than 30 air forces worldwide. However, it requires regular maintenance to ensure the louvers operate smoothly. Overall, the “gills” exemplify the MiG-29's blend of innovation and practicality, allowing it to excel in scenarios where other jets might falter.

## History of Our Aircraft

In the aftermath of the breakup of the Soviet Union, this aircraft was purchased along with 20 other MiG-29 aircraft from the Republic of Moldova in October 1997, with funds from the U.S. government's Cooperative Threat Reduction Program. National Air and Space Intelligence Center (NASIC) personnel deployed to Markuleshti Air Base Moldova will carefully test and extract the assets to Wright-Patterson Air Force Base, Ohio, where they began the task of studying the aircraft's capabilities and limitations.

Our restored MiG-29 Fulcrum-A is on loan from the National Museum of the United States Air Force. ➤



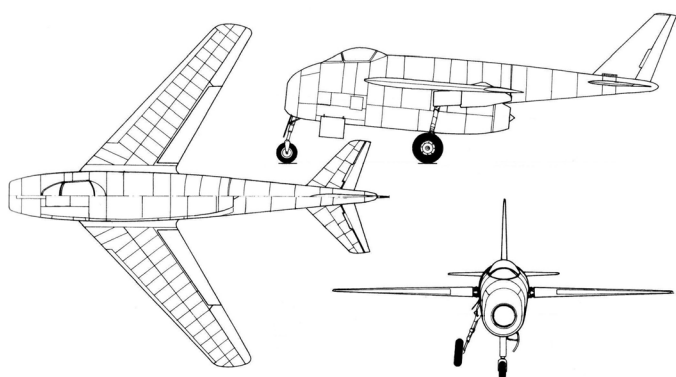
# Swinging Single

## The Evergreen Aviation & Space Museum's Flogger Fighter

**DON COX**

*ARCHIVES & SATURDAY DOCENT*

**B**ear to the left of the entrance desk in the Titan Pavilion and you will immediately find yourself nose-to-nose with one of two swing-wing aircraft in the museum's collection: the MiG-23ML Flogger-G in the markings of the East German Air Force. You will undoubtedly be taken aback by Red 339's strange appearance, looking for all the world like an arrowhead with the chunky legs of a dodo bird stuck backwards. Closer inspection will uncover other oddities, such as a folding dorsal fin and the absence of ailerons - all of which, when taken together, highlight one of the most unique and overlooked aircraft designs in the Museum's collection.



Messerschmitt P.1101

Like many third-generation fighter concepts, the MiG-23's variable geometry wing (VGW) design had its roots in German late-war technology. Variable sweep is a way to maintain aircraft flight performance throughout the envelope: wings are swept forward at lower speeds, affording more lift, while at higher speeds they sweep back to reduce drag. Simple in concept, but much more complex to implement. The Messerschmitt P.1101 was the first serious (albeit primitive) attempt by aircraft designers to incorporate variable sweep into wing design; the angle of its wings had to be prepositioned on the

ground, with the pilot having no control over the sweep once airborne.

America's flirtation with VGW technology began in the early 1950s with the Bell X-5 - the world's first truly variable sweep design - and Grumman's XF-10. Although touted as a jack-of-all-trades approach to flight control, only three designs made it into U.S. production: the F-111, the B-1, and the F-14. France experimented with a modified Mirage III, while a British-Italian-German consortium offered three versions of the Panavia Tornado. In contrast, the Soviet Union ended up producing no less than five distinctive swing-wing airplanes: the Tu-160, the Tu-22M, the Su-24, the Su-17/20/22...and the MiG-23/27.



Bell X-5

Although bearing no resemblance to each other whatsoever, the MiG-23 was designed with the same role as the F-104 in mind: that of a supersonic fighter-interceptor. The Flogger's swing wings were a solution to the

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# Swinging Single

## The Evergreen Aviation & Space Museum's Flogger Fighter

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problem that had haunted the F-104 from its inception: low-speed handling. Compared to the F-104's stall speed of nearly 200 mph, the MiG-23's variable-sweep gave a decided improvement at roughly 140 mph when set to a 16-degree sweep. At the same time, the F-104 maxed out at Mach 2.2, whereas later variants of the MiG-23 were able to attain Mach 2.35 (by some accounts even reaching Mach 2.6) with its wings set at 72 degrees. Mikoyan gave the Flogger improved lateral stability with a large dorsal fin that could be folded in sync with the landing gear extending. The gangly yet rugged appearance of the landing gear is also by design; one of the requirements was for a high-speed interceptor with rough field capabilities.

Despite all these innovations, the MiG-23's operational record was something of a mixed bag. A well-maintained airframe flown by a skilled pilot could prove to be a formidable opponent, especially if that pilot employed hit-and-run tactics. Unfortunately, this combination was seldom the case. Engine troubles plagued early models, due in part to Russia's insistence that the Tumansky has a low service life (some reports suggest as low as 30 hours between services). When the Soviet

doctrine of ground-controlled interception is added to the mix, you have the recipe for lemon pie. To be fair, later versions of the Flogger did much to dispel its negative reputation, but by the 1980s, when the -G and -K models came online, the competition was much stiffer; no longer would it face F-4s and Mirage IIIs but F-14s, -15s, and -16s.



Also, the '80s weren't especially kind to MiG-23's reputation. In 1982's Operation *Mole Cricket*, Israel managed to take out several Syrian Floggers, both in air-to-air combat as well as on the ground, with no losses to themselves, and in 1989, a pair of U.S. Tomcats shot down two Libyan Flogger-Gs in a dogfight over the Gulf of Sidra. Earlier, in 1986, an Iraqi MiG-23 did take down an Iranian F-14...but it was something of an own goal; the Iraqi pilot hadn't gotten the message that the Iranian was in fact defecting to Iraq with his highly prized Tomcat. Then there was the case of the pilotless MiG-23 that flew westward from its base in Poland for over an hour after its pilot had ejected due to engine trouble (which ironically restarted itself just after his ejection), crashing into a Belgian farmhouse when it ran out of fuel and killing the lone occupant, an unfortunate computer science student on vacation from university.

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# Swinging Single

## The Evergreen Aviation & Space Museum's Flogger Fighter

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When the U.S. first became aware of the MiG-23 in the mid-1970s, there was considerable concern that this new design might prove to be a game-changer in the aerial combat arena. Those concerns vanished when we acquired a half dozen Floggers from Egypt through Operation *Have Pad*, a 1977 CIA-driven initiative to entice Anwar Sadat to part with his latest fighters, which he ultimately did in exchange for a squadron of F-4s. Operated by the USAF's 4477th Test & Evaluation Squadron ("Red Eagles"), the U.S. flew these Floggers for several years in a dissimilar air combat training role out of Tonopah. During the late 1980s, it wasn't uncommon to see these former Russian aircraft—complete with red stars on their wings—sharing the same skies over Nevada with F-117s.

Evergreen Museum's Flogger has an interesting history, to say the least. Manufactured at the *Znamya Truda* (Banner of Labor) factory north of Moscow, Red 339 began its service life in February 1983 when the East German Air Force (*Luftstreitkräfte/Luftverteidigung* - LSK/LV) took delivery and assigned it to *Jagdgeschwader 9* (JG9) at Peenemünde. One of JG9's duties was to intercept the SR-71 on its Baltic run, a role in which the MiG-23/Sapfir BVR radar/R-23 missile combo was ably suited to...on paper, at least. Two of the wing's Floggers were always assigned to the around-the-clock *diensthabendes* System, or what we call quick reaction alert. Over the eight-year span of its service with JG9, Red 339 was unquestionably involved in the dozens of attempted Blackbird intercepts - quite likely even against EASM's very own SR-71 #971 when the latter flew GIANT REACH missions out of RAF Mildenhall throughout the '80s.

It was among the 30 Flogger-Gs in the East German Air Force's inventory on 30 September 1990. Three days later, East Germany officially ceased to exist, with all its military assets - including Red 339 - being inherited by the new, reunified Germany. Red 339 was assigned its new 20+16 code and painted with *Luftwaffe* crosses in place of its East German markings, but it never flew operationally with its new owners. While the *Luftwaffe*

continued to operate several Russian types it had inherited from East Germany's stock, the Flogger wasn't one of them. Its role and reputation precluded any further service in the reunified Germany, and the government couldn't get rid of them fast enough.

Which is why, just five months after acquiring East Germany's Floggers, Germany shipped off Red 339 and four other MiG-23MLs to the National Museum of the Air Force at Wright-Patterson Air Force Base in Dayton, Ohio. Although there it was probably repainted with the markings it had originally flown in with the LSK/LV—the markings visitors see it in today—339 was apparently never put on display, instead languishing with its four fellow MiGs for another decade until the museum farmed the lot out to other museums, including Evergreen, and private collectors around the country.

On a side note, Red 339's sister, 338, went to the Strategic Air Command and Aerospace Museum in Ashland, Nebraska, where most of it can be seen on display today. I say "most of it" because its vertical stabilizer was swapped out with the one on the Pima Air Museum's MiG-23 Flogger-K in Tucson. ➤



**Editor's Note:** The Museum is working to establish the true history of our MiG-23ME, as multiple sources suggest varying pedigrees. We'll publish the full details once our investigation is complete.

# MiG Comparison Chart

**BILL KOLB**

MONDAY DOCENT

Model	NATO Nickname	Primary Role	Max Speed (mph)	Empty Weight (lb)	Key Notes
MiG-9	Fargo	Fighter	~590	~7,700	First Soviet turbojet fighter (1946)
MiG-15	Fagot	Fighter / Interceptor	~670	~7,900–8,100	Iconic Korean War aircraft; highest-production early jet fighter
MiG-17	Fresco	Fighter	~710	~8,600	Enhanced MiG-15 with improved high-speed performance
MiG-19	Farmer	Fighter	~900	~11,900	First production Soviet supersonic fighter
MiG-21	Fishbed	Supersonic Fighter / Interceptor	~1,350–1,385	~11,700–12,600	Most-produced supersonic jet fighter in history
MiG-23	Flogger	Variable-Geometry Fighter / Interceptor	~1,550	~20,300–22,000	Swing-wing design; later variants multirole
MiG-25	Foxbat	High-Altitude Interceptor / Recon	~2,080–2,110 (Mach 2.83) Mach 3.2 dash	~44,000–44,100	Fastest operational fighter jet ever fielded
MiG-27	Flogger-D/J	Ground-Attack / Strike	~1,060	~26,200	MiG-23 derivative optimized for air-to-ground missions
MiG-29	Fulcrum	Air Superiority / Multirole Fighter	~1,490–1,520	~24,000–24,030	Highly agile fourth-generation fighter; widely exported
MiG-31	Foxhound	Long-Range Supersonic Interceptor	~1,860–1,900	~48,000	Two-seat heavy interceptor; remains in Russian service
MiG-35	Fulcrum-F	Multirole Fighter (4++ Generation)	~1,490	~24,000	Advanced MiG-29 derivative with modern avionics and thrust vectoring

# Sabres vs. MiGs-The Jet Duel Over MiG Alley

## Korea: The Early Days of Jet Fighters



**BILL KOLB**

*MONDAY DOCENT*

The aerial conflict during the Korean War (1950–1953) between American fighters and Soviet-designed—and often Soviet-piloted—MiG jets represented the first major jet-on-jet air battles in history. The United Nations Command (UNC), primarily led by U.S. Air Force (USAF) and Navy pilots, clashed with communist forces from North Korea, China, and, covertly, the Soviet Union. In the war's early stages, UN air superiority went unchallenged, as propeller-driven fighters like the F-51 Mustang and early jets such as the F-80 Shooting Star easily overpowered North Korean Yakovlev Yak-9s and Ilyushin Il-10s. That changed dramatically in November 1950 with the arrival of the Mikoyan-Gurevich MiG-15, prompting the USAF to introduce its own swept-wing

fighter, the North American F-86 Sabre, as a countermeasure. Powered by a reverse-engineered British Rolls-Royce Nene engine, the MiG-15 surpassed straight-wing UN jets in speed (Mach 0.92), climb rate, and high-altitude performance, capable of exceeding 50,000 feet. The F-86, deployed in December 1950, matched the MiG's speed while outperforming it in handling, dive capability, and armament reliability, thanks to advanced hydraulically boosted controls and a radar gunsight.

The air campaign evolved in three distinct phases: initial UN dominance from June to October 1950, followed by the MiG's introduction and communist resurgence from November 1950 to mid-1951, and finally, the reestablishment of UN air superiority from 1951 to 1953. UN pilots operated from bases in South Korea and Japan, while communist MiGs flew from safe havens in Manchuria, China—areas off-limits to UN aircraft due to restrictive rules of engagement (ROE) that prohibited hot pursuit. This sanctuary allowed MiGs to attack, retreat, and refuel without risk, often outnumbering UN formations by 3:1 or more. Soviet participation remained secret; post-war archives showed that seasoned World War II veterans from the Soviet 64th Fighter Aviation Corps flew up to 75% of MiG sorties, disguised in Chinese uniforms and using only Korean phrases on the radio for deniability. These elite “Honchos,” as UN pilots termed skilled adversaries, far outmatched the less-experienced Chinese and North Korean pilots, leading to inconsistent communist performance.

Tactics adapted quickly on both sides. MiG pilots preferred “boom-and-zoom” strikes, diving from high altitudes to fire cannons before climbing back to safety. UN pilots, limited by the F-86's short fuel endurance (just 20-30 minutes over target from Korean bases), relied on flexible formations and radar-guided intercepts. The first all-jet dogfight took place on November 8, 1950, when a USAF F-80 claimed a MiG-15, though MiGs soon began downing slower UN planes. The F-86's first

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# Sabres vs. MiGs-The Jet Duel Over MiG Alley

## Korea: The Early Days of Jet Fighters

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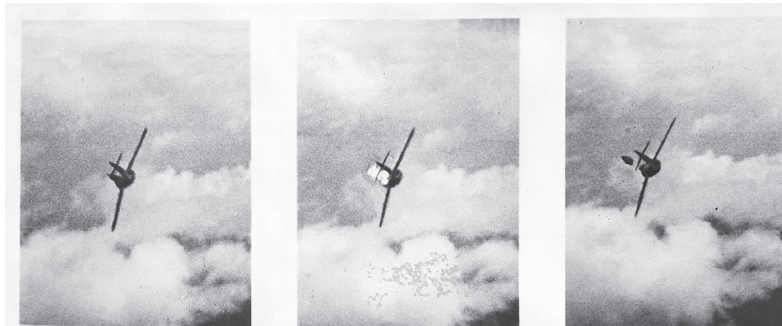
victory followed on December 17, 1950, with Lt. Col. Bruce H. Hinton shooting down a MiG, igniting a series of fierce encounters. Armament played a key role: the MiG's mix of two 23mm and one 37mm cannons packed a powerful punch but fired slowly (400-500 rounds per minute), complicating hits in fast maneuvers. In contrast, the F-86's six .50-caliber machine guns delivered rapid fire (1,200 rounds per minute), proving more reliable in prolonged engagements, albeit at closer ranges.

By the war's conclusion, UN forces reported destroying 792 MiG-15s (mostly by F-86s) against 78 Sabre losses in air-to-air combat, resulting in a contested overall kill ratio of 10:1, though some analyses adjust it to 5.8:1 when including all losses. Superior UN pilot training, often drawn from WWII veterans, combined with effective tactics, offset numerical disadvantages. The conflict accelerated U.S. jet development, shaping future designs such as the F-100 Super Sabre.

### MiG Alley: The Jet Battlefield

"MiG Alley," a 75-by-100-mile stretch along the Yalu River in northwestern North Korea—from Sinuiju to Antung in Manchuria—emerged as the war's central aerial battleground, hosting over 90% of jet combats from late 1950 onward. Named for the MiG-15's early dominance, the area featured rugged hills and river valleys perfect for ambushes. MiGs launched from bases like Antung (housing up to 300 aircraft), crossing the Yalu to intercept UN patrols while exploiting sanctuary protections. Large MiG groups (20-50 strong) would "bounce" UN flights from above 40,000 feet, using their climb advantage to disengage. UN pilots viewed it as a prime "hunting ground" for high-stakes action.

Battles in the alley intensified during 1951–1952. On December 22, 1950, F-86s achieved six MiG kills in a 20-minute skirmish, losing just one Sabre and demonstrating growing parity. UN tactics included "train" formations, with staggered flights extending patrol coverage. MiG pilots, frequently Soviets such as WWII ace Ivan Kozhedub, favored hit-and-run raids, but UN



Taken by gun camera film of a U.S. Air Force F-86 Sabre, this sequence shows a MiG-15 pilot abandoning his aircraft after it has been hit by the Sabre's gunfire. *U.S. Air Force*

aces responded with energy-based maneuvers, leveraging the F-86's superior roll rate and stability. A standout clash was "Black Thursday" on April 12, 1951, when over 100 MiGs attacked 48 B-29 bombers escorted by F-86s, downing three Superfortresses and forcing a shift to nighttime raids.

UN control strengthened by mid-1951 with the arrival of more F-86s (reaching 150 against over 800 MiGs). Legendary aces rose to prominence: USAF's Joseph McConnell with 16 kills, James Jabara (the first jet ace) with 15, and George Davis with 14. Soviet counterparts like Yevgeny Pepelyaev (23 kills) held their own, but UN training ultimately tipped the scales. As armistice negotiations advanced, MiG Alley's ferocity diminished by 1953, yet it endured as a symbol—a crucible for jet warfare that highlighted U.S. weaknesses in high-altitude fighting and underscored the primacy of pilot expertise over sheer technology.

In the aftermath, defections such as No Kum-sok's MiG-15 escape to South Korea in September 1953 yielded vital intelligence, verifying Soviet involvement. The Korean air war, which claimed 1,466 USAF aircraft (primarily to ground fire), illustrated air power's pivotal role in deadlocked ground wars and shaped Cold War military strategies. ➤

# Found in the Archives: F-4 vs MiG-17

ALLYN VANNOY

WEDNESDAY ARCHIVIST & SUNDAY DOCENT

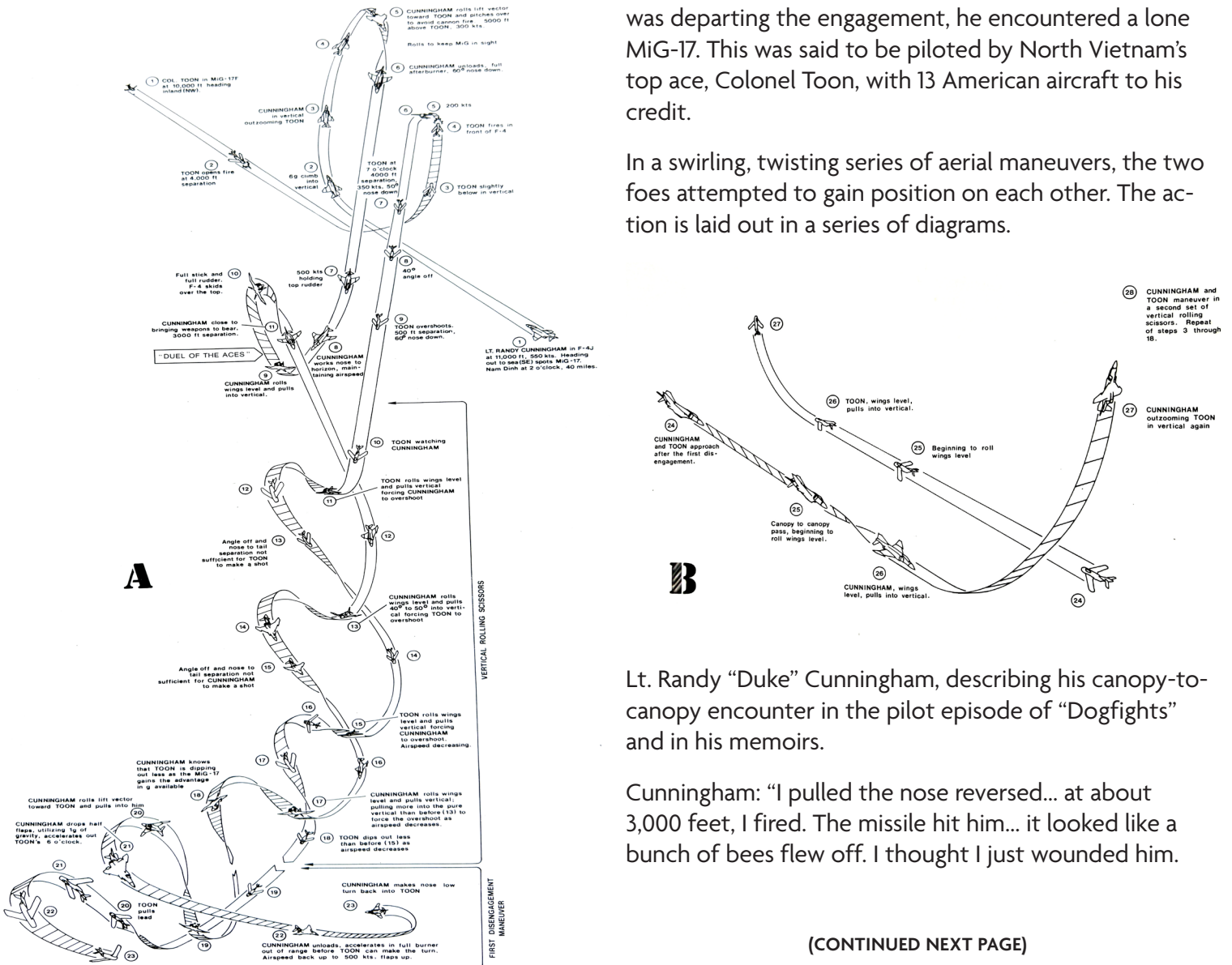
**Editor's Note:** The following story about Lt. Cunningham and his dogfight with Col. Toom of the North Vietnamese Air Force has largely been seen as an exaggeration. We still present the article because it highlights the techniques used in jet-age combat.

Located in the Evergreen Archives is a large framed graphic diagram accompanied by the narrative "The Black Knight versus Colonel Toon," 1400 hours, 10 May 1972.

Lt. Randall "Duke" Cunningham, USN, flying an F-4J Phantom II armed with two AIM-9G Sidewinders and two AIM-7E-2 Sparrows, was said to engage Colonel Toon, NVAF, flying a MiG-17F Fresco-C, armed with two 23mm cannon and one 37mm cannon, in aerial combat over North Vietnam.

Lt. Cunningham had downed a MiG-21 on 19 January 1972 and a MiG-17 on 8 May 1972. Two days later, on 10 May, Cunningham was flying in an Alpha Strike against the Hai Doung railroad storage area. After releasing his bomb load, he engaged defending MiGs, a swarm of MiG-17s, MiG-19s, and MiG-21s. He downed two MiG-17s. As he was departing the engagement, he encountered a lone MiG-17. This was said to be piloted by North Vietnam's top ace, Colonel Toon, with 13 American aircraft to his credit.

In a swirling, twisting series of aerial maneuvers, the two foes attempted to gain position on each other. The action is laid out in a series of diagrams.



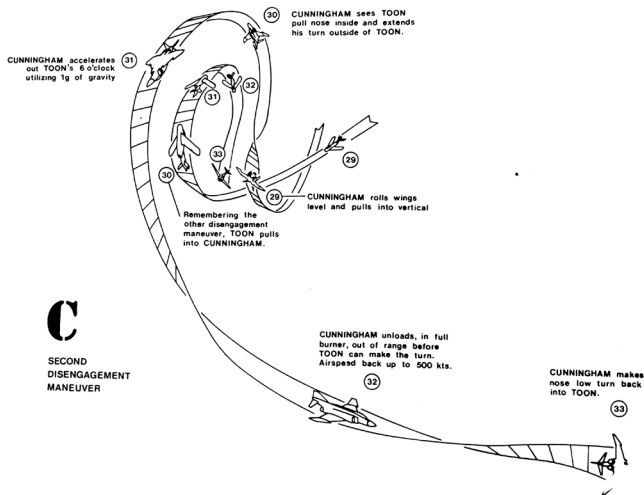
Lt. Randy "Duke" Cunningham, describing his canopy-to-canopy encounter in the pilot episode of "Dogfights" and in his memoirs.

Cunningham: "I pulled the nose reversed... at about 3,000 feet, I fired. The missile hit him... it looked like a bunch of bees flew off. I thought I just wounded him."

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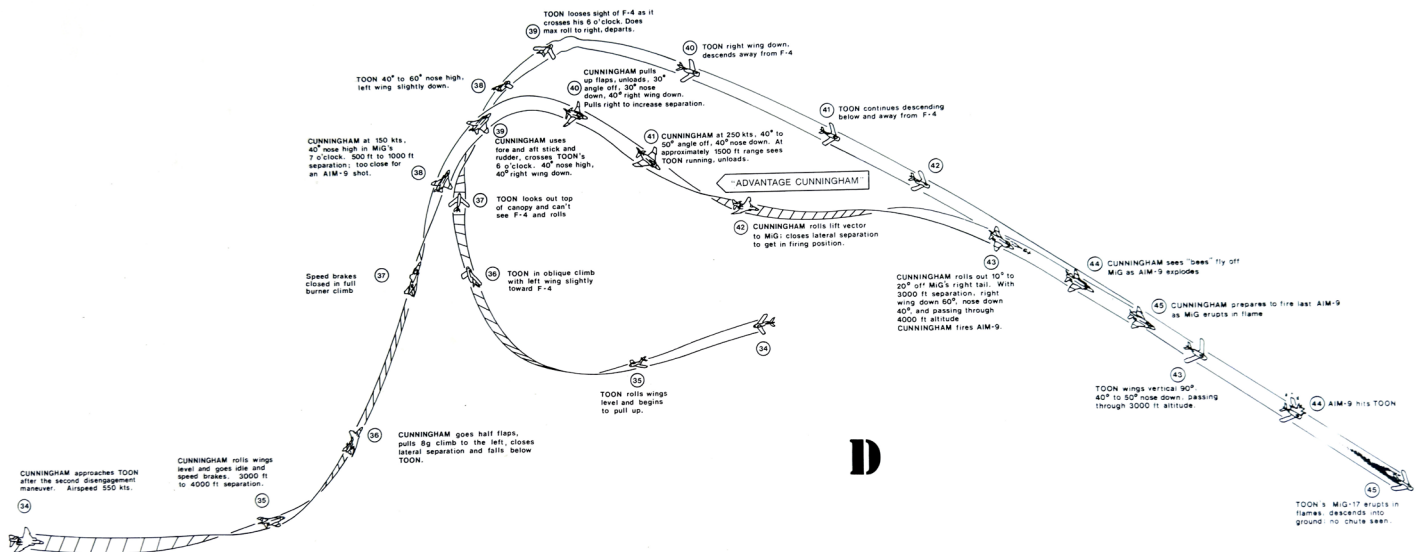
# Found in the Archives: F-4 vs MiG-17

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I started to squeeze the trigger for my last Sidewinder, and a big flame erupted... big billowing black smoke. I never saw him exit the airplane. There are rumors that he got out with extensive damage to him, but survived... I never saw a chute."

Note: While the air battle was underway, Colonel Toon, also known as Nguyen Toon or Colonel Tomb, was a mythical North Vietnamese Air Force fighter ace, loosely based on a North Vietnamese pilot from the 921st Fighter Regiment named Nguyen Van Coc. Toon allegedly shot down 13 American aircraft. It was later revealed that no such colonel existed in the North Vietnamese armed forces. ➤



# Operation Linebacker I

## The Biggest Air Battle in the Vietnam War



**BILL KOLB**

MONDAY DOCENT

Operation Linebacker I was a major U.S. aerial interdiction campaign during the Vietnam War, conducted by the Seventh Air Force and the U.S. Navy's Task Force 77 against North Vietnam from May 9 to October 23, 1972. It was the first sustained bombing of the North since Operation Rolling Thunder ended in 1968. It was launched in response to the North Vietnamese Nguyen Hue Offensive (Easter Offensive), which began on March 30, 1972—an invasion of South Vietnam with large conventional forces, tanks, and artillery.

President Richard Nixon authorized the operation to disrupt supplies fueling the invasion, support South Vietnam's defense under Vietnamization (the transfer of ground combat to ARVN), and pressure Hanoi to resume serious Paris peace talks. Initial strikes in April, known as "Freedom Train," targeted southern North Vietnam. After these failed to halt the advance, naval aircraft mined harbors in Operation Pocket Money on May 8–9. Full Linebacker expanded northward on May 10 with large-scale tactical strikes.

Objectives focused on isolating North Vietnam by destroying railroad bridges, rolling stock, and lines toward China; targeting primary storage areas and marshalling yards; eliminating transshipment points; and damaging air defenses. The campaign introduced widespread use of precision-guided munitions (laser-guided bombs), electronic warfare, and SEAD tactics. Aircraft included Air Force F-4 Phantoms, F-105 Thunderchiefs, and occasional B-52s; Navy A-6 Intruders, A-7 Corsairs, and F-4s from carriers such as USS Kitty Hawk and Constellation.

Over 40,000 sorties were flown, dropping more than 150,000 tons of bombs, with Navy aircraft contributing over 60% of sorties, particularly in the panhandle.

Fierce air combat marked the operation, especially on May 10, when U.S. pilots downed multiple MiG-17s and MiG-21s. Navy Lt. Randy Cunningham became the first U.S. ace of the war. U.S. forces claimed 63 North Vietnamese aircraft destroyed; losses included 134 U.S. aircraft (combat and operational), with 104 in combat (55 by AAA, 26 by MiGs, 18 by SAMs).



Results were decisive: Linebacker severely crippled North Vietnamese logistics—supply flows dropped sharply (some reports indicate deliveries from China fell dramatically), halting the Easter Offensive by mid-1972. Combined with ARVN counterattacks and close air support, it blunted the invasion without U.S. ground troops. The campaign demonstrated airpower's effectiveness in interdiction when unrestricted and tech-enhanced, convincing Hanoi to negotiate more earnestly. Though talks later stalled, this led to Linebacker II in December.

Linebacker I represented a shift to aggressive, precision-focused airpower, proving key in stemming the conventional threat during Vietnamization. ✈



# MiGs Over Nevada

USAF F-5Es flying with a Soviet MiG-17 and MiG-21 of the 4477th Tactical Evaluation Squadron. *U.S. Air Force*

## ALLYN VANNOY

WEDNESDAY ARCHIVIST & SUNDAY DOCENT

**H**AVE DOUGHNUT, HAVE DRILL, and HAVE FERRY were the top-secret programs that began the U.S. military's exploitation of Soviet-designed aircraft. In 1968, a MiG-21 acquired by Israel after the defection of an Iraqi pilot was brought to Groom Lake, Nevada. The USAF conducted both technical exploitation and operational capability testing before returning the aircraft to Israel.

Soon after, Israel acquired two Syrian MiG-17s after their pilots became lost and were forced to land in Israel. Intelligence gathered from these aircraft was shared with both the Navy TOPGUN program and the Air Force Fighter Weapons School. This information proved invaluable in improving air combat tactics during the Vietnam War.

As the Vietnam War ended, it became clear that U.S. air-to-air combat training was inadequate. Both the Air Force and Navy began using aggressor aircraft to simulate MiGs and Soviet tactics in both the Navy TOPGUN and Air Force Red Flag programs.

By the mid-1970s, the Air Force's need for more intelligence on MiGs increased. Additional MiG-17s and MiG-21s were acquired—some purchased outright, others obtained from countries transitioning away from Soviet weapon systems and toward U.S. equipment under the HAVE IDEA program. Most of the airframes were in poor condition. A cadre of Air Force pilots

and maintenance personnel was formed to ensure the aircraft was safe to fly. As the program expanded, it was renamed CONSTANT PEG. The goal was to expose Air Force and Navy pilots to tactical combat against real MiGs using Soviet tactics.

In October 1978, the Red Eagles were officially activated as the 4477th Test and Evaluation Squadron at the Tonopah Test Range (TTR) in Nevada. TTR, originally a World War II base, had long supported nuclear weapons development and needed several million dollars' worth of new construction and upgrades.



The objective of CONSTANT PEG was twofold: to gather detailed data on the strengths and weaknesses of Soviet-designed aircraft and to expose Air Force, Navy, and Marine pilots to them in realistic combat scenarios. One of the key lessons from Vietnam was that pilots often experienced “buck fever” the first time they encountered a MiG. Familiarity through training was expected to improve combat effectiveness and survival.

The Red Eagles initially flew MiG-17s and MiG-21s and later expanded to include MiG-23s acquired from Egypt. Over the life of the program, only 69 Air Force, Navy, and Marine pilots were qualified to fly Red Eagle MiGs. The pilots found the MiG-23 to have poor handling

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# MiGs Over Nevada

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characteristics, and its complex variable-sweep wings limited the dog-fighting capabilities. The Constant Peg program was Top Secret, requiring that Red Eagle pilots use the same callsign, “Bandit,” and that, whenever an adversarial satellite flew over the site, all aircraft and support equipment be hidden.

Over time, several factors increased pressure on the unit. The accident rate was the highest in the Air Force, spare parts became increasingly difficult to obtain, and Lt. Gen. Robert “Bobby” Bonds—Vice Commander of Air Force Systems Command and one of the program’s

early advocates—was killed in a MiG-23 crash. As TTR was selected for deployment of the F-117, the Red Eagles were required to conform to more standard Air Force procedures, including uniforms, grooming standards, and increased inspections and paperwork.

In late 1987, TAC commander Gen. Bob Russ decided to shut down the Red Eagles. The final flight occurred on March 4, 1988, when 13 MiG-21s and four MiG-23s launched; this was the largest formation the unit had ever flown. Between 1979 and 1988, CONSTANT PEG generated 15,264 MiG sorties and exposed 5,930 aircrew to Soviet aircraft.

After the shutdown, remaining aircraft and spare engines were placed in storage at Red Eagle hangars at TTR. Over the years, some were transferred to museums, while the rest have been destroyed.

Both the MiG-21 and the MiG-23 at the EASM are painted in a camouflage pattern. This is the way most of the Red Eagle aircraft were painted. ➤

A left underside view of one of twelve Soviet-made MiG-21 Fishbed-C aircraft flown by the US Air Force for air-to-air combat training. U.S. Air Force



# UAVs in the First Gulf War

## Acquisition and Use of Battlefield Information in VII US Corp

**PHIL SANTUCCI**

*MONDAY DOCENT*

In the fall of 1990, as the U.S. military continued its buildup of men and materiel in Saudi Arabia, a new asset was deployed in the VII Corps sector. This asset, not yet type-classified by the Army and still considered experimental, was the RQ-2A Pioneer UAV, developed and field-tested at the U.S. Army Intelligence School at Fort Huachuca, Arizona. The system was equipped with a camera and connected to inertial navigation systems and computers. The intent was to gather hard data on opposition emplacements.



The detachment deployed to the Gulf in support of VII Corps was commanded by Captain John Vance, Military Intelligence (MI) Corps. Captain Vance was later assigned to my instructor team at the MI school in the fall of 1991. The following information was provided to me by Captain Vance during our discussions while he was at the MI school.

The UAV detachment had been positioned in the rear of VII Corps sector near a stretch of paved road. The road was used as a runway for takeoff and landing of the Pioneer UAVs. Initially, Captain Vance and his detachment had no specific mission and no operational orders from VII Corps. It appeared that VII Corps was unaware of the detachment and its capabilities.

A colonel from VII Corps was driving on the paved road and encountered the UAV detachment as it was test flying one or more of the UAVs. The colonel, not knowing who this unit was and being unfamiliar with this type of equipment, stopped and asked who was in command. Captain Vance reported to the colonel and identified himself as the detachment commander. The colonel asked what type of unit they were and what they did. Captain Vance invited the colonel into the unit's control center, an air-conditioned metal shed built on a two-and-a-half-ton truck bed.

Inside the shelter were radios, UAV control consoles, desktop workstations, and several television monitors mounted on high shelves. One of the monitors was powered on and displayed terrain passing overhead. In the center of the monitor screen was a crosshair, and in the upper-left corner was a series of numbers that kept changing. The colonel asked about the crosshair and the numbers. Captain Vance told the colonel that the crosshair was the center of the view of the camera mounted on the UAV, and the numbers were the grid coordinates for where the crosshair was. The colonel instructed Captain Vance to keep his unit in place and that he would return shortly.



The colonel drove to VII Corps operations, where he contacted the artillery lieutenant colonel (the VII Corps fire support coordinator) and an engineer lieutenant colonel (the VII Corps operations staff engineer). He told them to come with him. They all got into the colonel's vehicle, and he drove them out to the UAV detachment location. On arrival, the colonel told Cap-

(CONTINUED NEXT PAGE)

# UAVs in the First Gulf War

## Acquisition and Use of Battlefield Information in VII US Corp

(CONTINUED FROM PREVIOUS PAGE)

tain Vance to give the two lieutenant colonels the same briefing he had received. Captain Vance took them all into the shelter and then repeated the briefing he had given to the colonel. At the conclusion of the briefing, the colonel and the two lieutenant colonels asked questions about the range, flight duration, and other technical capabilities of the UAVs. The colonel then asked the artillery lieutenant colonel if he could develop targeting data using the UAVs. That lieutenant colonel replied that he and a team of target analysts could compile a list of targets for each brigade sector and, working with the maneuver units, prioritize them based on the operational plans then being developed. He stated that they would be able to include every command post, bunker, foxhole, monitor position, machine-gun position, and any other asset within the Iraqi defense belt. He further stated that they would be able to include supply points, refueling locations, ammunition dumps, and other logistics assets behind the defense belt within the UAVs' range. There was virtually nothing in or close behind the Iraqi defense belt that couldn't be suppressed or destroyed by artillery or other fire support assets as the maneuvering forces moved forward.

The colonel then asked the engineer lieutenant colonel if it would be possible to use data from the UAV flights to construct a full-scale replica of the Iraqi defense belt. That lieutenant colonel stated that they could use maps to recreate the terrain and the targeting data to position mock-ups of the Iraqi assets and their positions.

Over the next several weeks, UAVs were flown all over the Iraqi defense belt in the VII Corps sector. The target lists were created, and data to build a replica of the Iraqi defense belt were developed and used in Saudi Arabia and at Fort Irwin, California, to construct full-scale replicas of large sections of the defense belt. At Fort Irwin, there were a mechanized infantry battalion and an armor battalion. When Fort Irwin's defense belt replicas were complete, the two battalions reorganized into a single battalion, one armor-heavy battalion task force, and one mechanized infantry-heavy battalion task force.



Each task force then planned and rehearsed approaches to breach the defense belt, ultimately determining the most effective tactics for the operation.

The information developed by the Fort Irwin battalions was forwarded to VII Corps, where their battalion-size task forces were able to use the methods and tactics developed at Fort Irwin to train and rehearse their attacks. These rehearsals also included fire support teams from the artillery, who constructed the sequence of target engagements to best support the attacking battalions, including suppression of Iraqi mortars and artillery.

During the buildup to the ground attack, UAV flights continued to provide information that the battle planners could use to refine the target list and battle plans. Given the relative capabilities of the U.S. forces versus the Iraqi forces, the ultimate outcome of the attack was not really in doubt. The Iraqi army was overmatched in training, equipment, and logistical capabilities. The thorough battlefield knowledge gained through UAVs multiplied the U.S. Army's advantages many times over. The result of the VII Corps' attack was so overwhelming that casualties on the U.S. side were extremely low, and some Iraqi soldiers even surrendered to a low-flying UAV.

One captain who had commanded a company in the attack was asked by a reporter, a few hours after his unit had pushed through and beyond the defense belt, how well the attack went. His response, "Just like we rehearsed it." ➤

# Alcock & Brown vs. Lindbergh: The Dawn of Transatlantic Aviation



**STEFANO PERER**

SUNDAY DOCENT

***Editor's Note:** The 1919 transatlantic flight by British aviators Captain John Alcock and Lieutenant Arthur Whitten Brown marked a historic milestone as the first non-stop crossing of the Atlantic Ocean by air. However, it differed significantly from Charles Lindbergh's famous 1927 flight, which was the first solo non-stop transatlantic journey. While both feats pushed the boundaries of early aviation, they differed in crew, route, aircraft, and duration.*

In June 1919, John Alcock and Arthur Whitten Brown achieved one of the most decisive milestones in aviation history: the first non-stop flight across the Atlantic Ocean. Flying a modified Vickers Vimy, they departed from St. John's, Newfoundland, and landed in Clifden, Ireland, after more than sixteen hours in the air, battling fog, ice, strong winds, and near-total darkness.

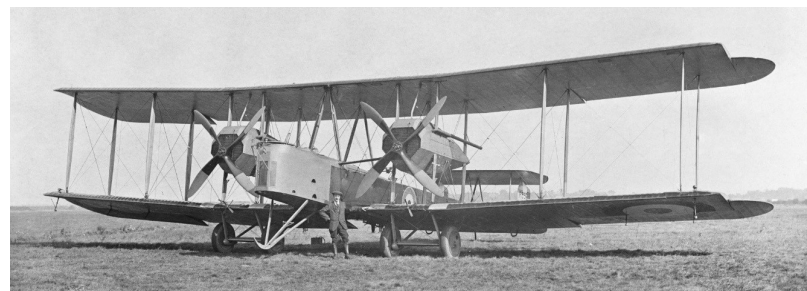
Their success proved, for the first time, that intercontinental flight was not a dream but a practical reality. Yet today, their names are far less familiar to the general public than those of later aviators. This is not because their achievement was lesser, but because history often remembers how a story is told, not only what was accomplished.

Alcock and Brown flew as a team: a pilot and a navigator. Their achievement was the result of cooperation, technical skill, and precise navigation under extreme conditions. While this partnership was essential to success, it did not fit the enduring myth of the lone hero. In 1927, Charles Lindbergh crossed the Atlantic alone, flying from New York to Paris in a single-engine aircraft

designed specifically for long-range flight. His journey was longer, his solitude more dramatic, and the narrative easier for the public to embrace.

The historical context also mattered. In 1919, Europe was emerging from the devastation of the First World War. Alcock and Brown's aircraft was a former military bomber adapted for a peaceful purpose, but it still carried the shadow of conflict. Their flight was viewed primarily as a technical demonstration rather than a symbol of hope and progress. By contrast, the world of the late 1920s was ready to celebrate aviation as a force shaping the future.

Tragedy further limited their legacy. Alcock was killed in an aircraft accident only months after the Atlantic crossing, leaving no opportunity to build a public career or personally promote his achievement. Brown continued working in aviation but remained largely outside the spotlight. Lindbergh, on the other hand, lived long enough to become an international figure and a powerful symbol of modern aviation.



Despite this, the importance of Alcock and Brown cannot be overstated. Without their pioneering flight, later achievements would not have been possible. They demonstrated that accurate navigation over open ocean was achievable, that aircraft could endure long-distance operations, and that the Atlantic was no longer an impassable barrier.

Alcock and Brown proved it could be done; Lindbergh showed the world what it meant.

Remembering them today completes the story of early aviation and honors the courage, teamwork, and innovation that first connected continents by air. ➤

# Mystery Corner

**JEAN HERKAMP**

LEAD ARCHIVES VOLUNTEER

In this and future editions of the FlightPlan, Archives (The artists formerly known as Collections) will provide a picture of an artifact/item for which they have no idea what it is, how it came about, or where it originated.

The following month, Archives will provide the answer or the best-guess submissions. ➤

## THIS MONTH'S MYSTERY: What the heck is this?

Approximately 2 feet



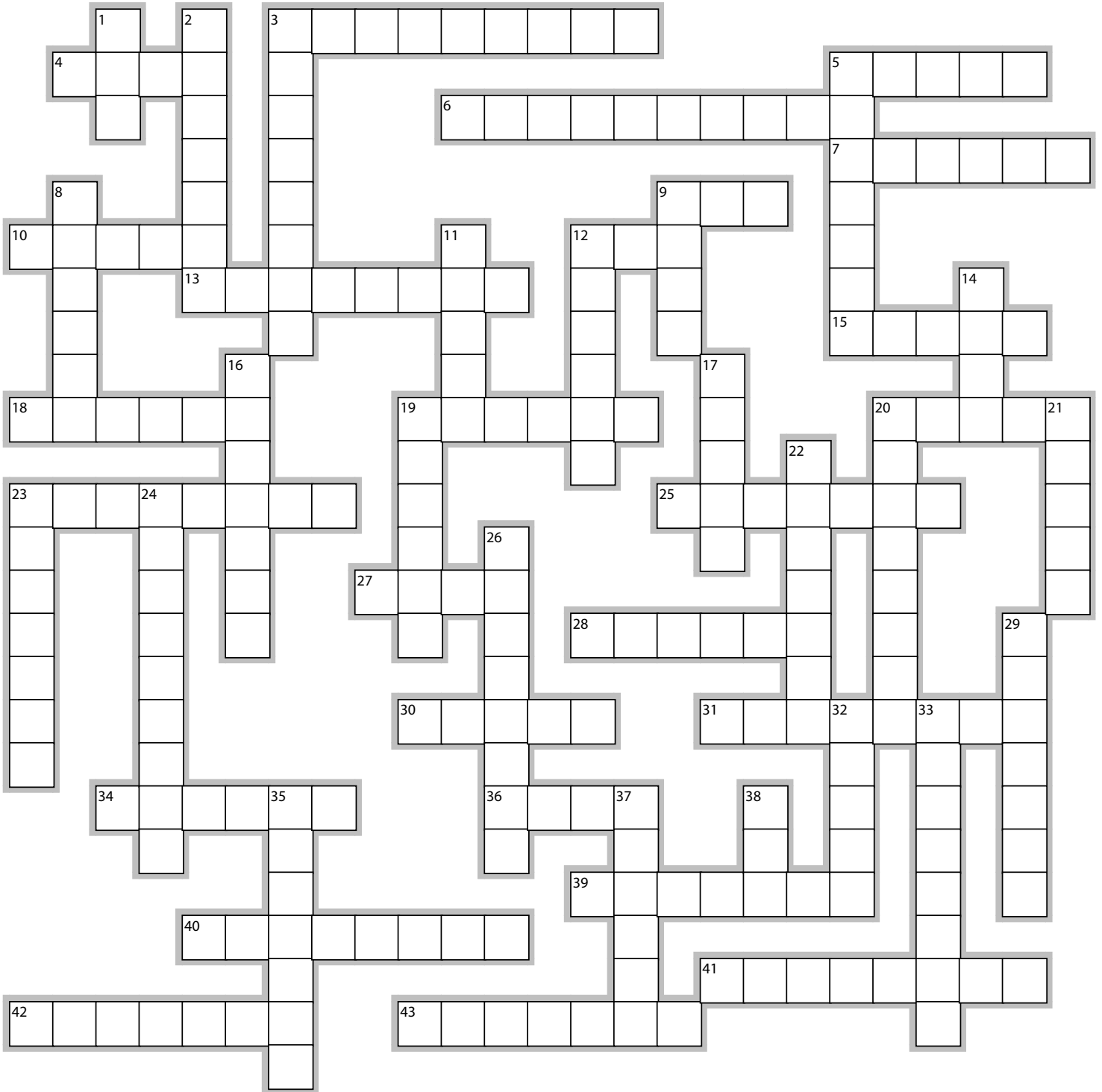
This object truly is a mystery. We hope someone has knowledge of this device or at least can make an educated guess. Readers are encouraged to provide Archives with their best answer/guess by responding to Jean Herkamp at: [jean.herkamp@evergreenmuseum.org](mailto:jean.herkamp@evergreenmuseum.org).

Your editor was sadly disappointed that no one came forth with theories on how our **Piasecki H-21 accumulated five bullet holes**. Let's give it a better go this month.

# Something About MiGs

DON COX

ARCHIVES & SATURDAY DOCENT



EclipseCrossword.com

(CLUES LOCATED ON NEXT PAGE)

# Something About MiGs - Clues

## ACROSS

3. Flogger's VGW, colloquially (2 wds)
4. Warsaw Pact's arch nemesis
5. What NATO calls the AA-2
6. Atoll's serpentine sibling
7. MiG headquarters city
9. USSR's successor state (acronym)
10. Powered by reverse engineered BMW-003 engine
12. MiG-31's backseater (acronym)
13. Chinese builder of MiGs
15. Mikoyan's Christian name
18. NATO's name for the Vypel R-73
19. Man outstanding in his field, or a MiG-19
20. MiG-15,-17,-19 wing planform
23. Shape of MiG-27's nose
25. Gurevich, to his mother
27. MiG Alley was over this river
28. NATO's name for EASM's MiG-15 version
30. MiG-21's wing planform
31. Builder of MiG-19's engines
34. MiG-21U, in NATO-ese
36. NATO's name for Foxhound's main missiles
39. NATO's name for the MiG-21
40. Mikoyan's partner
41. Right under Gurevich's nose
42. Country where MiG-29 was first publicly flown
43. Gurevich's family religion

## DOWN

1. Flogger's folding fin stabilizes in this axis
2. What U.S. fighter pilots called their Soviet counterparts in Korea
3. Early MiGs' septum?
5. Mikoyan's home country
8. Flogger's radar
9. Type of war between NATO and WARPAC
11. Largest operator of Fulcrum outside of Russia
12. Private military group that flies Fulcrums
14. MiG-15's engine based on Rolls-Royce's \_\_\_\_\_
16. Role of MiG-15UTI or MiG-25U
17. Gurevich received Order of \_\_\_\_\_ in 1962
19. Belenko's defective mount
20. NATO's name for MiG-21 radar (2 wds)
21. Russia's aviation research center (acronym)
22. Fresco's alliterative nemesis in Vietnam
23. What 16,45, and 72 are to a Flogger pilot
24. MiG-29Ks operated from the Admiral \_\_\_\_\_
26. The "N" in NR-23 and NR-30 cannons
29. NATO name for MiG-21bis radar
32. NATO name for R-60
33. NATO name for Fulcrum's radar (2 wds)
35. MiG's IFF antenna nickname (2 wds)
37. Russia's MiG-29 aerobatic team
38. Russian acronym for Experimental Design Bureau

**Editor's Note:** We're adding a new feature to the FlightPlan. Each edition will now include a crossword puzzle at the end, tied to that month's theme. Answers will be provided in the following month's edition. For now, the best way to work on it is to print out the puzzle. We're exploring options to make it interactive, but that will come later.

# Band of Brothers



The McMinnville, Oregon Band of Brothers meets on the **first Thursday of each month** in the large glass-walled room to the left of the primary admissions desk in the West Pavilion (formerly the Aviation Museum). **Meetings run from 11:30 am to 12:30 pm**, with coffee and cookies served. More details can be found at the group's **Facebook page: <https://www.facebook.com/groups/838928846550343>**

## MUSEUM MISSION

Evergreen Aviation & Space Museum is a force of curiosity and courage for kids of all ages to gain the confidence to take flight.

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