

NO CONTEST: AERIAL COMBAT IN THE 1990s

Dr. Daniel L. Haulman
Air Force Historical Research Agency
2002 Version

During the decade of the 1990s, the United States and her allies won three conflicts. In 1991, they forced Iraq to withdraw its army from Kuwait. In 1995, they forced the Serbs of the former Yugoslavia to recognize the independence of Bosnia-Herzegovina. In 1999, they forced Yugoslavia to stop an ethnic cleansing campaign in Kosovo, to withdraw its army from that province, and to allow ethnic Albanians who had been expelled to return. Air power played a larger role in these victories than in any previous conflicts in history. That air power could not have been employed without control of the air. In the words of USAF Chief of Staff General Michael E. Ryan, “We can’t lose sight of the fact that air superiority is the enabler for everything else we do.”¹

One controls the air by denying its use to the enemy, partly by shooting down enemy aircraft. This can be done with surface-to-air missiles, antiaircraft artillery, or other airplanes. During the 1990s, the United States and her allies chose the last of these options most often.

One method of determining the success or failure of aerial combat is by the use of kill ratios, or the number of enemy aircraft shot down by friendly airplanes compared with the number of friendly airplanes shot down by enemy aircraft. In this paper I will focus on the kill ratios of the United States Air Force. I do not mean to imply in any way that the United States Air Force alone achieved all Allied aerial victory credits in the 1990s.

In operations against Iraq between 1991 and 1993, United States Air Force airplanes shot down 39 airborne enemy aircraft, while Iraqi aircraft shot down not one USAF airplane.² Between 1994 and 1999, USAF pilots shot down nine Yugoslavian aircraft, but lost not a single airplane in aerial combat.³ During the 1990s, U.S. Air Force pilots shot down 48 enemy aircraft. In the same decade, enemy pilots shot down not one U.S. Air Force aircraft. In the field of aerial combat, there was no contest. What are the reasons for such an overwhelming kill ratio? At first glance they might seem obvious. The United States and her allies, the richest and most technologically advanced nations in the world, fought against Iraq and Yugoslavia- hardly an even match. The allies had clear quantitative and qualitative advantages over small nation states that were fighting alone.

At second glance, the reasons are not so obvious. The United States enjoyed the same advantages over North Korea between 1950 and 1953, and over North Vietnam in the late 1960s and early 1970s, but the aerial kill ratios were different then. For every six enemy aircraft USAF pilots shot down during the Korean War, they lost one.⁴ In Vietnam the record was worse. The USAF lost one airplane for every two it shot down.⁵ How did the kill ratio change from 6-1 and 2-1 to 48-0? Clearly there are lessons to be learned here.

In the remainder of this paper, I want to suggest reasons why the United States Air Force was able to enjoy such aerial combat success in the 1990s.

First, the United States Air Force after Vietnam deliberately improved training its fighter pilots for air to air combat. Its dismal kill ratio in Vietnam convinced the Air Force to overhaul its training. Following the lead of the Navy, which during the Vietnam

War had established a special training course for aerial combat, the Air Force set up its own training course called RED FLAG. In these exercises, pilots in different types of aircraft flew against each other, one side portraying enemy pilots using enemy tactics. By contrast, both Iraq and Yugoslavia lacked many pilots well-trained in air to air combat. In the long Iran-Iraq war in the 1980s, neither side devoted much of its effort to air power. Despite the low level of aerial combat, some of Iraq's pilots were lost in the war against Iran. Yugoslavia and the Serbs in Bosnia also lacked much experience in aerial combat and did not train for it as extensively as did USAF. In both Iraq and Yugoslavia, pilots largely used Soviet aircraft, Soviet advisors, and Soviet tactics.⁶ International sanctions against both Iraq and Yugoslavia persuaded them to conserve aircraft parts and fuel by restricting training flights. Iraqi pilot readiness suffered from the few training sorties allowed.

USAF fighter pilots were not only better trained but also better equipped than their opponents in the 1990s. International sanctions restricted the availability of operational aircraft in Iraq and Yugoslavia. At the time of the Gulf War, most of Iraq's MIG-21s were stranded in Yugoslavia, where they were being repaired.⁷ The economic collapse of the Soviet Union, and the willingness of the Soviet Union and later Russia to cooperate with the United States and its allies, deprived both Iraq and Yugoslavia of the parts they needed to prepare for or prosecute an air war.

Technology gave the USAF better weapons than its opponents. During the Vietnam conflict, in which the multi-role F-4 had not completely outclassed its MiG-21 opponent, the Air Force's Tactical Air Command called for a new air superiority fighter that could overcome the threat of current and expected Soviet fighters. The result was the

F-15 Eagle, an aircraft so advanced that a quarter century after its debut, it is still the most important aerial combat weapon of the Air Force. The F-15 was superior for aerial combat to any aircraft because of its maneuverability. Its missiles would allow it to shoot down enemy aircraft such as the Soviet Foxbat, that could fly faster and higher. First flying in 1972, the Eagle was the first fighter to have a thrust greater than its weight, enabling it to accelerate while climbing vertically. Bearing a pulse-Doppler radar system in its nose, it was also the first fighter with a look-down, shoot-down capability. It carried a 20mm cannon and up to eight air-to-air missiles. The F-15 was the first USAF fighter designed primarily for air superiority since the F-86's debut about two decades earlier⁸ F-15 pilots downed 39 enemy aircraft during the 1990s, including 35 of the 39 Iraqi aircraft shot down during Operation DESERT STORM in 1991, and 4 of the 5 Yugoslavian aircraft shot down during Operation ALLIED FORCE in 1999.

Another USAF fighter aircraft important in aerial combat in the 1990s was the F-16 Fighting Falcon. Although it was not designed primarily for aerial combat, the F-16 could perform that mission well. Entering Air Force service in 1984, the F-16C carried a 20 mm cannon and up to six air-to-air missiles, two of them on its wingtips.⁹ Pilots in F-16 Fighting Falcons in the 1990s scored a total of seven aerial victories- two against Iraq in 1992 and 1993, four over Bosnia in 1994, and one over Kosovo in 1999. In the 1990s, enemy pilots shot down not one F-15 or F-16.

As advanced as some of the enemy aircraft were, they were only a shadow of the American aircraft their designers largely tried to copy. Designed to compete with the F-15, the MiG-29 entered Soviet service in 1983. Like its American predecessor, it carried a Doppler radar for look-down, shoot-down capability, had a thrust greater than its

weight, could launch missiles from beyond visual range, and carried up to eight air-to-air missiles. In some ways, the MIG-29 was superior to the F-15. It bore a larger gun, and it featured alternate dorsal air intakes for landing or taking off on poorly developed runways. Although it could fly faster and higher than the F-16, it was still the inferior of the F-15 in speed and altitude.¹⁰

Of course, the USAF fighter aircraft themselves were only partly responsible for success. The air-to-air missiles they carried were equally important. The AIM-7 Sparrow and the AIM-9 Sidewinder were used in Vietnam, but they were not very effective then. Between May 1972 and January 1973, only ten percent of the AIM-7 Sparrow missiles hit their targets. In the same period, only about eleven percent of the AIM-9 Sidewinder missiles hit their targets.¹¹ Larger and heavier than the heat-seeking Sidewinder, the Sparrow had a longer range, a larger warhead, and an all-weather capability. Unlike the Sidewinder, it could not be fired and forgotten. It depended on its launch aircraft for radar guidance to its target, so the launch airplane could not take immediate evasive action. Improved versions of the Sparrow and the Sidewinder made them more effective in southwest Asia and the Balkans in the 1990s than in Vietnam in the 1960s and 1970s.¹²

To capture the “fire and forget” feature of the Sidewinder and the range and all-weather advantages of the Sparrow, the Air Force developed the advanced medium range air to air missile, or AMRAAM. Also called the AIM-120, it was first used in aerial combat in 1992. The AIM-120 carried its own radar, so that the launch aircraft pilot could fire it, take immediate evasive action, and be reasonably assured that the missile would find its target. The AIM-120 gave USAF fighter aircraft of the 1990s a lethality

lacking in Vietnam. The air intercept missile of choice in 1991 was the Sparrow. By 1999 it was the AMRAAM.¹³ In 1991, infrared missiles and guns still brought down enemy airplanes, but in 1999, AMRAAMs accounted for them all.

USAF pilots in Vietnam reluctantly used the Sparrow missile at the great distances for which it was designed because they feared shooting down a friendly aircraft. The emergence of the E-3 Airborne Warning and Control System, or AWACS aircraft, made possible positive identification of the enemy, and consequently his destruction, from beyond visual range. The E-3 looked much like a four-engine Boeing airliner with a 30-foot-wide disk rotating 11 feet above its fuselage.¹⁴ Not available in Vietnam, the AWACS aircraft appeared in the 1970s and transformed the aerial combat landscape dramatically. The E-3 gave USAF pilots the confidence to launch their longer-range air intercept missiles and bring down more aircraft they could see only on radar.¹⁵ Of twenty-three AIM-7 kills by USAF F-15s during the period January 17 through February 28, 1991, sixteen were from beyond visual range. The Gulf War was the first conflict in which a large percentage of aerial victories were from beyond visual range.¹⁶ Besides allowing these long-distance kills, the AWACS aircraft often provided the fighters it served with advance notice of the presence of enemy fighters with which to deal. To some extent, the F-15 radar could detect enemy aircraft, but it was the E-3 that gave the F-15 confirmation. The combination of newer fighter aircraft designed specifically for aerial combat, newer generations of air interceptor missiles, and the E-3 AWACS aircraft contributed immensely to the USAF fighter record of the 1990s.

Besides training and technology improvements, methodology helps explain the Air Force's greater aerial combat success in the 1990s. Both Iraq and Yugoslavia copied

Soviet centralized counterair systems that integrated the use of surface to air missiles or SAMs with the use of interceptor aircraft. This not only reduced the flexibility of the pilots, but also made the ground stations that controlled the aircraft more important as targets. USAF aircraft attacks on enemy command and control structures deprived enemy fighter pilots of their radar eyes and ears, and, to some extent, of their directions. Within the first two days of the Gulf War in 1991, coalition forces had largely destroyed Saddam Hussein's command and control system.¹⁷

Air attacks on enemy airfields, aircraft shelters, and even aircraft on the ground also contributed to the failure of enemy pilots to shoot down even one USAF airplane in the 1990s. Coalition aircraft in the Gulf War dropped mines and cratering bomblets on Iraqi airfields to restrict their use. They also flew combat air patrols over the enemy airfields for the same purpose, attempting to shoot down any Iraqi airplane that attempted to launch.¹⁸ Such tactics discouraged the Iraqi pilots from flying, but the United States and her allies reasoned that as long as the Iraqi air force survived, the enemy had the potential to deliver nuclear, biological, or chemical weapons by air. A week into the air campaign, the USAF began targeting hardened aircraft shelters, using precision guided munitions such as laser-guided 2,000-pound bombs dropped from stealth aircraft.¹⁹ Not long after the attacks on Iraqi aircraft shelters began, Iraqi combat aircraft began flying in large numbers to Iran. Coalition aircraft flew patrols over eastern Iraq and shot down about 13 of them. Despite allied efforts, over 100 Iraqi combat airplanes escaped to Iran.²⁰

The numerical superiority of coalition aircraft, both against Iraq and against Yugoslavia, made the allied attacks and combat air patrols practical. The allies of the

United States must be given some of the credit for the dramatic USAF kill ratio of the 1990s. For example, in the Gulf War, the international coalition fielded twice the number of fixed-wing combat aircraft as Iraq. This allowed the allies to devote many more sorties than the enemy to air superiority missions.²¹ During Desert Storm, a large variety of airplanes flew in strike packages. While F-16s attacked ground targets and F-15s fended off enemy fighters, F-4s attacked enemy air defenses such as surface-to-air missile sites, EF-111s jammed enemy radars, and KC-135s and EC-130s orbited for air refueling and communications.²²

Iraq and Yugoslavia failed to shoot down USAF airplanes with their own aircraft partly because they depended on other weapons to do the job. This had been true in Vietnam, where ground fire from anti-aircraft weapons or surface-to-air missiles accounted for more than 90 percent of USAF aircraft losses in combat.²³ Iraqi and Serb ground fire accounted for 100 percent of USAF aircraft combat losses. Ground fire brought down seventeen USAF airplanes in the conflicts of the 1990s. Iraq shot down fourteen during the Gulf War, and the Serbs shot down one in 1995 and two in 1999.²⁴ During the Air War Over Serbia in 1999, NATO was unable to completely destroy Yugoslavia's surface-to-air missile capability.²⁵ Surface-launched missiles and anti-aircraft guns continued to present much more of a threat to USAF aircraft than enemy aircraft. Enemy fighters sometimes served only as bait to lure USAF fighters into areas with heavy concentrations of surface-to-air missiles and anti-aircraft artillery.²⁶

Finally, geography contributed to the poor air combat performance of the enemies of the United States and her allies in the last decade of the twentieth century. The desert environment of much of the Gulf War theater deprived both Iraq and its coalition enemies

of vegetation in which to hide, but allied air superiority made Iraq much more vulnerable in that environment. Air superiority allowed the United States and her allies to strike deep Iraqi targets much more easily than Iraq could strike coalition targets. Clear skies over the theater and lack of vegetation gave the United States the ability to destroy the Iraqi command and control system and take out much of the Iraqi air force on the ground.

Cloudier skies and thicker vegetation made Yugoslavia's air force less vulnerable to air strikes on runways, hangars, and command and control structures, but geographic factors also contributed to Yugoslavia's poor performance in aerial combat. The aircraft of the United States and her NATO allies were able to strike Yugoslavia from several scattered bases and from many different directions, while they knew exactly where the enemy aircraft would be coming from. Moreover, Yugoslavia's relatively small territory made its own bases more vulnerable than those of her enemies.

During the decade of the 1990s, the United States and her allies achieved victories in which air power played a larger role than ever before. The victors of aerial combat deserve some of the credit, because they denied the enemy use of the sky. In future wars, the same factors are likely to produce the same results.

Paper presented at the Society for Military History meeting
at the University of Calgary, Calgary, Alberta, Canada, in May 2001.

Dr. Daniel L. Haulman
Original completed 23 May 2001.
Updated on 8 July 2002.

¹ HQ USAF Initial Report on The Air War Over Serbia, p. 52.

² Williamson Murray and others, Gulf War Air Power Survey, vol. II, part 1, 111, 119.

³ Sixteenth Air and Space Force Aerial Victory Credits Board Review/Results for Operation Allied Force, documents collected by Carol Parks, Sixteenth Air Force historian, in 1999, and sent to the author at AFHRA. TSgt Gregory Henneman, Six Decades in Europe: The History of the 48th Fighter Wing, 1941-2001 (RAF Lakenheath: 48th Fighter Wing history office, 2001), 10.

-
- ⁴ Far East Air Forces Korean Air War Summary, K720.04D at AFHRA, and USAF Historical Study 81, "USAF Credits for the Destruction of Enemy Aircraft, Korean War, 101-81 at AFHRA.
- ⁵ Walter Hanak, James N. Eastman, Jr., and Lawrence J. Paszek, editors, Aces and Aerial Victories (Maxwell AFB: Albert F. Simpson Historical Research Center, 1976), 157, and Fixed Wing Losses, 1962-1973, manuscript 31914-22 at Air University Library. See also Air Force Aircraft Combat Losses by Cause in SEA, FY 1962-1973 and Southeast Asia Review, Fiscal Years 1961-1973, 30 Aug 1973. Statistics vary. Some say the USAF shot down 137 and lost 67 (a ratio of 2.05 to 1), but others say the ratio was 137 to 74 (1.85 to 1). See Wayne Thompson, To Hanoi and Back (Washington, DC: Air Force History and Museums Program, 2000), 311.
- ⁶ Gulf War Air Power Survey, vol. II, 79.
- ⁷ Norman Friedman, Desert Victory: The War for Kuwait (Annapolis, MD: Naval Institute Press, 1991), 67.
- ⁸ William Green and Gordon Swanborough, The Complete Book of Fighters (New York: Smithmark, 1994), 371-373. Susan H. H. Young, "Gallery of USAF Weapons," Air Force Magazine, vol. 83, no. 5 (May 2000), 138. Jacob Neufeld, "The F-15 Eagle: Origins and Development, 1964-1972," Air Power History, vol. 48, no. 1 (Spring 2001), 11, 12, 19.
- ⁹ William Green and Gordon Swanborough, The Complete Book of Fighters (New York: Smithmark, 1994), 237-240.
- ¹⁰ Green and Swanborough, 402, 404-405.
- ¹¹ Benjamin Franklin Cooling, Case Studies in the Achievement of Air Superiority (Washington DC: Center for Air Force History, 1994), 553-556.
- ¹² Susan H. H. Young, "Gallery of USAF Weapons," Air Force Magazine, vol. 83, no. 5 (May 2000), 155. Walter J. Boyne, Beyond the Wild Blue (New York: St. Martin's Press, 1997), 302.
- ¹³ Young, 155-156.
- ¹⁴ Enzo Angelucci, Rand McNally Encyclopedia of Military Aircraft, 1914-1980 (New York: The Military Press, 1980), 482. Susan H. H. Young, "Gallery of USAF Weapons," Air Force Magazine, vol. 83, no. 5 (May 2000), 141, 143.
- ¹⁵ Walter J. Boyne, Beyond the Wild Blue (New York: St. Martin's Press, 1997), 302.
- ¹⁶ Gulf War Air Power Survey, vol. II, 113.
- ¹⁷ Ibid.
- ¹⁸ Gulf War Air Power Survey, vol. II, 139-140.
- ¹⁹ Gulf War Air Power Survey, vol. II, 119-120, 129.
- ²⁰ Gulf War Air Power Survey, vol. II, 130.
- ²¹ Gulf War Air Power Survey, vol. II, 107.
- ²² Gulf War Air Power Survey, vol. II, 109-110, 113.
- ²³ History of the Seventh Air Force, 1 Jul 1972-29 Mar 1973, vol. I (K740.01-25 at AFHRA), 150. See also "Fixed Wing Losses, 1962-1973", manuscript at Air University Library.
- ²⁴ Walter J. Boyne, Beyond the Wild Blue (New York: St. Martin's Press, 1997), 302. HQ USAF Initial Report, "The Air War Over Serbia, Aerospace Power in Operation Allied Force" (USAF white paper), 52. Frederick J. Shaw, Jr., and Timothy Warnock, ed., The Cold War and Beyond (Maxwell AFB: Air University Press, 1997).
- ²⁵ HQ USAF Initial Report on The Air War Over Serbia, 52.
- ²⁶ David Ruppe, "Shots in the Dark," from ABC News.com on the internet.