LIGHTNINGS TO SPITFIRES

A lifetime as a fighter pilot

BY CLIVE ROWLEY, MBE RAF (RET.)

Editor's note: Clive Rowley has contributed several features in recent issues of *Flight Journal.* Here he treats us to some excerpts from his new autobiographical book, "Lightnings to Spitfires."

The author, Flying Officer Clive Rowley, aged 25, with a Lightning F.2A at Gutersloh in 1976, toward the end of a three-year front-line tour flying Lightnings in Germany. (Photo author's collection)

The Lightning

The English Electric (later BAC) Lightning was a remarkable and innovative British design. It was the first British aircraft able to sustain supersonic speeds in level flight and the first to achieve twice the speed of sound, Mach 2.0. Its Rolls Royce Avon reheated engines were stacked one above the other in an unusual arrangement in the relatively thin but tall fuselage. The wings were swept back 60 degrees, the radar was contained in a bullet fairing in the center of the nose intake, and two air-to-air missiles were mounted on the sides of the fuselage under the cockpit. The cockpit and the pilot seemed to be almost an afterthought, squeezed onto the top and front of this "rocket ship." On the ground, sitting on its tall, spindly undercarriage and thin high-pressure tires, the Lightning seemed an ungainly beast, but in the air with the undercarriage retracted, its highly-swept-wing planform gave it a sleek and purposeful shape that made it look fast even when it was flying relatively slowly.

Cold War Lightnings in Germany

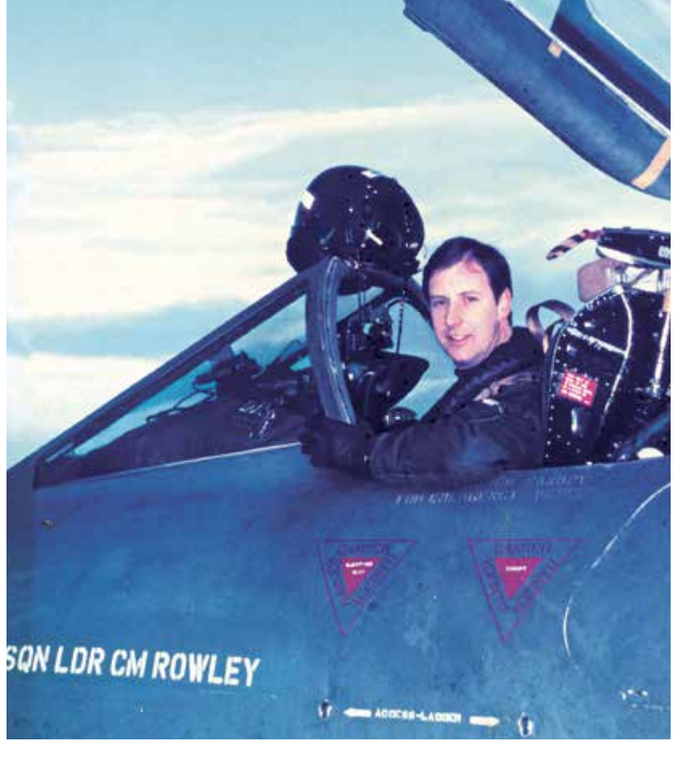
From 1965 to early 1977, there were two RAF Lightning squadrons based at RAF Gutersloh in Germany, Numbers 19 and 92 Squadrons. From 1968, these squadrons operated the Lightning F.2A. Only 31 examples of this mark of Lightning were produced. By 1974, when I arrived at Gutersloh as junior pilot straight out of training, the F.2As had been painted with plain dark-green upper surfaces, covering their previous silver-polished-metal finishes, in recognition of the primarily low-level role they were expected to undertake in the event of war.

The Lightning F.2As were modified F.2s, with the addition of the large ventral fuel tank and the cranked and cambered wings of the Lightning F.6, modifications that significantly increased the aircraft's operational effectiveness. Many Lightning pilots who, like me, have flown most marks of the aircraft believe that the F.2A was the best to fly operationally, as it was the ideal compromise. It carried the most internal fuel (10,300 pounds), and the two Rolls

Royce Avon Mk 211R engines produced a total of almost 29,000 pounds of thrust in full reheat, endowing the aircraft with more than sufficient power while being more economical than the slightly more powerful engines of the Lightning F.3 and F.6. The F.2A had the larger square-topped fin and the arrester hook fitted to the F.6, but retained the two nose-mounted 30mm Aden cannons of the earlier marks. Equipped with the AI 21 air intercept pulse radar, the F.2A did not have the capability to carry Redtop missiles; instead it carried two of the slightly less capable, but arguably more reliable, Firestreak infrared-homing air-to-air missiles. (The Firestreak was essentially a pursuit weapon that had to be fired from within a 30-degree sector either side of the target's tail.) This weapon suite was no particular disadvantage in the low-level overland environment of Germany. In fact, the F.2A's older system offered some positive benefits, especially the gunsight (the "pilot attack sight"), which was almost a small head-up-display, providing weapon-aiming information and, when the radar was locked on to a target, a target indicator, radar range, and closure rate.

During the period when the Lightning F.2A was operational in Germany, it generally outperformed all comers in the quick reaction low-to-high-level visual interception role that was so crucial to NATO's forward air defense against possible attack from the East. The Lightning's outstanding performance and its simple weapon system made it a match for any other aircraft that it was likely to tangle with, either in training or for real. Most of the fighter and fighter-bomber types on both sides at that time were either cannon-armed only or, if fitted with air-to-air missiles, had a capability no better than the Lightning and its Firestreak heat-seeking missiles. The only exception to this in the 1970s was the McDonnell F-4 Phantom in service with the RAF, which was equipped with a pulse-Doppler radar and semi-active radar missiles. This advanced weapon system provided the F-4s with a beyond-visual-range (BVR) capability that could provide the Lightning pilot with some difficulties in surviving to the visual merge. In a visual fight with an F-4, however, the Lightning pilot would fancy his chances, as he did with all the other potential opponents, as long as he fought to his aircraft's strengths.

Above: Lightning F.2A XN724 "F" of 19 Sqn. landing at Gutersloh, Germany. The touchdown speed in the highly-swept-wing Lightning was about 160 knots. (Photo by Erich Westersotebier via author)



Right: Sqn. Ldr. Clive Rowley in the cockpit of Lightning F.3 XR718 "DA," his personal aircraft bearing his name, in 1987 when he was the Officer Commanding the Lightning Training Flight at RAF Binbrook. (Photo author's collection)

For an aircraft designed as an interceptor, the Lightning proved to have excellent air-combat-maneuvering (ACM) dogfighting capabilities with a good turn rate and an excess of power, especially below 15,000 feet. As an indication of the power available it was possible to set the aircraft into a 5G turn at 450 knots at low level and then, with full reheat selected, fly a climbing 5G spiral maintaining speed and G up to 15,000 feet—quite impressive for that era.

Being something of an elite force, the Lightning pilots felt confident about their ability to do the job asked of them; they were proud of their aircraft and their prowess, and were able to hold their heads high in the NATO fighter community. There was quite a spirit—an esprit de corps—among the Lightning pilots at Gutersloh, which was evident on the ground and in the air.

Supersonic and Stratospheric

One day in December 1974, I was scheduled to be flying a training sortie involving a supersonic intercept against a supersonic target at high level. The normal profile for this routine training exercise was to have a Lightning target flying at 40,000 feet at Mach 1.3 (M1.3), while the fighter aircraft would begin the intercept at 36,000 feet accelerating up to M1.6. The Lightning was easily capable of these heights and speeds, although the extensive use of reheat would shorten the sortie length, usually to around 45 to 50 minutes in the Mk F.2A Lightning.

On this particular day, the Lightning scheduled to be my target went unserviceable just before we walked out to fly. There was no spare aircraft, and my chances of flying were looking doubtful. Then it was suggested that, as the Boss, Wing Commander Bob Barcilon was flying an air test in another Lightning, which would involve a supersonic run at M1.6. If I asked him nicely, perhaps he would agree to my intercepting him. I duly made my request to the Boss, who was not particularly enamored by my proposal as the air-test profile was extremely fuel critical. He would not be able to make any adjustments for me, but I was free to intercept him if I could. This was something of a red rag to a bull for this young flying

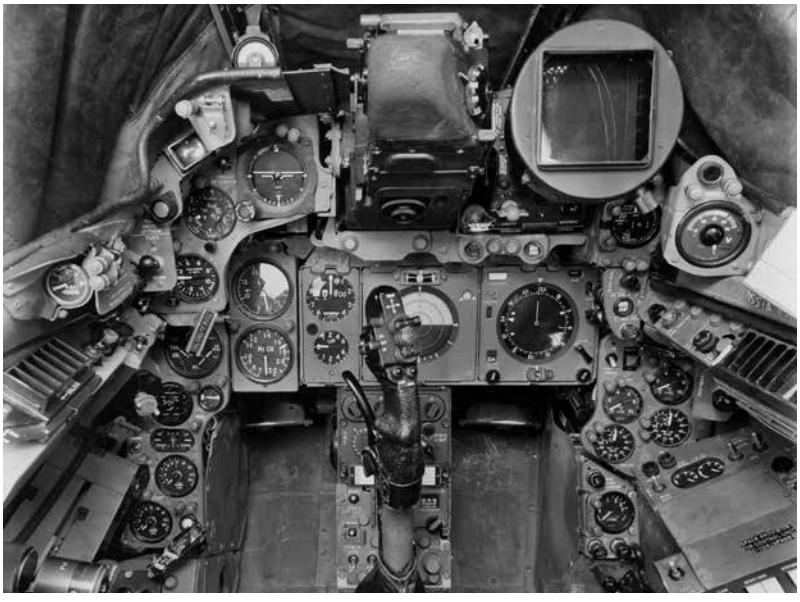
Above: A McDonnell F-4 Phantom in the gunsight of Clive Rowley's Lightning F.2A. In the mid-1970s, the Lightning was at least a match for any other aircraft that it was likely to meet, either in training or "for real." (Photo author's collection)

Below: Lightning F.2A XN790 "L." This was the author's personal aircraft during his time on 19 Sqn. from 1974-77 and bore his name under the cockpit. The author took this photo himself from another single-seat Lightning alongside. (Photo by Clive Rowley)

officer fighter pilot: a gauntlet had been thrown down and I was determined to show him what I could do.

I telephoned the German fighter controller who would be controlling my intercept and explained the vital need to get this one right.

The intercept went perfectly with some expert help from the fighter controller. I gained radar contact at decent range and, with help from the controller, maneuvered so that I had the ideal lateral separation for a 2G turn in behind the target to allow me to continue accelerating. By the time that I rolled out in missile range behind the Boss, he was at 40,000 feet and beginning to decelerate down through about M1.4. I was doing M1.6 and my aircraft was still accelerating nicely. I took a simulated Firestreak missile shot and continued to close on the Boss, intending to fly past him close aboard, to give him the benefit of my supersonic shock wave and to let him know that the intercept had been successful. When I sat as the target on these types of sorties, I never ceased to be amazed at the speed that the fighter closed and shot past. It was fun to feel the "thump" of the shockwave as it passed. My Lightning was now accelerating through M1.7, which was the release to service maximum speed limit for the F.2A, although we all knew that each and every F.2A had been tested to M2.0. With that in mind, I let the speed build up to M1.8, which is what I was doing as I shot past the Boss's Lightning a couple of hundred yards off his starboard wing. Having passed him, I now needed to slow down and, without giving it too much thought, I pulled the aircraft up into a 15-degree climb from 40,000 feet. As I did so, I throttled both engines gently back to idle/fast idle (minimum power). Even without the benefit of full power, the aircraft climbed rapidly to 65,000 feet, which was my second "rule bust" of the day, as the maximum altitude at which our equipment would keep us alive in the event of a pressurization failure or canopy loss was 56,000 feet. Not that I was wearing the pressure jacket, anyway.



Approaching 65,000 feet, it was noticeable how dark the sky had become; the horizon had a definite curve to it and the light was being reflected from below rather than coming from above. There was also a strange relationship between the indicated air speed and Mach number; as I topped out at M1.1 the airspeed was only about 180 knots, just above the normal approach speed. I had gently rolled inverted a couple of thousand feet below this, but not surprisingly, given the thin air, the controls were somewhat lacking authority and it took a few seconds to get the nose to adopt a descending attitude, during which time the thought briefly crossed my mind that I was going into orbit.

There are many Lightning pilots who have reached much higher altitudes than this, but it was a most interesting experience, albeit not one that I chose to repeat.

Lightning F.2A cockpit. Later versions of the Lightning had a strip airspeed indicator /machmeter, but the F.2A retained the earlier analog dials. The radar scope at top right was usually covered with a rubber folding "boot" to reduce glare and reflections. (Photo author's collection)

Fast forward just over 20 years and I had become a display pilot with the RAF Battle of Britain Memorial Flight (BBMF) whilst holding down a full-time RAF post as an instructor with the Tornado F.3 Operational Conversion Unit co-located at RAF Coningsby. After initial training on the DH Chipmunk, a couple of trips in a T.6 Harvard and 14 hours flying in the Hawker Hurricane, the day came when I was to fly a Spitfire for the first time.

Spitfire: An ambition fulfilled

Knowing that I would be converting to the Spitfire filled me with excitement and a fair amount of trepidation, but I tried to approach it in as professional a manner as possible. I studied the notes for the Spitfire, learned the Flight Reference Card drills and spent time sitting in the cockpits of Spitfire IIa P7350 and Mk Vb AB910 in the BBMF hangar to become familiar with the layout and to practice the checks. The cockpit of the Spitfire actually had a simpler layout than the Hurricane with fewer controls. In addition, sharing a Merlin engine with the Hurricane, many of the engine controls, procedures and limits were the same or similar. Everything in the Spitfire cockpit fell easily to hand, with the only slight drawback being the need to change hands to raise the undercarriage after takeoff.

On July 2, 1996, the big day arrived; as far as I was concerned it was the culmination of years of dreaming that, one day, I might fly a Spitfire. I was told that my first-ever Spitfire flight was to be in what is probably the world's most precious and irreplaceable Spitfire, P7350, the only airworthy survivor of the Battle of Britain. No pressure there, then.

Taxiing out to the runway, I could feel how light, lively and skittish the Spitfire was on the ground with its narrow-track undercarriage. It was also obvious how much the Spitfire nose obstructed the forward view with the tail wheel on the ground, and weaving was very necessary to see ahead.

My first surprise came on takeoff when, with the same engine power set as in a Hurricane, the acceleration on the runway was so lively that I didn't raise the tail in time and the Spitfire lifted off in a three-point attitude, almost saying to me, "Come on, keep up." As soon as I had raised the undercarriage and set the power for the climb, I could immediately feel how wonderful the Spitfire felt on the controls. It was light, sensitive and responsive—

Inside the cockpit of BBMF Spitfire Vb AB910 (Photo by Clive Rowley)

The author airborne in the cockpit of BBMF Spitfire Vb AB910 in 2002. (Photo author's collection)

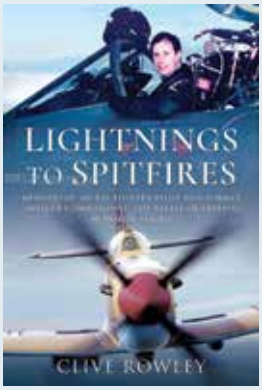
an absolute delight to fly. When I took it through some stalls at 7,000 feet, taking care to keep straight and balanced, there was no drama at all, no wing drop, just some buffet and a loss of lift as it "mushed" down, and it recovered immediately when I moved the control column forward and applied power. In fact, those ellipsoidal wingtips are still flying quite happily even after the wing roots have stalled. The reduced drag from the wonderful and aerodynamically almost perfect wing shape was noticeable, especially when pulling 4G in a practice display at height. Then it was back to the airfield for a practice forced landing to overshoot, followed by three circuits and landings. The skittishness of the Spitfire on the runway was very evident and I had to work hard to keep her straight and under control, long after touchdown and right down to taxiing speed, but all my landings were okay and none raised my heart rate

excessively on this sortie, as was sometimes to happen in the future.

I flew Spitfire P7350 once more that day, flying two practice displays over the airfield with a minimum height of 500 feet, and then a third at 100 feet, plus three circuits and landings. In the afternoon, I flew the other of the BBMF's "Baby" Spitfires, Mk Vb AB910, another wartime survivor with an impressive pedigree. On this sortie, I flew my first ever "synchro" display as the leader of a pair of Spitfires. We flew two synchro displays with a minimum height of 500 feet and one at 100 feet, and then once again I flew three circuits and landings. It was quite difficult to arrange the synchro crossovers to occur at crowd center, compensating for the effects of the wind on both aircraft, but the "close aboard" head–on crossovers were great fun.

At the end of the day, I had flown three Spitfire sorties with six practice displays, including my first synchro displays, and nine landings, and I was beginning to feel at home in the aircraft. Amazingly, I could call myself a Spitfire pilot. I went home feeling over the moon, completely drained and satisfyingly exhausted.

Two days later I flew another sortie in Spitfire AB910 with three practice synchro displays, this time as the No. 2. Then I was declared Spitfire–qualified and ready to display in public, including synchro displays. I had 2 hours and 10 minutes on Spitfires. ✈



LIGHTNINGS TO SPITFIRES

Memoirs of an RAF fighter pilot and former officer commanding the RAF Battle of Britain Memorial Flight

For 45 years, Clive Rowley flew with the Royal Air Force and for 31 of those years, he specialized as an air defense fighter pilot. Such was his love of fast fighter aircraft that, in order to stay flying, he transferred to Specialist Aircrew terms of service, relinquishing any chance of further promotion above his rank of squadron leader.

During those years Clive flew Lightnings, Hawks, and Tornado F.3s but, perhaps more intriguingly, for 11 years he flew Hurricanes and Spitfires with the Battle of Britain Memorial Flight (BBMF), the RAF's–if not the world's–most famous "warbird" display team, which he ultimately led and commanded. Many readers will have watched him, perhaps unknowingly, as he flew these iconic aircraft, often alongside the Lancaster, at air shows and large-scale commemorations around the UK and Europe.

During the Cold War, Clive flew the BAC Lightning from Gutersloh in Germany and in the UK, becoming an expert in the art of air combat in the process. Then for 16 years he flew the Tornado F.3 as the RAF moved into expeditionary operations. During his long career as a fighter pilot, he witnessed quantum jumps in the development of aircraft, equipment, and weapon systems, and the subsequent and parallel evolution of fighter tactics.

Packed with humorous and often hair-raising anecdotes, but also revealing the shock and sorrow he felt at the deaths of friends and colleagues, this book is a highly detailed account of life as a fighter pilot in the RAF in the last three decades of the twentieth century and into the twenty-first. Clive is open about the fears he sometimes felt in this dangerous world and how he allayed them to continue flying for more than four decades. This book is illustrated with wonderful photographs from his time on the front line as well as with the BBMF, many of which have never been published before.

If you have ever wondered what it is like to fly supersonic jet fighters, like the Lightning and the Tornado F.3, or iconic warbirds, such as the Hurricane and Spitfire, Clive Rowley brings you into those cockpits and shares his experiences.

"Lightnings to Spitfires" is published by Air World and is available from Amazon and other online outlets. (ISBN-13:978-1399015622)

ABOUT THE AUTHOR

Squadron Leader Clive Rowley, MBE RAF (Ret.) served with the Royal Air Force for a total of 45 years. In full-time service, he flew continuously as a pilot from 1971 to 2006 and was still flying fast-jets when he was 52 years old. As a fighter pilot with the Battle of Britain Memorial Flight (BBMF), Clive displayed the unit's Spitfires and Hurricanes for 11 years up to 2007. Nine years of flying as a volunteer reservist followed, completing a period in which Clive accumulated over 8,500 hours, all in aircraft which he "could turn upside-down." During his RAF service, Clive also commanded the Lightning Training Flight and was the Officer Commanding the BBMF. Since retiring, Clive has become a respected military aviation historian and writer.