

Preface

As a young "nugget" naval aviator and aspiring fighter pilot I listened intently to my instructors, studied hard, did my best to apply what I had learned during airborne practice flights . . . and constantly got "hammered." After some period of enduring this humiliation I began asking embarrassing questions of my salty old instructors concerning what I assumed to be pretty basic tactical concepts. Probably the best answer I got was: "Oh, you're supposed to lose at this stage."

We wanted a man of the caliber of Boelcke or Mannock or Molders or Malan to explain the unknown and to clear our confused and apprehensive minds; but on this occasion the right senior officer was not present.

Air Vice-Marshal J. E. "Johnnie" Johnson, RAF
Leading RAF Ace in Europe, WW-II
38 Victories

Being a hard-to-please sort of guy, I have persisted in my dumb questions throughout what seems to be a rather long, but unillustrious, career as a fighter pilot. After a relatively short time, however, I came to a startling conclusion: Nobody seemed to have the answers I was looking for—or if they did, they weren't talking. In desperation I searched the literature, thinking that surely, in sixty years of fighter aviation, someone had written the answers down. What I found, mostly, were histories that covered periods of aerial, combat with broad strokes and a superficial depth, histories whose authors, it often appeared, were working from newspaper accounts to find information on a subject about which they had little firsthand knowledge. There were also some personal histories written by successful (i.e., living) fighter pilots (or derived from interviews with these pilots), who recounted in detail some of their more interesting combat anecdotes. Aside from being fascinating to another fighter pilot, this latter class of work quite often actually covered tactics the pilots used and those employed by their opponents. Unfortunately, I soon discovered that these

tactics varied greatly, and, amazingly, that all were sometimes successful but disastrous at other times. Although some of the more general concepts of air combat gleaned from such accounts seemed to be valid in modern warfare, many of the details were not. Each engagement appeared to be a little slice out of time which could never be repeated. The aircraft, the people, the weapons, the tactics, and the conditions all came together to form a result, and if the engagement had been repeated, even the next day, the outcome easily could have been reversed. Luck and chance seem to be very strong players in this game. Indeed, one of a fighter pilot's favorite expressions is "I'd rather be lucky than good any day."

An excellent weapon and luck had been on my side. To be successful the best fighter pilot needs both.

Lt. General Adolph Galland
General of the Fighter Arm, Luftwaffe, 1941-45
104 Victories

But my engineering background had taught me that somewhere there exists a neat mathematical solution to even the messiest of problems, so I continued to search for the basic "truths" that govern these events—or at least stack the odds one way or the other. Some of these principles do exist, and I hope most of them are included in this text. Much of what you will read here has been derived from personal flight experience, engineering analysis of fighter performance data, and "bar talk" with other fighter pilots. (It's amazing how smart a person becomes after a couple of beers.) If I have stolen any one's-favorite move or pet expression, please accept my apologies. I can assure you the theft was not intentional. It is impossible to be certain of the exact origins of impressions and opinions formed over many years. Neither do the tactics described here necessarily reflect the tactical doctrines of the air services of any nation. I have done my best to be as objective as possible on this controversial subject by discussing the pros and cons of several doctrines. No doctrine is perfect, and there will, no doubt, be "B.S." flags flown by some students and practitioners of this science. In this business there is certainly plenty of room for disagreement.

Nothing is true in tactics.

Commander Randy "Duke" Cunningham, USN
5 Victories, Vietnam Conflict

It has been my experience that nations, and even separate air arms within a given nation, differ in air combat tactics as widely as they do in other areas. In fact, they often disagree even on what constitutes a "tactical doctrine." For example, I have found that asking two U.S. pilots for their tactics in a given situation elicits three different answers. By contrast, it is my understanding that three Russian fighter pilots will all give the same answer. Probably neither of these extremes is optimum. Obviously, if you have only one tactic, it had better be the correct one; however, even if this is the case, there are disadvantages to inflexibility. Almost any tactic can be defeated if it is totally predictable, and dogma stifles innovation. Total flexibility is not ideal either, as it is difficult for the fighter pilot to become proficient if he is constantly changing his style and technique.

... a fighter pilot must be free to propose improvements [in tactics] or he will get himself killed.

Commander Randy "Duke" Cunningham, USN

A few words might be in order to explain the title of this work, *Fighter Combat: Tactics and Maneuvering*. The subtitle may sound redundant, but actually many fighter tactics have very little to do with maneuvering. Although all the maneuvers described here have tactical applications, some are used more in practice than in actual combat, where anything more than a level turn feels exotic. *Air combat maneuvering* (ACM), therefore, has a connotation of "simulated" combat. *Fighter tactics* are more the "real thing." Both are covered here, and it may not be clear which is which. One clue is to look for phrases such as *uncontrolled conditions* or *unknown environment*, which are usually associated with combat fighter tactics.

I didn't turn with enemy pilots as a rule. I might make one turn—to see what the situation was—but not often. It was too risky.

General John C. Meyer
Vice-Chief of Staff, USAF
26 Victories, WW-II and Korean Conflict

Another term that requires definition is *fighter*. These days every military airplane jockey, whether he straps on a helo or a trash-hauling transport, thinks he's flying a fighter. *Fighter*, in this book, will mean an aircraft whose mission is destroying other airborne aircraft. Much has been made of the term *fighter-bomber*, which describes an aircraft that can perform both air-to-air and air-to-ground missions. Regardless of the designation, as long as that aircraft is assigned to drop things in the dirt, it's a *target*, not a fighter. Once it has jettisoned that air-to-mud stuff and goes looking for trouble, *then* it's a fighter. As a self-respecting fighter pilot, that's all I'll say on that subject.

There are only two types of aircraft—fighters and targets.

Major Doyle "Wahoo" Nicholson, USMC
Fighter Pilot

The word *tactics* also could use some clarification. Too often historians confuse this term with the term *strategy*. *Strategy* signifies pre-engagement planning for accomplishing rather large-scale goals. For instance, in the Battle of Britain, the English developed a strategy of using coordinated fighters and ground-based radar controllers as a defense against German bombers. The *tactics* of the fighters would have included their choice of attack formations, pre-attack positioning, attack speed, maneuvering to attain a firing position, and engagement/disengagement decision criteria. You will find that most of the literature which purports to deal with fighter tactics in actuality covers only strategy. This is probably because information on strategy is much more readily available and is easier for both the writer and the reader to comprehend, but such works are of little more than entertainment value to the practicing fighter pilot. Although strategic concepts are outlined here, the primary purpose of this text is to fill the

current void of information and understanding associated with nitty-gritty air combat tactics.

Bombing is often called "strategic" when we hit the enemy, and "tactical" when he hits us, and it is often difficult to know where one finishes and the other begins.

Air Vice-Marshal J. E. "Johnnie" Johnson, RAF

Throughout my research in this area, I often have come upon the theory that air combat has remained essentially unchanged since its advent in World War I. To a certain extent this is true. Obviously the laws of physics and geometry do not change very rapidly, so as long as fighter aircraft remain fixed-wing airplanes with air-breathing engines, there will be some continuity in combat tactics. The details of these tactics, however, are changing constantly. Although the total bag of available tactics probably has not been expanded appreciably since World War I, those tactics which will be successful vary with each new weapon, aircraft, and combat situation. Military planners often fail to account for this evolution, and consequently they fall into the old trap of training and equipping for the last war. The opposite also has been true, however. Probably the best example of this was seen in the 1950s and 1960s, when many fighters were designed and built without guns, since it seemed obvious that the tremendous speeds of these new aircraft would preclude the close-range turning engagement and that the new "wish-'em-dead" missiles being employed would make such dogfights unnecessary. The first large-scale combat with these aircraft and weapons proved this reasoning to be seriously flawed. Once again the predicted demise of the dogfight had been "greatly exaggerated."

The most important thing is to have a flexible approach. . . . The truth is no one knows exactly what air fighting will be like in the future. We can't say anything will stay as it is, but we also can't be certain the future will conform to particular theories, which so often, between the wars, have proved wrong.

Brigadier General Robin Olds, USAF
16 Victories, WW-II and Vietnam Conflict

Along with tactics and aircraft, the fighter pilot also has changed. The crude "packing crates" and weapons of World War I demanded great physical dexterity and endurance, excellent marksmanship, good eyesight, and quick reflexes. Successful fighter pilots were, therefore, drawn largely from the ranks of athletes, hunters, sport flyers, horsemen, and race-car drivers. Although the same attributes and talents are still valuable today, modern fighters and weapons systems have shifted the emphasis somewhat more toward eyesight, manual dexterity, and the ability to think in combat, and away from marksmanship and reflexes. Flying today's fighter aircraft is much like playing a piccolo with each hand, while 3,000-psi hydraulic systems have reduced the requirements for great physical strength. Paradoxically, the faster speeds of modern fighters have actually slowed the pace of turning dogfights because of the resulting slower turn rates. World War I fighters usually could reverse course in less than five

seconds, while today's fighters often require about triple that. More time provides greater opportunity for the pilot to think and plan during the engagement, and so reduces the reliance on reflex reactions to the opponent's maneuvering. Conversely, longer turn radii and greater weapons range have greatly increased the engagement distances between opposing fighters, making excellent eyesight even more critical. Simultaneously, guided weapons and computerized gunsights have reduced marksmanship requirements.

Aside from the physical qualities, however, aggressiveness, determination, patience, and a cool head seem to have distinguished the successful fighter pilot throughout the history of aerial combat. Although the purely physical attributes normally must be provided by nature, many of the mental and psychological qualities can be gained through experience. Particularly in modern air combat, the experience of an older pilot can outweigh the physical strength and quicker reflexes of youth, as long as the older pilot can maintain his eyesight, either naturally or by artificial means.

Great pilots are made not born. ... A man may possess good eyesight, sensitive hands, and perfect coordination, but the end product is only fashioned by steady coaching, much practice, and experience.

Air Vice-Marshal J. E. "Johnnie" Johnson, RAF

Only one further point needs to be made at this time; this regarding the nature of air combat. Since so much in this business involves human action and reaction, there are few absolutes, so it is unwise to make unqualified statements about almost anything in the field. Inevitably someone will expose a legitimate exception to any proposed rule. Therefore, I adhere to the "never-say-never" philosophy. So, if you should note statements that include unqualified words such as *always* or *never*, please consider them to be oversights.

ACM has many of the qualities of boxing, chess, auto racing, and video gaming, with the ultimate reward for success or failure. It can be sweaty, exhausting, highly cerebral, and terrifying, and it requires great skill and reflexes. Herein lies its challenge and its fascination.

Nothing makes a man more aware of his capabilities and of his limitations than those moments when he must push aside all the familiar defenses of ego and vanity, and accept reality by staring, with the fear that is normal to a man in combat, into the face of Death.

Major Robert S. Johnson, USAAF
27 Victories, WW-II

