

Tiger Check: Automating the US Air Force Fighter Pilot in Air-to-Air Combat, 1950–1980 by Steven A. Fino,
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Warriors, with courage and integrity as their distinguishing traits, have been always respected. Skilful warriors, such as military aviators, have created a special place for themselves in the society. In this class, a very small section of fighter pilots has an iconic status. Adages like ‘All men are born equal, then a few become fighter pilots’ support this perception. Myths and perceptions about fighter pilots, their interaction with fighter aircraft, and through that with battle environment, have been creatively brought out in *Tiger Check: Automating the US Air Force Fighter Pilot in Air-to-Air Combat, 1950–1980*, by Steven A. Fino. In the book, Fino, an F-15 pilot in the United States Air Force (USAF), brings to fore multiple aspects of the impact of technology infusion in combat aviation in the period between 1950 and 1980 with special reference to human interface. Combat aviation underwent significant changes in the three decades that Steven examines in the book. The concept of aerial combat was transformed in that period. The major changes were in the way inputs were obtained for combat, and the lethal weapon delivered. Sensors changed from human senses to electronic sensors and weapons changed from unguided short-range bullets to guided long-range air-to-air missiles. All these technological innovations had a major impact on the man in the cockpit. The change in the way aerial combat was

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conceived and fought changed the key attributes of a successful combat aviator.

Besides the introduction and conclusion, the book is divided into four chapters. The first chapter, 'The Myth of the Fighter Pilot', covers perception of fighter pilots within the community. The next three chapters are devoted to three specific fighter aircraft. The first of these is the F-86 Sabre and Chapter 2 covers in detail its participation in the Korean War. The Phantom is covered in Chapter 3, in the battlefield of Vietnam. This is the period when aerial combat commenced its transition from air-to-air guns attacks to air-to-air missiles attacks. The F-15 Eagles and their aerial combat potential is covered in the fourth chapter. The book primarily covers how the self-image of the fighter pilots changed along with the technological advancement of the combat aircraft. That fighter pilots gradually changed from being aggressive knights to calm and calculating scientists.

The book also brings out the need to simplify an intricate relationship between the fighter pilot and the technologist. It highlights how the ability of both sides—pilots and technologists—to understand each other's capabilities, needs and limitations is essential for developing a combat-capable system. Although pilots are given credit for an aerial combat victory, technologists have a major role in providing lethal weapons and sighting systems for the final shot. It is essential for the pilot to understand various facets of the on-board systems to fully exploit them in aerial combat. For technologists, it is prudent to get a feedback on the limitations experienced by the pilots in utilising systems in combat. This two-way communication and understanding is key to mission effectiveness and enhancement of capability.

Combat in the Korean airspace was primarily a battle between the Sabres and the MiGs, with the all-important goal of achieving air supremacy. Three critical factors were flying skills, platform capability and weapon-aiming tools. The endurance of platforms on both sides was limited and mission durations were short, and only one combat engagement per mission was possible. The skill sets included ability to spot the adversary in the sky before being spotted. Thus, human eyes were the primary sensors of the time. The sky had to be divided into various segments and scanned to pick up black specks. This was to be followed by tactical manoeuvre to achieve firing position prior to pressing the trigger. That was an era of force-on-force air combat, with multiple aircraft formations merging. Combats invariably commenced

with a high-speed vertical manoeuvre to knock the enemy off, but ended with a turning fight.

Tactical evolution during the Korean conflict included changing of battle formations and attack plans. The aggressive attitude of combat aviators played a major role in the engagement, but a functional gunsight was essential to achieve the objective of shooting at the enemy. The narration of development of various gunsights to enhance attack proficiency from a fixed reticule to the incorporation of the gyroscope and radar is interesting. There were problems associated with the understanding of the working principle of the new gunsights as well as the reluctance of the older generation to switch from time-tested older version. However, gradually, a convergence was achieved when the gunsight designers better understood the operational requirements and the aviators accepted new technology for enhanced weapon-aiming efficiency.

The Phantoms in Vietnam, with a 'Guy in the back', changed the self-image of a fighter pilot. It no longer was a solo effort and teamwork between the two occupants of the Phantom often defined the outcome of the combat. Very close combat with guns was now passé, and an era of airborne radar-fitted fighter aircraft, armed with guided air-to-air missiles, had dawned. The skill sets required by the fighter pilots in this era were starkly different from the earlier generation. The ability to visually scan the airspace to spot the intruder, though still relevant, was relegated to second place; and the ability to discern the radar picture and identify the enemy aircraft was of greater salience. Longer range of air-to-air missiles enhanced the combat envelope. Also, the significance of the first shot increased further. An operational fall-out of the war was a major shift in flying formations and attack plans. And air-to-air missiles resulted in over 85 per cent of the aerial kills by the Phantoms in Vietnam.

The generation of pilots that participated in the Vietnam War were controlling the planning process, so it took some time for the planners and field pilots to get on the same page. The physical courage and psychological aspects of getting in a close aerial combat were rarely required. The most useful skill was to create a merged picture from sensors and inputs from other formation members of the operational environment. The story of the reluctant acceptance of new technology and changing the tactical ploy for new operational environment was akin to that seen in the Korean War era.

Post-Vietnam, the induction of F-15 Eagles, with a single seat, in the US Air Force brought in a new energy in the fighter pilot fraternity. The physical aggressiveness in manoeuvring the aircraft to achieve a gun kill was now of little relevance. A plethora of sensors fed information to the multifunctional displays in the cockpit. The ability to decode the entire data and create a three-dimensional picture of the operational environment was essential to exploit the full capability of the new platform. With a multitude of weapon options, an optimisation process during the combat was essential. Moreover, the distances between aircraft engaged were well beyond the visual range. Indeed, the combat envelope and combat zone expanded with longer-range air-to-air missiles. The easiest part was locking-on to the target and launching the missile in the initial stages of the combat. However, once merged, the threat of fratricide made the aircrew reluctant shooters. Sifting and sorting of targets and communication of the decision to other formation members in real time became a necessity.

The primary mode of information exchange between formation members, for the first time, changed from voice to data. Radio calls, though still there, had transformed. The high tempo of activity in visual aerial combat with frequent high-G manoeuvres was replaced with hot-cold patterns far away from each other. With the enhancement in platform endurance and several weapon-carrying stations, multiple combat engagements per mission were now easily executed. Aerial combat appeared more like a surgery, with mathematical precision and greater amount of computation to achieve the first shot. This further changed the way formations flew and how the attacks were planned. With operations beyond visual range, it was no longer possible to have a comprehensive debrief. Thus, the induction of Air Combat Manoeuvring Instrumentation (ACMI) changed the way missions were debriefed and analysed. The recording of all parameters and manoeuvres during aerial combat brought in a greater degree of accuracy in assessing the possible outcome of the combat. From a training combat exercise, the concept of real time removal of a combat aircraft that has been successfully attacked, (normally called 'Kill Removal') could be employed realistically and training made more meaningful. Hence, as the author opines, the fighter pilots transformed from being skilled fliers to efficient systems managers, and from knights to scientists.

Notwithstanding the dated facts about combat aviation and highly technical description in the book, *Tiger Check* makes for an interesting

read. Although it is a story of combat aviation from one side of the red line, it is best suited for aviation enthusiasts and young fighter pilots. Interviews and quotes from a number of fighter pilots make it easy to understand the psychological aspects of combat aviation. This book helps us to understand the basics of development of aerial combat and the role of technology. It also serves as an ideal backgrounder for technologists associated with combat aviation. Additionally, it dispels a large number of myths about fighter pilots. However, to fully grasp all aspect brought about by Fino, a first-hand experience of combat aviation is necessary. Anyone who knows that the impromptu response to 'Tiger Check' is 'Tiger 2' will actually comprehend the book in its entirety.

