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THE

DOUBLE ATTACK SYSTEM

M64
 RPN

Received
 January
 1964

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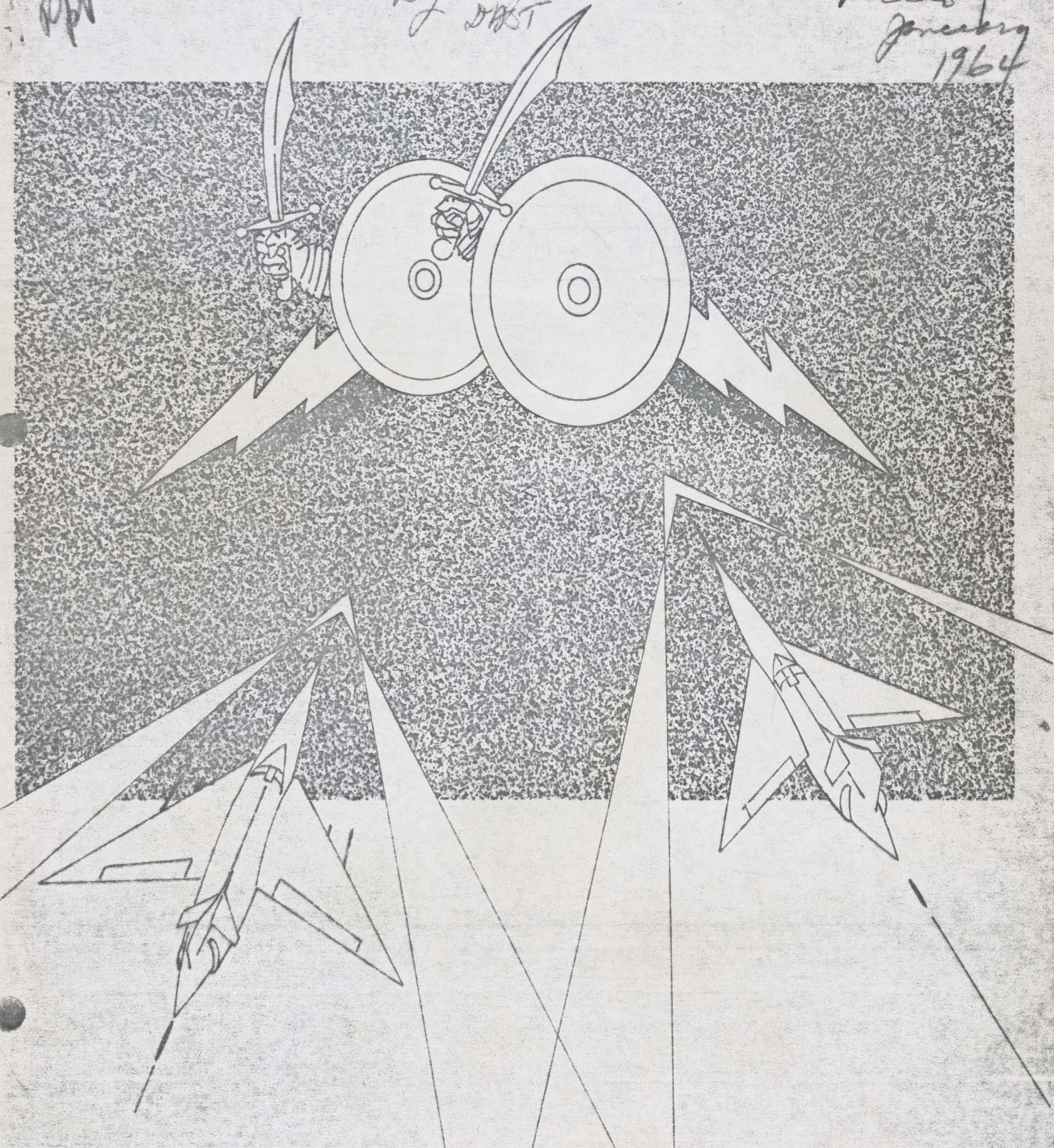
THE

DOUBLE ATTACK SYSTEM

By Major Rucioni
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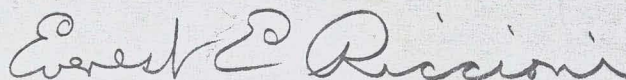


A PROPOSED NEW METHOD OF EMPLOYING THE F-100C IN COMBAT

This work is in two parts: (1) Tactics, and (2) Related Thoughts. The first is a discussion of a new system (concept) of air combat tactics. Only the groundwork is laid out and much can be built on it. The second is some of the building which can go on indefinitely. Also, the second part is clarification of concepts not usually made clear to operational fighter pilots.

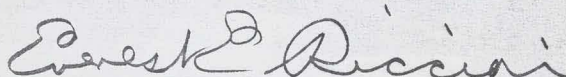
A new system had to come with the advent of a new and different aircraft. It is realized that this is not the final answer (no system ever will be), but fighter flying over Europe has demonstrated that this system cannot be ignored.

It is hoped that some of the ideas expressed herein are of assistance in using the F-100C in combat.



EVEREST E. RICCIONI
Captain, USAF
53rd Fighter Day Squadron
36th Fighter Day Wing

The large demand for a description of the Double Attack System has necessitated a new printing. Despite requests and intents to formalize this work, many request are made for it in the original form. A rewriting is formalized and will hopefully be printed by a "guts editor" in a Nellis News Letter. Very few changes are made in this reprinting.



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NOTE: To keep the ever changing panorama (it must change or be in error) of the history of the development of fighter tactics in view it should be recorded that this composition was completed and published in 1957.

PART I

TACTICS

THE DOUBLE ATTACK SYSTEM

Which is to say -- "The Fluid Four is Dead!"

Some of the striking aspects of fighter aircraft employment over Europe with the F-100C aircraft has brought to light the fact that the old "tried and true" fluid four operation or method of employment of fighters is both obsolete and ineffective.

The NATO nations find themselves badly outnumbered in air superiority aircraft over Europe. To employ fighters against a superior numbered Air Force utilizing a method which intends to use the guns of one aircraft out of four while the four fly around thinking they are unattackable, is not only a waste of fuel; but it is obviously stupid.

One could suspect at once that the fluid four was not the optimum modern method to use fighters, because it was brought to perfection in the Korean operation where the F-86 aircraft was used against a very similar aircraft. The F-86 is dead and obsolete and so are the tactics that were used with it. Now the units processing F-100C aircraft have an aircraft capable of a wide range in performance, and the aircraft is comparable to no other in service by a friendly or enemy power. Naturally the method of employment of a new and different aircraft under different conditions must be different. The logic is as clear as "A rose is a rose, is a rose - - -."

What is necessary is a method which will significantly increase the number of guns (attacks) actively in the combat to change the factor of numerical superiority. It was this and related thinking that led to the development of the DOUBLE ATTACK SYSTEM.

Before getting into the description and analysis of the new system, it is desirable to discuss some of the defects of the old Fluid Four System. Some of these defects are listed below.

DEFECTS OF THE FLUID FOUR FIGHTER OPERATION

1. Only one man in four (or two) aircraft is actively employing his guns.
2. The system was evolved to create an impregnable fighting unit. This approach is primarily defensive in nature and philosophy. While it is recognized that defensive capability is closely related to the offensive capability, defense is a secondary factor. Fighter aircraft, to be effectively employed, must, repeat, MUST be used in as offensive a manner as possible.

3. The Fluid Four is no longer invulnerable to an aggressive enemy having supersonic aircraft. The high element has always been vulnerable and now in the days of an aircraft that has gone supersonic, the high element is completely vulnerable to such attacking aircraft since the high element no longer has time enough to dive down to obtain firing support from the lead element, and a high speed acceleration away from an attacker is impossible.

4. The F-100C is basically a medium altitude aircraft. When the four are in battle array in high cruise speed, the limitations of the altitude capability of the high element forces the low element to fly near the altitudes of 35,000 feet to 38,000 feet. This is hardly an advantage altitude-wise. Only the fact that the altitude of 37,000 feet is one that permits the aircraft to perform quite well is a saving factor. To repeat, neither element of the four F-100Cs can lay claim to a vantage point of altitude which he could trade for airspeed. All would-be attackers can get higher at roughly comparable or better cruise speeds.

5. When one is fighting with two aircraft, it is generally necessary for the leader of two EQUALLY fast aircraft to fly at slightly reduced power to permit the wingman to overcome the inevitable errors in positioning, delayed reactions, etc. This power loss, and hence performance loss, frequently is multiplied by flying with four aircraft. The flight cruises slower than the combat cruise speed of the slowest aircraft in the flight!

6. It takes a good deal of practice to go into a fight and be mutually supporting and to maintain any semblance of integrity in a fight that is seriously pressed. In fact, it takes more practice than the average fighter jock is getting in fighting! It lays a heavy onus on the flight leader, and the flight of four must fly together frequently to build up this proficiency. One must admit that four aircraft are much more cumbersome to fly around than two aircraft if precise positioning for support is to be maintained.

7. Four aircraft flying as a unit complicates the recovery procedure, usually higher fuel minimums must be carried and the situation is to aggravate an already weak recovery system. Certainly elements of two pose no join-up problems, and they have a higher flexibility in recovery.

8. Not only does it take a high level of experience for the flight leader, but also it is quite difficult to fly the perfect wing position in any scrap that is reasonably furious. The wingman has the dual responsibility of maintaining his position and of keeping his leader cleared of other attackers visually. This is a great weak link in the system. If a man is spending fifty per cent of his time maintaining his position, he can use only the remaining fifty per cent of his time looking around. Also, since the wingman is flying in the so called maximum performance come behind the leader, he also is in the leader's blind spot; and the wingman has the impossible duty of guarding their six o'clock position. Only a valorous call from the wingman as he goes down in flames will save the leader in these circumstances. Ultimately, it will be shown that the worst possible position for a wingman to fly is that dictated by the old system of fighter employment.

9. Four aircraft flying the fluid four are much easier to spot than two aircraft flying the Double Attack formation.

10. The defensive split for two aircraft flying the patrol formation of the Fluid Four concept takes time which one does not have available any more.

THE DOUBLE ATTACK SYSTEM

Is there a system that does not have any of the inherent disadvantages mentioned relative to the Fluid Four? Fortunately, YES - - - THE DOUBLE ATTACK SYSTEM.

What is the new system composed of? Its nature is properly divided into two parts, the defensive and the offensive battle array and concepts.

THE DEFENSIVE FORMATION OF THE DOUBLE ATTACK SYSTEM

As with any other system, until a target is sighted, the flight of TWO aircraft is operating in defensive battle array in the sense that there should be no chance for an aggressor to begin the combat unseen. This is done by flying the flight of two approximately one mile apart from the line abreast position to fifteen degrees back for the wingman. In fact, the wingman flies essentially the position of an element leader that is spread out a bit, slightly high and down sun and well forward. The reason for the increased spread is the increased capability for an enemy aircraft to close if he is supersonic, and ONE MUST HAVE A GREATER WARNING TIME WITH AN INCREASED CLOSURE SPEED. The great real limitation on the spread is visibility of the two aircraft. Obviously the higher one goes into the deep blue sky, the closer together one must be to give the same visual support. One cannot carry the concept too far or a loss results since mutual fire support is sacrificed in too great a spread. Let it be said here, once and for all, for people who have some difficulty in visualizing this and other aspects of theory of the new system: "The two aircraft are never split!!!" They must always retain good visual and radio contact. A good bonus of the spread is that more area is swept. Another bonus of the system is if one is surprise attacked, the two aircraft are in the ideal position to break. It is not necessary to spread before the break. A small side issue is that maybe only one of the two aircraft will be seen and attacked. A great factor results in fighting aircraft comparable to the Mark VI Sabre - slow, highly maneuverable aircraft. If the aircraft start at the six o'clock position in the attack, it is virtually impossible to get at the Mark VI's six o'clock position without splitting. In the Double Attack System, the aircraft are spread initially and only a 90 degree turn is necessary with the lead aircraft staying out in front of the slower Mark VIs and the number two man going A/E to get into the attackers. If this system is not employed the fight cannot be carried on. A fighter aircraft was designed for fighting, not running, least of all from a slower opponent. Defensively and in the posture of looking for a fight, the new system is at least as good as the Fluid Four.

THE ATTACK ASPECT OF THE DOUBLE ATTACK SYSTEM

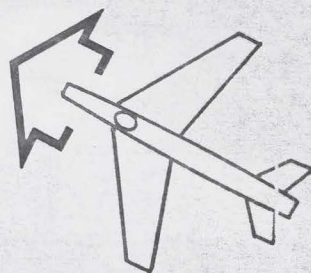
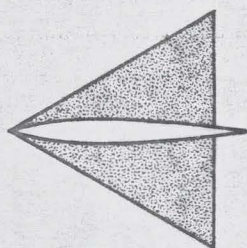
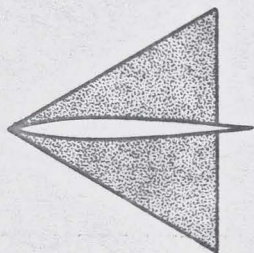
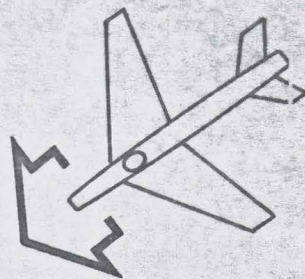
TWO AIRCRAFT USING THE DOUBLE ATTACK SYSTEM ATTACKING TWO ENEMY AIRCRAFT USING THE FLUID FOUR CONCEPTS

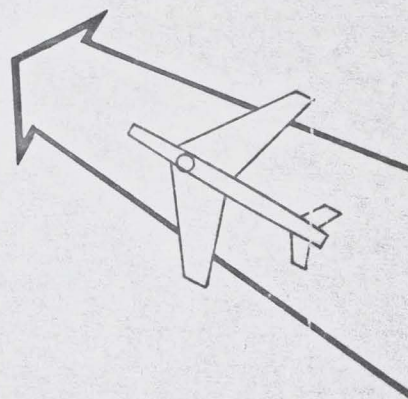
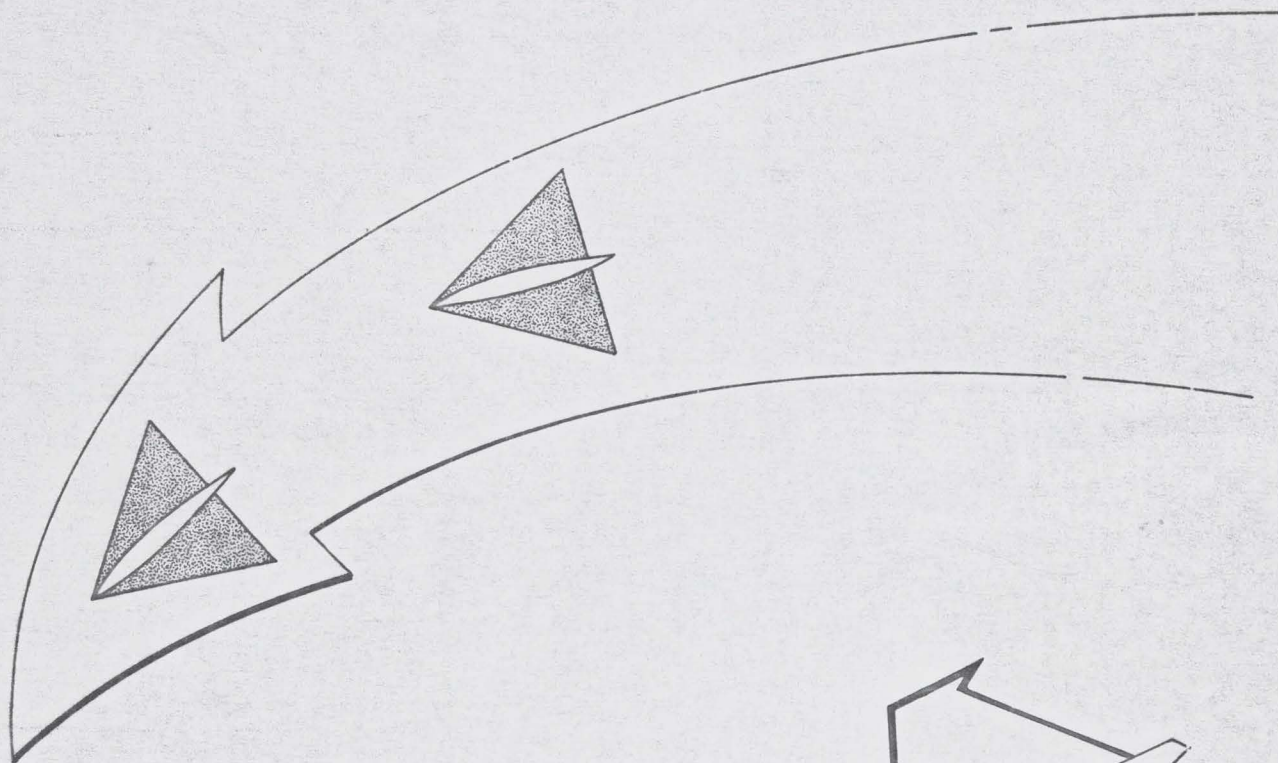
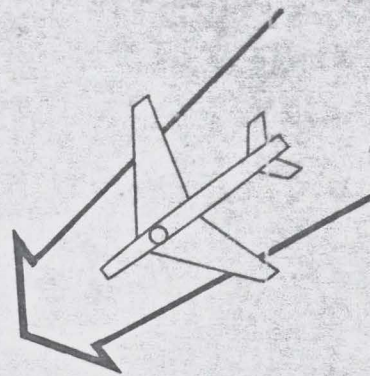
Attack is the artful and powerful aspect of the new system. Once the light is seen, the superiority of the new system is made completely clear.

Let us assume that a flight of two F-100Cs flying the new Double Attack System attacks two other F-100Cs flying the old system. The attack is made almost line abreast leaving the attacked element a difficult choice as to which direction to break. (Either direction will be wrong). Having made a choice of direction for the break the aircraft in the optimum position for the attack makes it with the other aircraft going higher or positioning as necessary for the follow-thru attack. It matters not at all which aircraft leads into the attack. If the first attacker can get the wingman and still go after the lead, he does so; if he cannot finish the attack, he pulls off calling the direction, and number two is now in the maintained and coordinated attack. All the time the lead aircraft was in his attack the supporting aircraft which was positioning itself for his entry into the fray was clearing the first aircraft visually in a manner that an ordinary wingman position could never hack. By this time the attacked element has broken once and is now off balance and usually disrupted, making an easier problem for the second attacker. The second attacker goes in, the former attacker has the dual role of repositioning himself for an attack and the very important role of visually clearing the attacker for his attack. This goes on until the fight is won.

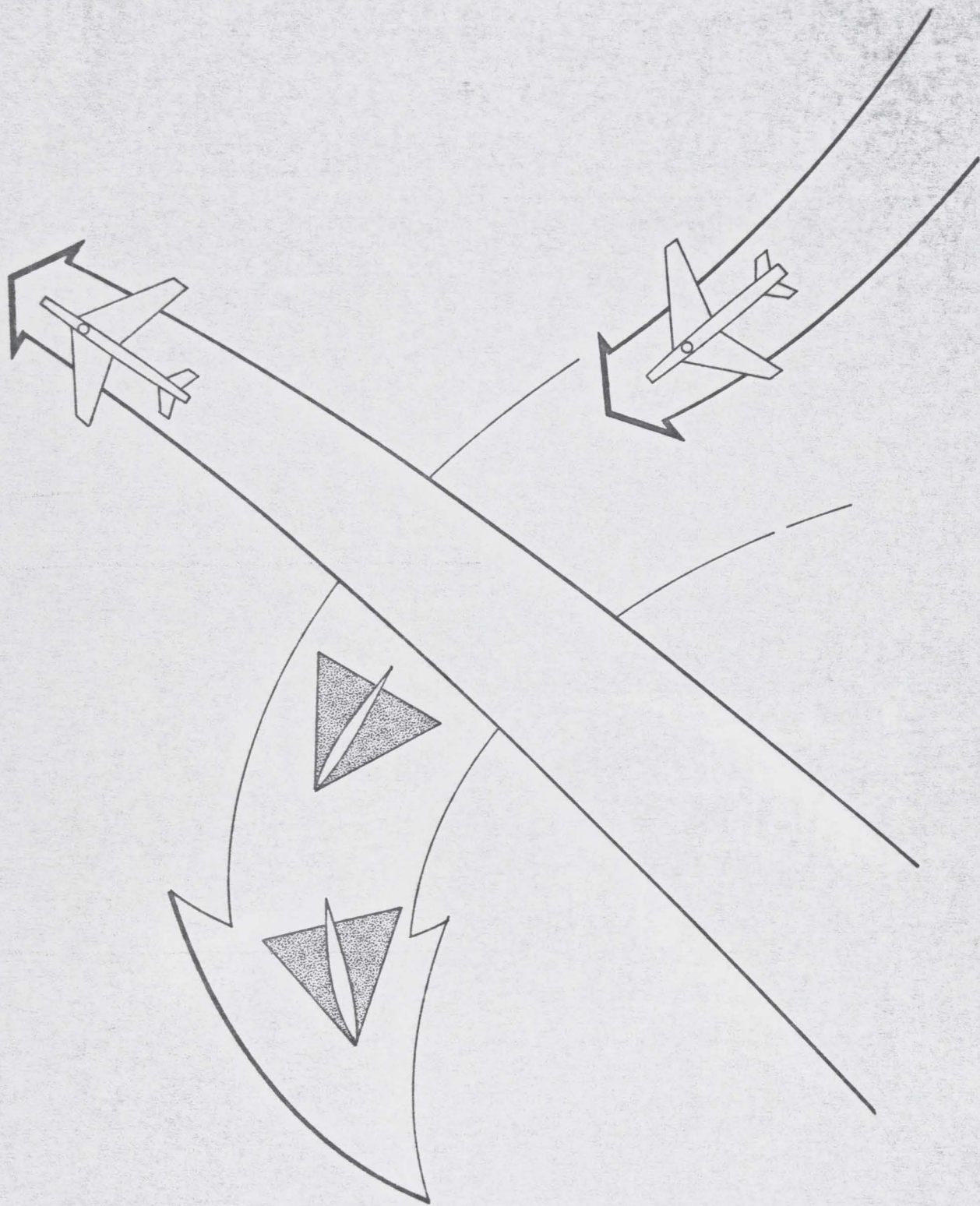
Let us review some of the salient features of this simplest situation which was purposefully chosen as optimum.

- a. The attacked element has little clue as to which way to turn.
- b. The attacker was impeccably cleared as he went into the attack due to the lateral spread.
- c. The attacked - even if they see the enemy coming in and go to gate operation, must break soon or make a hard turn into the attackers. This makes their speed stay down and reduces their zoom capability. Before they shed one attacker they find themselves avoiding the second attacker and never gain the offensive. In short, the attacked element finds itself OUTNUMBERED TWO TO ONE! THIS IS THE POINT OF THE SYSTEM!!!! Local superiority is the key to the effectiveness of this system.
- d. Some objection is inevitably raised by those who dislike the new system, viz., 'Who is clearing the number two man while he's watching the lead attack and is timing his attack?' Answer --- No one, or better, he is clearing himself. Justification --- if he were going into the attack following his leader around, no one would be clearing









visually the number two man plus the fact that he would be too busy flying trail formation and keeping the attack in mind to be guarding himself or his lead. It follows as pure, relentless, geometric logic that if a man cannot clear his six-o'clock position by himself (and he can't without weaving and banking up), and if he is in his leader's six-o'clock position, the leader cannot clear his wingman and the wingman cannot clear himself or his leader. (End of Proof)

e. The system asks for ability to coordinate an attack. It requires practice (exactly the practice that lead and element leaders of the old system needed), and it requires good radio contact and proper radio calls.

f. The new system is actually a simpler system because it takes a long time for a new pilot to learn the art of flying the old concept of the wing position. After he learns this and sees how fights have been fought for some years he finds himself in the new and different role of element leader. The training for the new system (most master flight leaders will tell one nothing) is simpler because it is the same game for leader and wingman. The maturity that goes with leader material is still desired for the initial attack positioning, recovery, determining who will go in and when, etc.

g. F-100 aircraft vary widely in performance. With the old system all aircraft in the flight or element were as slow as or slower than the slowest aircraft in the flight or element. With the Double Attack System all aircraft may fly at full performance capability. This is a small but significant performance gain operating against similar aircraft.

h. A tremendous, and frequent fallout of this simultaneous attack from two quarters (you cannot depend on this however) is that as the fighting unit maneuvers against one unit, it frequently loses sight of the other attacker. This is Bad A, with a capital. Indeed it sometimes occurs that the attacked element never sees the other aircraft at all!

i. The most critical aspect of the Double Attack is that the attackers are ATTACKING SIMULTANEOUSLY. No one fighting element can fend against a simultaneous attack from two directions. While it counters one it sets up the other aircraft. This is because a fighting unit composed of two aircraft in reasonably close trail can only fly in one direction at a time.

TWO AIRCRAFT ATTACKING A FLIGHT OF FOUR THAT IS FLYING THE USUAL FLUID FOUR

In attacking a flight of four aircraft the attack should be made as of old into the high element. The high element is almost unsupported fire-wise and is the logical unit vulnerable to attack.

The attack can be made effectively from above or below. All that is needed is closure capability. It is most usual to assume that the attack will be seen and called out. It is necessary to consider two possibilities: a. An attack into four F-100 type aircraft, or b. An attack into four subsonic, highly maneuverable aircraft like the Mark VI sabre.

a. Into F-100 type aircraft.

The leading attacker will go into the high element which will usually and correctly seek the cover of the lower element. Gate operation on the part of the attacked high element will be almost immediate; on the part of the low element it is usually delayed. The leading attacker goes in, if he cannot maintain the attack on the evading high element because he is vulnerable to the low element he immediately switches to the low element or pulls off in the usual manner calling off and picking up the number two man to give him visual coverage and mutual assistance. The number two attacker by now is well into his attack (he has called in) and is most probably attacking the now-vulnerable lead element and looking for the reentry of the high element into the fray. The attack thus proceeds with the attackers trying to get on the same vulnerable element (seeking to outnumber that element attack-wise!), outmaneuvering that element as one aircraft can outmaneuver two and then give its undivided attention to the remaining element which will then be outnumbered two to one and have seen the discouraging factor of one or two flight buddies shot down. The remaining element will certainly not be operating in the best of psychological conditions.

Thus the attacking flight of two has certainly neutralized the numerical disparity of the situation and if anything created a numerical superiority in his favor attack-wise. The idea is to attack (which disrupts) attack again at once, reattack, reattack, etc.

It matters not at all whether the high element is attacked from a big zoom from below (all modern supersonic aircraft now have a zoom capability) or from a level or high position. The rule is ALWAYS ATTACK (simultaneously, of course) THE HIGH ELEMENT. The way most people fly, there will always be one element higher than the other. Switch to any element that is high at the moment because IT CAN GAIN NO IMMEDIATE SUPPORT FROM ITS LOWER ELEMENT. This local superiority BOTH in space and time is crucial to success. If you don't seek to achieve this you are not flying the Double Attack System.

An aircraft comparable to the F-100 has a difficult time evading a faster aircraft that can break with it. The attacker if possible must refrain under this condition from getting embroiled into a scissors scrap, but rather retain the superior airspeed to zoom and pull up and out as the second attacker moves in.

SUMMARY AND SOME ANALYSIS OF THE DOUBLE ATTACK SYSTEM

After the skeleton treatment of the methodology and intents of the Double Attack System it is well to review some of its nature again, and to analyze some further points of the new system to effect complete clarification of the concept.

1. It is a much more effective use of the aircraft than the fluid four and for that reason more directed missions could be accomplished by the same number of aircraft. It takes only two aircraft to do the job formerly done by four and the job is done simpler and better.

2. There is no essential sacrifice in defense for over twice the offensive capability. This is a fair exchange! Granted that there is no high cover for the two attacking aircraft, but who is high cover for the high element of a flight four? The idea of keeping aircraft out of the fight to act as cover on the chance that someone else is going to attack is an extremely defensive outlook and if we were really worried about it we would never fly a flight of two aircraft with the old system! But we do. All we are now doing is making the two almost self sufficient; I believe more than four of the old system. Certainly in skies where we are outnumbered we cannot be holding off aircraft from the fray to act as cover if no other enemy aircraft are in sight. War is not safe!

3. The new system is believed to actually be simpler in concept for the reason that the lead and wing position are doing essentially the same operation, and the transition to the lead function is effortless. There is no doubt in the authors mind that a new fighter pilot that received two hundred hours of practice in the new Double Attack System would be way ahead of a man that had spent a thousand hours in the normal wing position when he took over the lead function. He has essentially been practicing for his new job for two hundred hours while the other has had a thousand hours of looking on as a bystander. There is no substitute for doing!

4. The patrol formation for the new system is superb. This fact is proved by (amazingly enough) the old Fluid Four concept. If a flight of two is flying the Fluid Four and is gotten into from the rear they correctly spread and perform the concept of a "defensive split". To begin with even the diction of the Fluid Four is wrong. Splitting implies both aircraft operating as singles which they do not do. What was really meant was a "defensive spread". Note that time is required for the spread, which time is eliminated by the new system since the two aircraft are already spread. Experience has been showing that one of the flight of two aircraft can usually be gotten before the spread is effective if the overtake speed was great and the attack was made from the cone of darkness and the two aircraft were flying fairly close. But the most remarkable aspect of the much touted maneuver of the "defensive

outstanding incommission rates and fine fightable aircraft. Now if the squadron can redouble its effectiveness for every flight of two that takes the air, we will ride completely above any competitor. But what is more important we will clobber our enemies in the air.

9. The new system is the literal manifestation of the concept --- Attack, attack, then attack, attack, attack -- WAR'S NATURE LIES IN THE ATTACK!

PART II

This second part of the Exposition of Tactics includes various thoughts and refinements relative to the employment of the F-100C against the enemy in aerial combat.

It has been found necessary to re-define certain aspects of F-100 operation and general operational treatment of any aircraft to retain clarity of thought in understanding of tactics. Recent association with men of considerable experience in past conflicts reveals a great tendency to rely on methods that have proven reliable in the past rather than treat the problem with an open mind and to grow and develop as the requirements of modern warfare indicate must be done. This backward thinking would result in fighting the new war with the methods of past wars - a severe limitation and certainly unacceptable thinking! It has been a great fallacy of our fine Fighter Weapons School to discuss methods which work reasonably well against other F-100s rather than face up to the enemy at hand. As an example in point the school still discusses scissors fighting and slow speed operation with the F-100. As will soon become apparent in the exposition slow speed flight is not a virtue of our bird; it is strictly a high speed hit and run aircraft (particularly so since it is fighting against a numerically superior enemy) and to advocate the system is (a) a complete stupidity, (b) to court disaster, (c) to do the US in general and the USAF in particular, a complete disservice.

Here too, will be found an elementary review of certain principles that are completely new and have been discussed in no other literature such as the employment of fighters against high speed and high flying bombers. It is hoped that even if the methods are not optimum, that they will stimulate interest to develop the most optimum methods.

1. First it is found necessary to review for some the really obvious features of the F-100C for the fighter types that have some difficulty facing the matter of obvious reality. The F-100C is the finest aircraft now in service in USAFE as an air to air weapon, and it's outstanding ability to get from points (a) in space where the F-100 is to point (b) where the enemy is. Now that the aircraft has been good enough to the pilot to have gotten into a fight for him, his problem starts. Apparently few people are aware that a fighter aircraft has always had to turn to win a fight because our brilliant machine lacks a little in turnability, which lack must (and fortunately can) be made up for by the pilot in the employment of his tactics. Also, as a matter of orientation, the aircraft is a medium altitude machine. Even though it can get fairly high, it cannot normally be expected to be very high because combat cruise is effected out of reheat. Further, out of reheat, the F-100C can be overhauled by most every fighter aircraft that flies on this side of the fence without tanks. (This last statement has little to do with any potential enemy, but is an aid in practice employment of the aircraft on this side.) Many people advocate what they call "judicious use of the A/B," it will be shown shortly that judicious use of the Afterburner really should mean to have it on most of the time that visual contact is established and maintained with any enemy.

Another point of operation - the aircraft, in keeping with the immutable laws of nature relative to heavy, highly swept aircraft, is not amenable to slow speed flight. Not only is it at a turn disadvantage at slow speed, but other aircraft that are lighter, less swept will out-accelerate the F-100 because at the same speed they are not as far back on the backside of the power required curve. So, the aircraft is not only vulnerable because it is unsuited to slow speed flight, but it has trouble getting into high speed flight after it is once slowed up.

Please do not feel insulted by the elementary review of the F-100; it was deemed necessary since this wing was plagued by people that not only expected the aircraft to be employed out of afterburner, but that claimed the Mark VI Sabre could be outmaneuvered, outclimbed, and outrun by the F-100C without afterburner, when in truth none of these is possible, and some are not possible with the afterburner! These people were in a command position and it is now necessary to undo the damage. Some of this misinformation was seemingly justified by the sophistic logic that if one can learn to fight without afterburner that we will really become tigers with use of the A/B. The statement is idiotic! The truth is that if one does not become familiar with the full combat capability of the aircraft, he cannot be familiar with the combat capability of the aircraft. For the reason that a rose is a rose, is a rose . . . If it were true we would be practicing combat maneuvering with the landing gear down, or at half throttle, or with wing tanks, etc. - it has become necessary to put some of the teeth back into the practice employment of the aircraft!! The true statement defining the situation is that the fighter pilot is concerned with the entire performance envelope and most particularly he is concerned with the extremities of the maneuver and performance envelope.

2. To win a fight it is necessary to attack. Also to practice fighting it is necessary to practice attacking. Many pilots, some of them flight and element leaders are content to cruise around the sky at high mach and at a high altitude, relatively invulnerably and never find a bounce that really looks "right" and then make a perfect jet penetration and after a flawless GCA, consider that a flight has been flown. Attack is the essence of fighting. Therefore - ATTACK! ATTACK! ATTACK! If one is not in position for an attack, the F-100C is (with it's afterburner) an outstandingly fine aircraft to get in position for that attack. There actually is a time when the aircraft is not in a condition for attack - when the fuel is so low that a complete fight cannot be effected. In fighting with an actual enemy or the Canadians, breakoff is not easy and they will follow one in onto the runway if possible making a perfectly valid kill. Since it is necessary to be out of afterburner at about 1700 to 1900 lbs. it is necessary to enter the fight with something above 2500 lbs. to permit positioning maneuvering in the fight and breakaway if the fight is in the vicinity of the home field (it always is at Landstuhl) and the weather is VMC. Distance from home, bad weather, and the type of enemy (whether breaking away can be chosen by you or the enemy) are all significant factors in the choice of whether a fight is possible or not. Flights into enemy territory can be flight planned and really must be!

3. The air combat maneuvering is really analyzable like a chess game. One can separate the opening game as that which lies roughly between the time the bogies are sighted and the time that the initial attempt is made to close less than 1500 feet range in the firing position and the evader makes his first evasive move. Next comes the middle game which is the entirety of maneuvering until the evader or the attacker is shot down or the time comes that one of the two parties desires break-away. The break-away of the final escape of the evader of the moment constitutes the end game. The fight game can be completely analyzed by breaking the fight down into its components. We have already discussed the manner in which the initial contact and the middle game should be handled with the Double Attack System. It still remains to discuss the breakaway.

4. Another outlook relative to the fight is the vertical separation aspect of the game. The final fight is a complex interweaving of the whole. There is a low altitude fight in which the fight is subsonic all the way and other aircraft have little advantage over the F-100C except in the ability to fly slowly. One should not fly the bird slowly. Down low it is a matter of pilot abilities for any aircraft types being about equal, and it is up to superior tactics and pilot ability to fly, etc. to win that fight. Then there is a medium altitude fight. This is the F-100 great forte. The aircraft can go well supersonic with a respectable ability to trade speed for altitude, ($M = ?$ at 37,000 can be traded for $M = ?$ at 50,000 to 51,000) and it can accelerate fairly well if the mach no. is kept at above 0.80. Opposing subsonic aircraft flown by subsonic pilots have difficulty estimating the speed and hence zoom capability of the F-100C and this latter fact combined with the excellent ability of the bird to turn at supersonic speeds and to

track, a supersonic zoom attack from beneath and almost any quarter except deadfront is an outstanding way to open a fight. Particularly if the attack is made from beneath the contrail layer. Then there is the high altitude game wherein altitude is kept with reheat and a significant attack Mach number is maintained. Here extreme delicacy of maneuvering must be employed, turns for position must be painstakingly figured, and the commitment to attack at such altitudes must be precise. A bomber attack at such altitudes is easily rebuffed by a bomber pilot who is aware of the existing attack, and the attack must be made by the Double Attack System. Ordinarily all a bomber has to do to refute the attack is make a low speed turn and the attacker is slung off the usual pursuit curve. Only the Double Attack System will make any direction of turn the wrong one, but more about bomber attacks later. Never is it so important to maintain both a fair indicated speed and a good Mach number as in high altitude flying. Failure to do so means that there is only one sure direction that the aircraft will go - DOWN. A real high altitude anchor is especially effective flying over a high solid overcast. One can look down and silhouette aircraft and the descent can be supersonic without the use of the afterburner. It is always extremely essential for an F-100 pilot to keep his high o'clocks cleared even at high altitudes because all potential enemy aircraft can and may be higher. Also it becomes much more difficult to see in the deepening blue sky.

5. A tremendous amount of literature is found devoted normally to the scissors fight. This old venerated and (used to be) most effective fighting maneuver is now effective against other F-100C's, most effective against F-100D's, against F-84F's with tanks, against F-86H's with full tanks but intelligence shows that it is very unlikely for any potential enemy to be flying any of these aircraft. Further, the F-100C is the worst scissoring aircraft in service with the USAF so the natural question occurs - when should one scissors, if ever? The answer is never unless forced by error in initial attack to do so and then only long enough for the Double Attacking wingman to shoot the enemy down or once in the scissors to get out of phase with the enemy prior to break-away. One can hardly not justify practicing the maneuver of guts scissors, but only with the intent of practicing this difficult maneuver, not with the intent of employing it in combat as a way of destroying the enemy since in the Super Sabre it can only lead to self destruction. The difference between "guts" scissors and the ordinary kind arises from the difference that the flight path is into the enemy forcing him to not only compute his scissors but to dodge his enemy. The normal terror that arises in man's heart to avoid a mid air collision can hardly be to his benefit in maneuvering for a kill. Naturally the impending collision must be a bluff but it brings out the old concept - "no guts, no glory". To recapitulate, vertical, or horizontal scissors fighting in the F-100C should not be used to effect a planned kill, only for break-away from an undesired engagement.

6. Tracking - a must for a kill. It is most essential at high altitudes to have the pitch and yaw dampers on if they are operational. Like the gun-sight, for effective maintenance they should be flight checked each flight.

Again it is thanks to that ridiculous non-Latin Captain Farr for keeping the 53rd Squadron aircraft in the best possible maintenance relative to these two gadgets. Tracking, like attacking must be practiced, practiced, practiced, etc. Good film, and the cooperation necessary the gunnery officer is a must. Film programs tend to slip if this cooperation is not given him. One Squadron in the wing spent the usual effort to get to the 6 o'clock position, but never gave the film concept any weight. The result was that the pilots were not always turning on the gunsight! INCREDIBLE! One of these pilots even went so far as to claim that he had no trouble tracking at any altitude. If tracking were troublesome, he would never have known. The truth is that tracking is a burden at angles above 20. Every aspect of the gunsight must frequently be used including manual ranging when the radar refuses to lock on, and electrical cage during violent maneuvering and at ranges closer than break-lock range. Again it is thanks to the sterling engineering section and their outlooks that our gunsights are generally in a condition to do radar firing; we as pilots should do our best to both keep the gunsight in flawless order by intelligent checking and not accepting a malfunctioning gunsight.

Tracking facility varies not only with altitude but with speed. The airplane not only is difficult to control and turn at its unstable Mach number, but is also very difficult to track at that Mach for the obvious reason of its instability. It tracks beautifully at supersonic speeds, though extreme care must be used to insure sufficient time for the tracking because of high rates of closure generally existing. The airplane tracks well both below and above its pitch Mach. If one finds oneself at the undesirable Mach number, an adjustment must be made in Mach number. Generally one finds oneself at that Mach fighting against subsonic aircraft like the Mark VI and it is most desirable to go to a slower Mach number, which will not only decrease the radius of turn but permit slightly more G to be pulled. This brings up a small but fine point, that it is desirable to occasionally take a look at the Mach meter in a fight if it is possible. Obviously one should not do so if it means compromising the fight in any way.

As additional problems to tracking, it must be mentioned that when one is at an "enemies" 6 o'clock position and the "enemy" is not aware of the attack, as frequently happens attacking the red or blue tail F-100s, and wingweenies, and F-86Ds, etc., it is almost impossible to track from within the jetwake and in the usual contrails. Great care must be used in estimating the closure speed frequently the interval that one can see the aircraft making the con is short. It is very desirable to plan the attack to get a little angle off if at all possible, though it is the inevitable and result of "locking" behind a target at its speed that little or no angle off will result. In fact plan or no plan, when flying a high altitude attack or not, a pursuit curve against a target flying a straight path at a Mach above 0.9 Mach, a low angle off will be the result.

Some pilots keep talking about running "thru an enemy". It is not clear to this pilot exactly what is meant by this terminology. Going

through an unsuspecting flight of two or four will not shoot them down if adequate and meticulous tracking is not employed, and this takes a little time. It may look good to an opposing flight to have two yellow tails go "thru them", but unless they are verging on heart attacks, it will not be likely to prove particularly dangerous to them, unless high speed yoyo is effected and the attack is pressed.

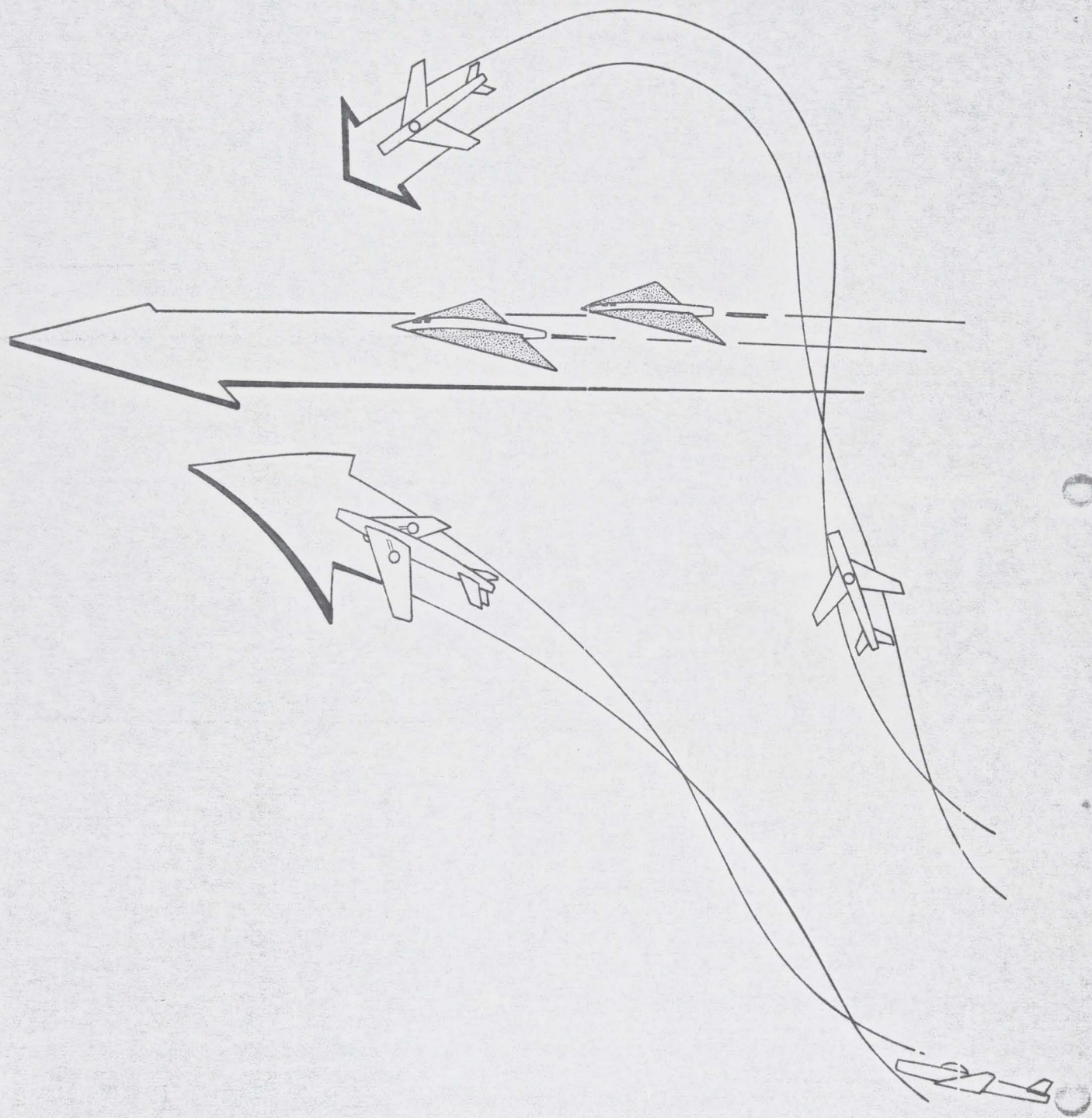
7. Afterburner Use. Pilots and literature keep using the term "judicious use of the afterburner". It is clear that merely going into afterburner will not kill an enemy, but it is rather difficult to believe that anyone is going to be seriously scratched by an F-100 without its use. Lets face it, the F-100C is a dog without the afterburner! Upon contact with an enemy since the method of opening the fight is so important in winning the fight, the A/B should be (almost always) employed at once. It should be used to gain position, speed, or altitude advantage, or any combination. Particularly in overhauling an enemy; it is necessary to use it for the surprising reason of saving fuel and flight time. (The subject of intercept is a special one). When in the fight, for maneuvering or using the zoom capability that when employed with the Double Attack System is so effective, the use of Afterburner is a must. Only if the closure speed was underestimated seriously, or if a supersonic dive of controlled speed is used in the attack is it reasonable to turn the A/B off. The use of the A/B not only keeps the speed up in a turning fight, but since it is a law of nature that "the amount of G than can be pulled in a turn is a function of the thrust available", one can seldom justify turning the A/B off. The A/B is most useful at speeds corresponding to high true speeds, since it is another inviolate law of nature that "propulsive efficiency is a function of the true airspeed" Still it can assist even at slow speeds by taking the weight off the wings and permitting a slower flight to be maintained or higher G at slow speeds. The only arc or curve that could conceivably be prolonged by the use of A/B is one downward at sufficiently high indicated speeds that the limit 7.33 Gs can be pulled ~~anyway~~. Certainly a break-away from a fight should be as expeditious and clean as possible, so again, use the A/B. To sum up then, truly judicious use of the afterburner means using it at all times during an engagement from initial visual contact to breakoff. (This like all rules and applies most of the time; certainly it is possible even if unlikely to both create and come across situations when the A/B should not be used). Expect not to use it only when seriously overshooting a speed or position, during some dives, and when the fuel on board does not permit it's use.

8. Torpedo From Below! In keeping with the theme of this section of idea which can be developed and improved, the concept of the underside attack is brought out because of it's importance. It used to be normal good strategy to get altitude advantage and to use this advantage. The F-100 has altered this picture entirely. Because a good deal of altitude can be stored up in a supersonic speed, because the airplane is a low altitude cruising aircraft, and because the altitude for most supersonic

aircraft to be at best speed performance is fairly low (this is another law of turbojet powered airplane design, and hence will generally be applicable to enemy aircraft that also have to conform to the laws of nature.) The altitude range for best speed is between angels 33 and 43, (i.e., medium altitude) it is fruitful to attack people from below. Besides, many pilots are still old fashioned and look for attacks to come only the high quarter, and it is difficult for most anthropoids to be able to see downward and to the rear in aircraft designed for anthropoids.

The technique follows rather naturally from the philosophy of the fruitful and natural Double Attack System of fighter employment. Let us assume that the "enemy" is a flight of two Mark VI aircraft cruising along at angels 45 not in GCI control to warn them of the impending stern attack from below. Our two valorous 53rd Squadron pilots are cruising along at roughly 0.9 indicated which will give about the same true Mach that the Mark VIs could possibly have even if they are clean. An elementary theoretical calculation shows that it is only necessary to have an overtake speed of 0.27 Mach to be at their altitude at their airspeed. (The computation was elementary theory but experience shows the figure to be quite accurate - it would be easy to get a significant amount of this zoom data so do it!) Thus it is merely necessary for our Double Attacking types to get up at least 1.2 Mach number, get fairly close to the directly underneath position, pull the nose up firmly and to be among them in short order. The attack should be made still spread so that when they break (if they break) the attacker they break away from will get the first attack with the other going higher to cut the turn radius and to get the proper time interval for his attack. It is quite difficult for pilots to see such and impending attack until too late, so that the tracking problem is not too great because the crossover speed is not too great and all that is necessary to track is a roll for the initial part of the turn. If the enemy is unaware of the impending attack, it is best for the initial attacker to arrive at their speed and every effort should be made to do so. The delaying attacker can go high and poise for the second attack and keep his leader impeccably cleared visually. Any break made by the attacked will be, because it must be, in the downward direction, giving both attackers the altitude advantage!

This attack can accept a lot more development than this pilot has given it. Only limited attempts have been made to get well underneath, pull up steeply, and then roll over so that a trajectory and pursuit curve at something better than 1.0G thus feeling very normal in the attack. Then the breakoff the target should be a roll to a normal climb (i.e., right side up) maybe pushing over to near zero G as one overtakes the target and breaks off the target. The inverted attitude is very good and feels good especially on days when no high cirrus clouds obscure the horizon; it is a poor position for seeing aircraft coming in to defend the attacked, but this is the wingman's job and he can do it far better with the Double Attack System than if he idiotically enough rolled over also to maintain formation and



contributed less than nothing to the attack. This writer needs more practice in the system to perfect it. The system is of particularly great value for a coordinated attack on bomber aircraft which must be shot down.

The attack need not always be from line astern. The attack is quite good from a side quarter though then it is necessary to have even more Mach up for the drop off in speed required in the turn up and into the target aircraft. This is a very good system for attack and surprisingly enough a very simple rule has been born out by experience against any aircraft cruising at or near 0.9 Mach. The attack Mach number has only ONE VALUE for a 90° approach to the target from below regardless of whether one is say 3,000 feet below or say 8,000 feet below. It is true because the less the zoom altitude required, the tighter the turn will have to be to get to the 6 o'clock position. The Mach value required is about 1.3. Thus even if the enemy is sighted on the level, one can light the A/B dive down to get the desired attack Mach in a hurry and then zoom into the attack. A good opposing flight leader can neutralize the first attack by an immediate break to get head on into the first attacker, but the opposing flight leaders are generally loath to do this because it would throw their "altitude advantage" away! So they frequently wait until the first attacker is well up in his zoom and can turn like a dream (because he is supersonic) and is will to accept the airspeed loss which is only helping him to lock behind the evading aircraft, at their airspeed. As Blasse would say, "What could possibly be better?" Try it! and remember the Mach for the attack - a magic number - 1.3.

9. It is a little inane to discuss attack against bombers unless one discusses which particular bomber. But since no literature exists (known to this pilot) on the subject an attempt is at least a beginning. In attacking a bomber several things must be known beforehand if possible. Some of the considerations for the attack are:

a. Knowledge of the rear and side firing armament, obviously an attack which challenges the least number of guns is desirable.

b. The type of aiming system the bomber is employing, i.e., can the system decode a simultaneous attack and account for it? ~~and~~ On what does the radar (if used) lock on?

c. The effective range of the armament.

d. The configuration of the bomber - this will determine blind spots of not only vision but also the ability of the defensive armament to cover a certain area.

Once the bomber is determined as the target for attack one method of attack comes out naturally from the natural system - the Double Attack System. Let us assume a "typical" supersonic, high flying, bomber of the Canberra type which for the purpose of the discussion has rear firing

armament of 20s in the tail and is capable of flying inbound to the target at 48000 feet, at approximately 0.9 Mach. This is a tuff nut! (Again it is reminded that the discussion is both hypothetical and general; one must actually discuss the existing bomber to give precise, specific details.) One attack made to order for the situation is the torpedo from below. An initial pull up Mach of 1.25 to 1.30 from angels 35 to 37 will get one in fine firing position except for one thing - the angle off will be low. In fact it is difficult to make any attack against such a target but what some risk must be incurred from the guns, hence it would seem reasonable not to intend to lock but to make passes limiting the time spent in the sector covered by the guns. Also with two aircraft in the attack it would be most desirable to employ them both with minimum time interval so that both aircraft are firing at once yet at most only one will get the return fire. One thing is clear "ya gets your flying pay, so ya take your chances" or to quote another great military philosopher "nothing is to good for the boys in the service". On breaking off the target one should maintain the zoom if there is any zoom left and make the next pass with both pilots coordinating the attack to attack at once from slightly different directions. By this time the bomber pilot will have at least a reasonable suspicion that someone dislikes him and will use a difficult weapon to counter. He unquestionably will make turns to throw off his attackers and frequently the bomber will be able to outturn the fighters. For this reason the attackers must be spread so that regardless of the direction of turn one of the two aircraft will be in the attack position. The aircraft must be flown smoothly to an extreme degree or a significant loss in altitude is the inevitable result. Once the F-100 is slowed up it is necessary to regain speed in order to climb back up and it is not inconceivable that a loss of visual contact may result from having the bomber above in the deep blue of the sky.

The overhead pass on the bomber at high altitudes is one that looks easy but in actuality is one requiring some experience to do precisely. It must be precise because it will probably be the last pass made on that bomber that flight by you. Particularly is it difficult if the overhead pass starts from a zoom up from below, because one must judge the flight path so as to get behind the bomber on the dive, yet the peak of the zoom cannot be too high or one gets hopelessly behind in the sense that a very low angle off will be the result in the subsequent tailchase, and the dive onto the bomber must be "aimed" ahead of the bomber so that one doesn't mush through the bombers path without getting a tracking pass. The pass is not really difficult; it is one that needs some practice before it can be done properly.

If the bomber is large and has only tail guns and is operating as high as it can, its maneuver margin between high-speed buffet and stall is very low, and a different technique can be employed. Coming up and in (converging) from a Double Attack System type of attack the two aircraft should try to fly not a pursuit curve on the bomber (which would put one in the range of the tail guns) but rather a path that will put them in formation position on say the wingtips on some thousands of feet outboard of the wingtips. This

should be done simultaneously and the speed should be judged so as to remain forward of the cone of fire of the tail guns. When one is in formation it is merely necessary to fire at point blank range at anything in sight. A small point here but if one gets in behind a jet pod firing is still possible with some accuracy as long as one gets squarely behind the engine; if one gets in the jet wake unsymmetrically the jetwake will give you differential lift and throw one all over the sky.

As an additional outlook, sometimes one can with specialized bombers come in behind the tailfin or any other object obstructing defensive fire and possible get in scot free.

10. Employing Flights of Four With the Double Attack System. Since we have demonstrated that a flight of two flying the Double Attack System can do everything that a flight of four aircraft flying the obsolete Fluid Four System, (and do it better) it is clear that a flight of two is now the basic cell for attack and not four. Still it must be admitted that greater numbers of aircraft in a concentrated area will tend to insure domination of that limited area, so that it will occasionally be necessary to send four (and perhaps more aircraft in). Hence the question - how does one successfully employ four aircraft? Since the DAS is a natural system it is "naturally" easy. The second two aircraft fly in any orientation relative to the first element. There is no need for any dependence of one element on another for clearance in fact because of the spread of the four aircraft such interrelationship between elements is impossible. It is suggested that by and large the two elements be flown almost line abreast, with possible only the inside two pilots keeping sight of each other - the four aircraft flying parallel and line abreast will sweep in visually a swath of about 10 miles. Altitude separation is not necessary (except possibly in some turns and it can always be effected by a change in altitude during the turn). The reason for the line abreast (or nearly so) suggestion is that a very substantial amount of sky will be swept and hence the chances for contact with the enemy is better. The first element making visual contact will merely alert the other of the position of the enemy and go into its self sufficient attack. If the other two go into the fracas they should make their target clear. It will take at least four of the enemy to even create a requirement for the second element to get into the fight and then if the second element goes in it should pick the remaining element of the enemy and attack it using the DAS. So a very different method of operation exists in the DAS as compared to the fluid four. There is almost no coordination required between the elements once the targets for attack have been made clear. This is a tremendous simplification for the system. Each flight of two should be able to adequately take complete care of its chosen target for attack, since they are completely self sufficient in both the matter of visual coverage and the matter of being in the best possible posture for firing attacks.

If sweep of sky is not a factor and there is complete assurance of being able to make contact with the enemy, there is nothing to keep the flight of four from flight with elements in trail. In fact entry into a fight in train might be a pleasant and effective experience. Since the first flight that attacked must have caused the enemy to have broken its formation of defense, the second attacking element will have a look at the boiling pot and make a poised, precise entry that may possibly go unnoticed for the initial part of the attack because the enemy flight of four is busy fending the attacks of the first element.

The defense of a flight of four is substantially the same as for a flight of two since there is little significant relationship existing or necessary between the elements. Again a simplification. An attacked element will alert the other by radio and take care of their own defense for the start of the contact. The second, non attacked element, (it will not be attacked because of the spread) can then make an attack on the enemy attackers in the old concept of the Double Attack System.

11. Tail Chase Intercept. There is a considerable abuse of speed control in the tail chase intercept. Even the GCI operators are not clear on the matter. Our aircraft, (the F-100C) through its great variation of speed capability is remarkable in its intercept capability. Most fighters cruise through the sky subsonically and are at or near 0.9 Mach. To effect a tail intercept it is necessary to exceed that speed. The simple formula which relates the time required for the intercept to its variables is:

$$\text{Time (in min.)} = \frac{\text{Distance between the aircraft (NM)}}{11 (\text{Difference in Mach No. s})} \quad (\text{Approx})$$

or better

$$T = \left(\frac{\Delta D}{10} \right) \frac{1}{\Delta M}$$

Hence for a given distance apart it is clear that doubling the speed difference between the two aircraft will half the time required for the intercept. Note that in no case is the Mach number of the aircraft being chased important! It is the difference in speed that is the important variable! That this is so becomes at once clear since it would take an L-20 just as long to intercept a balloon at the distance of 50 miles flying at 0.2 Mach as it would an F-86F flying at 0.9 Mach to intercept a T-33 flying at 0.7 Mach as it would take an F-? flying at Mach 2 to intercept an F-? flying at 1.8 Mach! When chasing fighter aircraft then, it is very desirable to get at the fastest altitude with afterburner on and get the greatest possible speed differential. It occasionally happens that GCI will ask one to go A/B at some low altitude like 10,000 feet to effect an intercept on a fighter. This is not only wasteful of fuel because of the low altitude operation, but it is ineffective because A/B on or not the differential speed (speed of closure) is low. Under this situation a change in altitude is most desirable, and should be requested at once. Even chasing some bogies which are fairly slow (like 0.8 to 0.9 Mach) it is not unusual to be assigned a tail chase at fairly long distances and it will become

apparent that the intercept would run out of fuel before it could be made or at least not permit return to the home base. Chasing a bogey subsonically with 0.03 Mach differential would be 11 times longer than going supersonic and getting a 0.33 Mach differential so that a considerable amount of fuel would be saved by going A/B and being well supersonic. The intercept would probably be accomplished in about 1/4 the fuel, if A/B were used.

12. Use of the Contrails. Only basic obvious aspects of the possible use of the contrail layers will be discussed here only because they are not discussed anywhere else in the literature. Generally, there is a definite contrail layer over Europe and the existence of the layer must always be taken into account in the deployment of the element for battle. A call should be made when any aircraft enters the cons with the angles at which conning starts and stops so that it is remembered and can be played closely.

Very frequently the layer is between angels 30 and say 42. This type is ideal for attacking with the F-100C. One can play either the game of torpedo from below or cruise above the layer to have an altitude advantage from altitude on aircraft in the contrails.

Obviously, one should not make the attack from within the con layer if it can possibly be avoided to avoid the detection of the attack.

One can frequently tell the type of aircraft from the contrail type. The cons also are a sure indication when an adversary has gone A/B. The Double Attack type of operation is much alleviated (i.e., even made easier) by the contrails because it so easy to keep track of each other.

Some "enemy" Mark VI flights like to keep a deep contrail layer above them to avoid surprise attack from above; this is resolved by attack from below though if it is a flight of two it really doesn't matter because the Double Attack System can easily cope with them. Even more frequently the Canucks put a flight in the air with one element in the contrails and another well above ready to "leap" on the attacker. Here it is better to attack from above. If it happens that the high flight was not seen (it must always be suspected and looked for) keeping a high Mach in the DAS attack will still keep one relatively invulnerable to subsonic aircraft. Then, too, the high element will only be attacking one of the Double Attacking aircraft and the attack should now be shifted to a combined attack on the high element of the Fluid Four defenders. Again the contrails will permit easy view of the return of the original evaders.

Operating against subsonic aircraft the situation can be done better in reverse since a wider range of speeds is available to the F-100Cs. If one is getting down to low values of "fighting fuel" loads and an attack has not yet been possible, it is advisable to put one F-100 in the cons with the other downsun (to make the shiny 53rd aircraft more visible) and quite high and well separated. The contrail will attract the Mark VIs like flies.

When they attack, the attacked F-100 should go A/B in spurts merely to stay ahead of them, and usually for a little time interval to see if two are attacking or four. In the chase the high element usually comes down into the cons because their higher altitude gives them a higher chase speed. A slight turn staying ahead of the first attackers is usually advisable to get nearer to the covering F-100 and it will surely bring down the high element. The entry into the fight is then the old one of the Double Attack System. Since all this time the other F-100 should have spent his time getting into position above the contrails and getting upsun of the gaggle.

13. Head on a Swivel? Everyone continually tells people to keep the old head in motion - that thought will not be expressed here. Clearly it is of the utmost importance to be continuously aware of all aircraft that come in the sphere of vision of the fighter pilot, but one way not to see them is to keep the head and eyes in continuous motion. One, in searching for other aircraft, should search sectors in depth! Pick a sector, search it in depth, then change the sector, and search it in depth. And LOOK, it is relentless work! Cover the vital spots defensively. Don't merely look at the aircraft you are covering visually, search the area in depth that is his dark area (behind him) and look around him above and below. It is one of the advantages of the Double Attack System of patrol formation that it is easily possible to keep one's flight buddy continually cleared. Remember that it is difficult to clear areas in the deep blue of the sky and in the sun. If it is possible to attack from the direction of the sun do so. In clearing oneself it is necessary to continually change the sector of observation looking and searching each section so the MTI of the eye can be most effective. It is necessary to look both behind as much as possible and the underneath sectors both below and behind. To look underneath it is necessary to roll the airplane up on its wing for looking behind and ahead. Needless to say it is of paramount importance that the crewchiefs have attended scrupulously to the important detail of cleaning the windscreen and canopy. It is possible to fly in aircraft so dirty on the windscreen that it is almost impossible to look forward in certain lighting. This shows inattentiveness on the part of pilots flying the airplane previously and by the crewchiefs.

If one is flying alone and is flying combat it is necessary to be extremely cautious. In fact it is almost a necessity to fly in continually turning flight while constantly banking up on a wing looking back and underneath. The turn of course should be slight.

14. Cruise Control. Cruise control has little to do with actual fighting but it was necessary to say just a few words on the subject because so many pilots have such an abysmal ignorance of the subject and there is so much garbage offered by pilots who supposedly "know".

First of all it is necessary to do only one thing to fly the aircraft for max range. Merely fly the calibrated airspeed for best cruise as

indicated in the dash one. That is all there is to it. Any other system is wrong! I've seen a squadron that was personally taught better try to fly power settings for best cruise and they almost fell out of the sky getting on the back side of the power required curve. To fly power settings or fuel flow, or any other "gadget" that individuals dream up, is wrong. The reason for this is that range is an insentient function of daily variations of atmospheric variables if the speed (MACH for LAS or calibrated airspeed) is used. The dash one has power values in there only as a guide and they vary from day to day and aircraft to aircraft but the speed for best range does not vary.

Also, the difference between retaining the power for best range or setting the power for best speed when heavy and cruise climbing or letting the airspeed increase is too little to prove of any practical value. Also the F-100 is one of the first fighters that one should not fly at max cruise altitude for max range. You may, however, be willing to sacrifice slightly for the higher altitudes advantages.

The 53rd has a flight card which is slightly conservative but quite accurate from flight checks made on it, so use it. The range should be cut down for flights above two aircraft. Don't pretend that the range data and time to climb data are wrong. They are for a standard day; use the data for precise flight planning on long trips and you will find that the computed fuel for the first checkpoint after climb is correct if the winds were properly predicted.

Winds - don't throttle back in the face of high headwinds for it will cut your range even further. Actually one should speed up for winds much above 50 knots on the nose and one should throttle back for max range in high tailwinds. Unfortunately the dash one does not tell one how much the speed should be changed directly. (NOTE - it does now if used correctly EER - 1963)

On cap missions where max endurance is the order of the day the system is identical - force the airplane to fly at the calibrated (or indicated) airspeed for best endurance. Incidentally endurance is a remarkably insentient function of altitude.

FLIGHT SAFETY AND FIGHTER FLYING

One thing is at once clear; the idea of flying fighters in a military organization preparing one's self to wage war conflicts completely with any breath or implication of the word safety. One must take risks to kill. Even a routine maneuver like high angle strafe or even panel strafe would turn the average transport pilot's hair green by the third pass. Safety is a relative thing and the only objective answer to the game is to take the most highly professional approach possible with the game. This means intense learning that never stops and striving that is continual for precision in all the necessary maneuvers and flight operations. To do things passably well is not good enough--you try to do the absolute best you can.

Along with this the command sections are constantly trying to effect the best procedures and run operations in the most sane manner possible. Flight Safety and operations are constantly seeking to remove unnecessary hazards, and this duty is also the continual duty of every line pilot. It is possible to give a few additional guides to help the fighter pilot help himself to avoid incurring needless risks and to retain his life to give it for his country in combat rather than become some ridiculous peacetime statistic. These are given below.

1. It is almost never one thing that gets pilots in trouble; it is usually an unfortuitous combination that bests him. So, to beat this one, if you are incurring any kind of trouble with the aircraft, get it on the ground with an early abort. Most of our peacetime missions do not call for accepting any great sacrifice of safety so don't leave yourself open to it. It seems to be an unwritten law of flying that troubles usually don't come singly, so when one trouble is going on look for another. Most important, don't live with the problem, get it down and get it fixed. The air is an extremely poor place for trouble shooting.

2. Don't fly if you are overly fatigued. Don't let foolish pride trap you into this one. The command situation in the 53rd is such that no one will ever chastise one for refusing a flight because an individual does not feel up to it regardless of the reason he got himself in that condition.

3. Practice what you know you are weak in. We all have our points of weakness so work them out. If you know that you need more practice in some important operation, a short talk with your flight commander will resolve the problem. Many times you know better than anyone else what you are weak in. Particularly if you fear some maneuver, practice it, become proficient at it, and you will have done yourself, the squadron, and Air Force a service.

4. Smoking--It is most strongly recommended that you don't. The habit is totally unnecessary but it is recognized that it is a real lulu to break. However, it can be broken and you will be immensely pleased

with yourself, you can start enjoying your foods, your sexual powers will increase and your chances with heart troubles and lung cancer will be much better for long, fruitful living.

5. Drinking--This is a real loser if you do heavy drinking prior to a days flying. Avoidance of this one is a must. Actually one bad flight in weather or fighting after an unfortunate heavy drinking bout will prove to you once and for all the folly and extent of the error. It is strongly recommended that all fighter pilots go on a terrific binge about once or twice a year and really lose this world as a bit of effective mental hygiene to gain balance in this glorious but sometimes frustrating business. This bout should be followed by an adequate period of recovery prior to flying again. If one runs snotbox to snotbox with a prohibitive amount of say Martinis and you had no control over the situation, be big enough to inform your flight commander of your flight and he will see to it that you are not on that days flight commander schedule. Not informing him is a serious error.

6. Women--Are wonderful creatures! However, unknown to the aero-medical section of the Air Force it is clear that three times with a woman in a night before flying is the limit. It is not a factor whether it is once with three different women or three with the same woman. Three times a night is the safe limit.

7. Condition--It is a great tragedy of the modern Air Force that after flying, additional duties; drinking, smoking, women, women, women, and some personal demands, there is not any time left for an athletic program. The Air Force talks much about it, recognizes its importance relative to flying, and demands good condition, but the cold hard truth is that it prevents a pilot from being in any semblance of good condition. Give this the college try, try to work on some form of exercise of a form higher than golf or the finger exercise of bowling to stay in shape. Don't over eat to get overweight, and get enough sleep.

8. For the love of your life--EAT A HEARTY BREAKFAST. It is a weakness of the average non-Latin American husband that he lets the woman he married convince him that she can't possibly get him breakfast. How that man can expect to command men and yet fail to handle a little slip of a woman is a continual mystery to the well oriented Latin, but the breakfast meal is the most important of the day so eat it. Technical terminology be damned, the salient fact remains that you can't do a mans job in a day if you don't eat like a man at breakfast, and throughout the rest of the flying day. Bachelors who sleep in and miss breakfast are making a miserable trade.

9. Driving--It is one thing to die gloriously doing your duty with your flying boots on but is a sad day when you bow out in an automotive accident. It not only doesn't give the squadron practice flying the #3 missing formation, but it makes Colonel Peap very angry. It is only natural

for fighter pilots to want to own sports cars; do it if you must but use them to impress the fairer sex rather than to get maximum performance on the ground. A word to the "new heads" about European driving. The French are a little same in their driving unless you are playing the bluff game of Paris. Only the German could make the autobahn unsafe to drive on and he does this by passing the men ahead of him regardless of anyone coming up fast from the rear. He is gifted with tunnel vision which covers most of the lane directly in front of him, but even if you are alongside do not assume that he has seen you. Should you drive to Italy -- take care! The Italian is the worst of the lot since he has no patience and will pass when he shouldn't on blind curves, etc. Use your horn going around all blind corners and stay well to your side. **ALWAYS EXPECT THE UNEXPECTED, AND COUNT ON NO DRIVING COURTESY IN EUROPE.** (It is much better than driving in Massachusetts.)

10. Back to the active flying game again. Many people pay an extreme amount of detailed attention to matters that require no detailed approach. In fact you can measure his mental incapacity by his penchant for details. In the flying game the situation is frequently reversed however. It is necessary to be able to see the "big picture" but at all times the details must all fall into place. Your preflight checklist must not only take on the view of the general aircraft over all (like making sure that the aft fuselage section is on and the radar dock is down) but it means taking in all the important details of Dzus fasteners, checking meticulously the brake lugs the antiskid mechanism, the Form 1, etc., etc.,. Good habits followed consistently and religiously will lead to good mental checklists. **THE CHECKLIST MUST BE MEMORIZED.** Answers must be at finger tips; complete in detail and in order. A pilot should never loaf in the cockpit. It is true that the squadron maintenance is so good that seldom do the aircraft sneak up and cause one difficulty, yet the opposite situation is generally true in the Air Force. The aircraft and the engine should be frequently checked for early signs of trouble. Don't get sucked into the sloppy habit of ignoring detailed preflight inspections etc., as you get to be completely familiar with the aircraft.

11. This squadron's engineering section is not only completely competent engineeringwise but like any admirable organization it has the excellent philosophy that the pilot is to write up everything that is wrong with the aircraft, big or little. This is the pilot's responsibility, and it must be done! This is the only fine operational policy that will continually insure fine aircraft for every mission. Never will a write-up be criticized! In addition to writing up everything, remember to make the write-ups complete and detailed and try not to do the analysis. The analysis is properly the duty of engineering; the pilot merely writes up the symptoms. Make sure that the gunsight gets thorough and continual checking and pay particular attention to the radio equipment which needs much maintenance in the F-100 and yet is the critical thread that will recover you the usual bad weather that exists over Europe.