



FIGHTER FORMATION FUNDAMENTALS



SPECIAL EMPHASIS ITEMS

This issue of Formation Fundamentals will discuss several topics that came up as a result of the Mustang Forum in Oshkosh this year. The vast majority of our members did not attend the forum so I thought it prudent to discuss some of the issues so that everyone could benefit.

First and foremost our thoughts and prayers go out to Laid Doctor in his recovery following the tragic accident at Oshkosh. This accident does, however, offer several lessons that we all can benefit from in the future.

First is the controversial formation take-off. There is no question that the formation take-off increases the risk factor in fighter departures. Even with seasoned and proficient fighter pilots, there is more risk associated with formation take-offs than in single ship take-offs. The subject of discontinuing formation take-offs is now a hot topic. It is not within our purview to terminate formation take-offs. Only the FAA can categorically prohibit a specific flight maneuver and enforce it. However, I urge all of you to weigh the consequences of the formation take-off before you attempt it. If you are not proficient in this maneuver with an instructor and if you are not flying in formation with someone you are proficient and familiar flying with, the formation take-off should not be considered. Generally, the time saved performing the formation take-off does not offset the increased risk it incurs.

For those that choose the formation take-off as an option, you must be aware of the risks we have just discussed. It fundamentally requires that each individual in the formation is proficient in the maneuver and that the procedures listed in the formation manual be strictly enforced. The abort procedures outlined in the formation manual must be committed to memory and executed without hesitation in event of a formation take-off emergency. I discussed these items at the Gathering of Mustangs in Kissimmee, Florida last April so I will not go into detail on the procedures. Remember, it is all in the manual! I do want to emphasize a few key points, however. Formation take-offs require a **minimum of 100 feet runway widths and a maximum crosswind component of 10 knots!** That means wider runways than 100 feet are better and lesser crosswinds than 10 knots are preferred. Depending on the type of fighter you are flying, a lesser crosswind than 10 knots may be your limit. At any rate, these values are established for your safety and **cannot be compromised.**

The second issue concerns runway lineup for take-off. Runway lineup is very important and critical! I will forego the procedural discussion since I covered it in April and it's clearly described in the manual, however, it needs to be emphasized that it's each member of the formations responsibility to ensure adequate separation for take-off. There are several ways to do this, but only one that works with impunity. The USAF standard separation is 8 seconds between departures. Timing alone in a perfect world would work just fine, but as we explain in the manual, a peek is worth a thousand seconds. I recommend that each member of a formation take-off lineup in position and then **cock** on the runway sufficiently to view the preceding fighters departure. There are two techniques that work well for establishing a sufficient amount of time to wait for departures. One technique is to wait until the preceding fighter's tail comes up prior to initiating your own roll. Another is to simply wait until the preceding fighter lifts off the runway. In most instances, the latter is the best method in our world. Additionally, each aircraft of a shotgun take-off and each successive flight lead of two-ship formations should call "**rolling**" (i.e., "Leads rolling, 2's rolling, 3's rolling, 4's rolling), We have no wars to win, no tankers to hit and not TOT's to make. The additional time far outweighs any implied necessity for expediency.

I want to emphasize again, the seriousness of performing the formation take-off. It should not be taken lightly. As we have seen, even seasoned, professional aviators can fall victim to this maneuver if each and every procedure and limitations are not methodically followed.

"flying fighters is not a matter of life or death - it's much more important than that"

To continue our discussion, I would like to change the subject and address several other topics that came up in the Mustang forum. The first topic is one of mutual support. Formation flying recently has become the subject of great debate, both with the FAA and within our own community. With all the hoopla surrounding flying formation these days, have you ever wondered why we **really** do it? Certainly it looks great, and is a challenge to perform as well, but there must be a reason fighter pilots began to fly in formation. Formation flight in a military role exists for several reasons. It enables large numbers of aircraft to be expeditiously moved from one point to another and certainly it increases firepower. The primary role of formation flight is, however, **mutual support!**

The concept of team survival is paramount. Each formation member plays a role, yet ultimately each member relies on the other to stay alive in a combat scenario. The same is true in our world. Although we are not being shot at (with exception of the FAA) we still have one primary responsibility to fulfill while flying formation. The responsibility is mutual support.

What does mutual support mean? Mutual support encompasses a multitude of actions. As flight leads, it means taking care of and teaching your new wingmen. That means periodically monitoring his performance and the condition of the wingmen's aircraft (one of my pet peeves is the flight lead who leads most of the flight and never looks at his wingman). That means not overtaxing your wingman's ability, and instructing him on ways to improve. ***As a wingman, mutual support means knowing the books and procedures and attempting to fly the best formation you possibly can.*** It means to learn and practice and learn more. For both aircrews it means simply taking care of each other. When emergencies arise, a second pilot is a valuable tool. The non-emergency pilot can look for signs of problems externally on the emergency aircraft. He can help with ideas and checklist items. He can help find a quick place to get the stricken aircraft down and help the emergency pilot with frequencies and headings. We all know how busy it gets inside a disabled fighter cockpit. The non-emergency pilot can then, fuel permitting, orbit overhead in an effort to establish the condition of the downed pilot and relay position details to search and rescue units. Remember that even what seems to be a minor problem can escalate rapidly, so always maintain formation integrity and mutual support.

The third emphasis item involves rejoin safety. Some of the most innocuous things we do can end in tragedy if we do not think ahead. One of these involves multiple airplane formation rejoins such as a 4-ship of P-51's rejoining on a photo platform (B-25, etc.). First the rejoin should be briefed very thoroughly with special attention to the rejoin. You must establish in the brief – altitude deconfliction for rejoining fighters. Generally, a thousand feet works well. A well defined orbit point is helpful and radio communication prior to rejoin is required. As the fighter lead, do not leave your assigned altitude prior to having the photo platform in sight and establishing radio communication. A helpful technique to expedite the rejoin after visual contact is established is to send your formation to route or even close trail at the end game. Assign positions for each wingman to take on the photo ship, It's much easier to fly into this position than to have to fly close formation on the lead fighter and get into position on the photo ship when sometimes dramatic closure rates occur.

The last topic discussed in the forum concerned the movement of aircraft within the 4-ship formation. I began this discussion primarily to clarify the actual movements by each formation member when requested to do so by the flight lead. Someone asked me about the signals required to move and echelon formation back to fingertip. My response was to use the radio. One of our most senior members quickly pointed out several com-out signals for these functions and how to accomplish the changes.

So, it's now time to discuss some fundamental concepts of our formation program. Both the original formation manual written by Hess Bomberger and the current formation manual are based on USAF procedures. I was asked several years ago to update the original manual and bring it inline with current USAF teachings and practices. What each of you needed to understand is that our manual is not a compilation of made-up signals or type-specific special formation practices. Our manual is for all practical purposes the exact document USAF tactical aircrews train on today, but modified only for piston powered fighter operations. The decision was made many years ago to follow USAF guidelines for P-51 operations, the good old days, so to speak. Our policy has never been to necessarily be "consistent" with other type-specific formation policies. We will continue to operate using only our current manual for guidance. The USAF has been flying formation longer than anyone else and has proven techniques and procedures that ensure success and above all safety! For those that have just moved up to fighter

formation, you may notice some differences in this manual from ones you have previously used. It is **your** responsibility to educate yourself by thorough reference to the Fighter Formation manual and by practice. It is the flight lead's responsibility to insure we are flying "by the book".

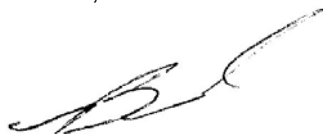
Now that I'm off my soapbox, lets discuss moving the 4-ship formation. Let's discuss the subject of 4-ship position change signals. **THERE AREN'T ANY!** In modern fighter units, the radio is the only method for 4-ship movements in non-combat, non-tactical conditions. The 4-ship close formation is not a combat formation and is described as a "Parade" formation when flown the way we do and the USAF deems position changes by visual signal in close 4-ship formations - nebulous and unsafe. Neither our original formation manual, nor our current manual, describes how to signal multiple movements in 4-ship formations visually. It's just not accepted practice. Flight leads use the radio for complicated 4-ship movement. Movements such as moving a fingertip left formation to fingertip right or moving a right echelon to a left echelon are complicated and leave too much room for confusion, especially considering that we do not fly formation for a living every day and that these type movements are rarely accomplished. A simple radio call makes it clear to everyone involved thus increasing the efficiency and safety of the maneuver.

Additionally, during our forum at Oshkosh, it was brought to everyone's attention by one of our members that our performance as a group was not up to the standards of the groups years ago. As much as we all would like the whole fighter group to act as a well-oiled military machine, it's just not possible; there have just been too many ownership changes to keep our total skill level at peak. With fighter sale prices skyrocketing and the extreme cost of operation, many fighters are not being flown as often as in the past.

It simply boils down to this: any team is only as good as its weakest members. With all the above said, it is our personal responsibility to insure that our skill and knowledge levels are up to the task. Flying formation is not a game; it's very serious business. Lives are at stake when mistakes are made. Having spent 10 years instructing in both the T-38 and the F-4, I can assure you that poor performance was and is not tolerated in the USAF and should not be tolerated here. Flight leads are required to quality control their flights. This means, a thorough brief and an especially thorough debrief. If a wingman is not up to speed procedurally, remove them from the formation and debrief them thoroughly. It's all our responsibility to improve as a group. We are the ones flying the high-dollar "fighters" and looked upon with scrutiny each time we fly, especially in formation. If we get our quality control under control, the FAA will be happy too. I urge each of you to practice formation every time you can and stay up with the procedures in the **Fighter Formation Manual!** This means not only the mechanics of just staying in position on the wing, but all the signals and techniques described in the manual. The survival of our program and safety of our team demand it! If anyone has ideas as to how to magically improve this program, please volunteer your time as we do!

On a final note, our fighter formation program will become a signatory of the FAST organization shortly. As discussed previously in these letters, FAST has agreed to accept our program in its entirety. Nothing will change in the organization or our program or the way in which it is run. In December or January I will mail out order forms for the FAST sticker and new card. The new card will essentially be identical to the current card with the possibility of a few administrative changes and the FAST sticker. For those of you wondering why the FAST umbrella, Mr. Ed Robinson of the FAA who heads up the airshow and exhibition division in Washington requested it. Although our program was the first to be FAA approved, FAST is the largest formation entity. The FAA for benefit of their inspectors in the field, requested we all have a common insignia so that there was no confusion as to who was qualified or what program qualified you. There will be a small fee as yet undetermined to cover the sticker and printing of new cards. In the mean time, the card you currently possess is still valid and can be used until January 2000.

Cheers,



Bradley C. Hood
Fighter Formation Qualification Program