

Feature

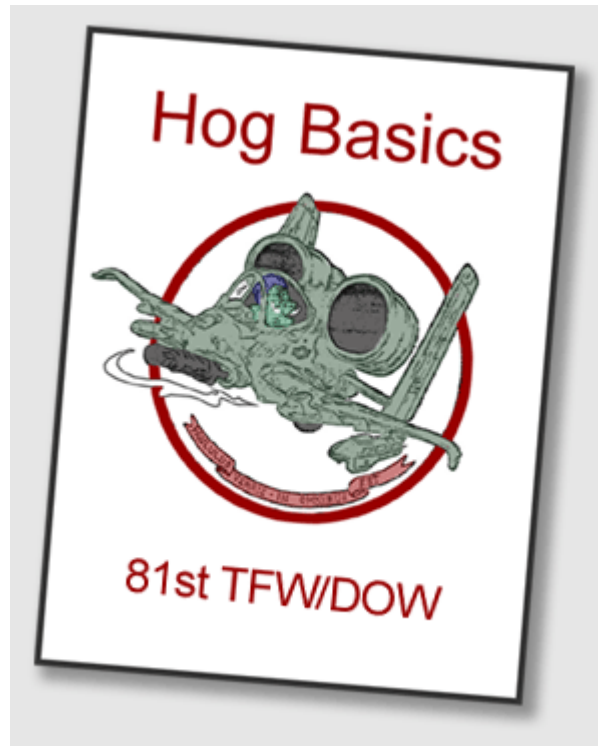
Hog Basics: RAF Bentwaters Tactics Guide, 1982

by **Andy Bush**



Introduction

What follows is part real world info from a tactics guide from the A-10 unit stationed in England in the 1980s... the rest is my attempt to flesh out the guide with additional info. I've made no attempt to specify which is which... basically, the first half is Bentwaters material, and the last half is mine. In any case, the objective is to give you an idea of how to employ Hogs in a low level A2G close air support (CAS) war. LOMAC is going to offer you the chance to fly the Hog as never before. It helps to know a little about how to do this. That's what this article is all about. Take the info... some real world, some written for simmers... and apply it to how you fly the game. Most of it is directly applicable to the game. Regardless of whether you are the flight lead or the wingie, use this info to make your mission more fun and rewarding! Having said that, let's get going!



The tactical partners concept has been with us for quite a while. It's different from the combat paired team idea, but just as important, tactical partners puts a little more burden on the wingman, so you guys who practice saying "two, bingo, mayday, blue lead yer on fire" over your Wheaties every morning might want to read on. As a wingie, you've now got more responsibility and flexibility... you share the responsibility for converting T-72s into rubble equally with your leader. As every SOS grad knows (but has probably forgotten) responsibility can't be delegated — you've got to earn it. This can be accomplished with a little effort, but it depends on your ability to become a "thinking wingman". That is, you've got to know just as much about the tactical situation as the guy who checks you in... and you've got to be capable of functioning independently when the need arises. If you find yourself trying to invent a new way to valsava during your latn route and don't know a "Gainful" from a Studebaker, you're probably not on the road to an effective tactical partnership. If, on the other hand, you spend your missions saying (to yourself, natch) "if I were leading this fandango, I'd be...", then you're on the right track.

When you've developed this attitude, there's one more requirement, but this one's easy. Know the standard terms, formations, and attacks (wake up, lead...this part's your responsibility too)! If you know 'em, and your combat paired teammate runs afoul of a ZSU, you'll still be able to tack on to another lost lamb and get the job done. If you don't, you'll either be ineffective or maybe even run into your new found playmate.

***"...responsibility
can't be delegated —
you've got to earn it."***

Now that you've done your homework and are convinced that you know just as much (or more) about the situation as that guy with the star on his wings, I'll deflate you (just a little). You still have specific responsibilities, as does the leader.

Here they are:

Mutual Support Responsibilities

Lead

1. Think
2. Navigate — find the target
3. Maneuver the formation
4. Plan and execute the attack and egress
5. Mutual support for the wingie
6. Communications — talk to FAC, keep wingie advised

Wingie

1. Think
2. Formation integrity — be where you should be all the time
3. Monitor navigation and situational awareness
4. Mutual support for the leader

The critics in our midst are now saying, "Ahh, this clown's forgotten about RWR indications, checking 6, etc, etc." maybe, maybe not. These aren't all the responsibilities, but they are the basics. If you've got some we've missed, don't keep it a secret. I won't be hurt — promise.

Let's sum it all up: you know you're a tactical partner when lead never has to worry about where you are or what you're doing.

Terms

If the bad guys have their jammers up in force, this section may not do you any good. If not, there are a few little catch words that can make your mission a lot easier. To be effective, these terms must mean the same thing to everyone. Most are familiar, but some might not be. If we use them when flying training missions, we'll use them also when the balloon goes up.

Line. Line abreast formation or attack. The direction is usually specified: "*Cobra...line left.*"

Wedge. Wedge formation or attack. Direction is specified again: "*Cobra...wedge left.*"

Visual. I see my leader or wingman.

Blind. I do not see my leader or wingman.

Tally. I see the degenerate commie who wants to ruin our day.

No joy. I do not see the threat.

Padlock. I see something important and don't want to take my eyes off of it.

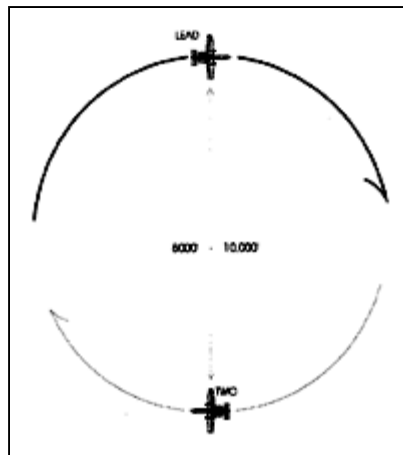
Point. A mutual hard turn to point at each other... a way of clearing each other's six. After passing each

other, we turn back to the original heading.

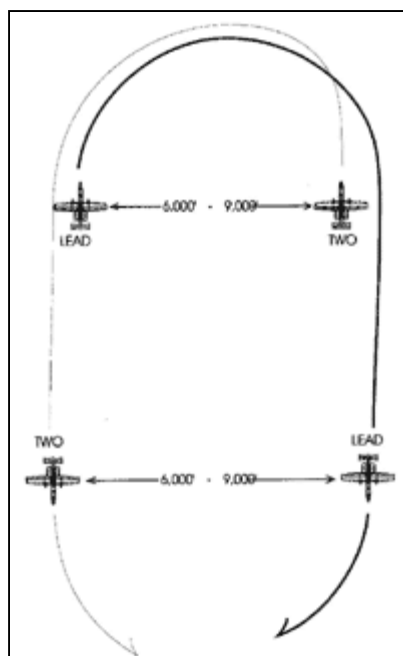
Cross. A hard turn into each other of 180 degrees. Wingie always goes to the outside.

Circle. Circle the Hogs... one way to hold over a specific point. Let's talk about this for a moment. A Hog circle isn't just a leader and a straggler... if you're not on opposite sides of the circle, you don't have mutual support. Entering the circle is relatively easy. Lead calls "circle" and turns hard into the wingman for about 135 degrees. The wingman waits until the lead's nose passes him and then begins an easy turn into lead. Once the wingie starts his turn, the lead reverses back into the wingie, and the circle is formed.

Bone. Another way to hold (also known as "racetrack"). Begun with a cross turn. The lead rolls out of the cross turn and establishes the bone. Another cross turn is used to complete the bone. The straight legs are used for referencing the map, switch changes, etc.



Circle



Bone (or Racetrack)

Use of these terms assumes you have some communications available to you. If you have the good fortune to be able to chat at length, fine. But you may find your comm to be partially jammed or the frequency being used by others. When in a limited comm situation, you need to keep things short and sweet. The **"five point brief"** is designed to pass the critical items for an attack.

Here it is:

1. IP location. The initial point (IP) is the geographical point that the attack starts from. It may be preplanned or assigned on the spot.
2. Attack formation, type, and roles.
3. Number of attacks. (only given if more than one).
4. Egress formation. (only given if different from attack formation).
5. Egress direction or point. (only given if different from IP).

The brief would sound like this:

"Cobra, Bravo 601, wedge, shooter-cover, one shooter, Bravo 602".

This tells the wingman that the flight will depart from IP B601 in wedge formation and that the wingman will fly the cover role for lead. The flight will egress in wedge to IP B602.

One final word of preparation from the lead will be his call for the **"fence check"**. This is a cockpit switches check done prior to entering the target area. Each pilot checks that his armament panel is set up correctly for the weapon to be used. In addition, he also checks that his ECM pod is programmed correctly, his exterior lights are turned off or down, the RWR settings are adjusted for the anticipated threat, and that he has sufficient fuel to complete the mission. The A-10 version of the fence check looks like this:

1. **F** - Fire control systems. Make sure EO, TISL, and weapons panel are set up.
2. **E** - EW systems. Set up ALE-40 (chaff/flare), ALE-69 (RWR), and ECM pod.
3. **N** - Navigation systems. INS programmed, map open to correct location, TACAN set.
4. **C** - Communications. Have Quick (secure radio) and authenticator ready.
5. **E** - Emitters. IFF, TACAN, exterior lights set.

Formations

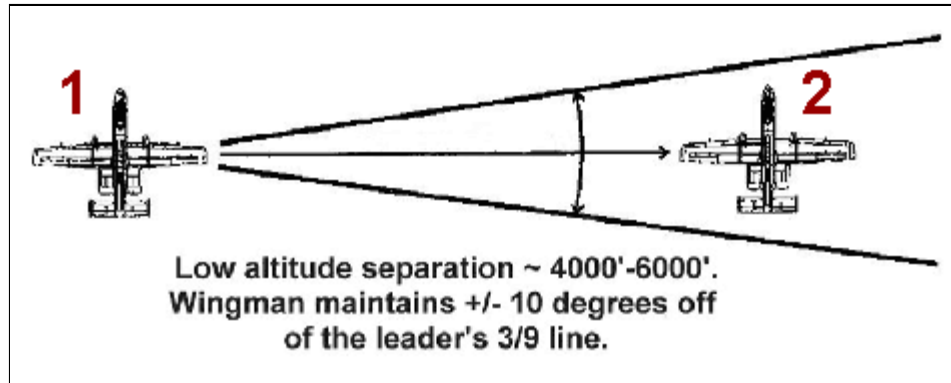
Two-Ship

We've spent a fair bit of time philosophizing on the tactical partner concept and spelling out some of the standard terminology for the limited comm environment. Now, let's turn our attention to formations. Until the state of the art allows us to gesture hypnotically and appear at the IP, you, the Warthog driver, must find a way to get your armada from the home drome to a point at which you can employ it. The formations to be discussed are obviously not the only ones at your disposal... — their success will depend upon a number of factors: weather, terrain, and defenses to name a few, and they must be modified in response to these factors. The formations described are to be considered as wing standards and used as a basis for tactical planning. We think they're good formations, but we don't want to imply that they are the only ones worth using. Flight leads may (and should) innovate, but if every pilot in the 81st remembers a

few standard parameters, things could be a lot easier when you join up with a tactical partner who doesn't know your favorite tricks.

Line Formation

The favorite of many Hog herders. Flying line does some good things for you — good mutual support for both aircraft, both in terms of visual lookout and firepower support (the ability to turn and point the gun at anyone who threatens your partner). On the other hand, it's tougher to fly than others we'll mention... it requires more proficiency from both partners, is difficult for the leader to manage, lacks ease of maneuverability, and is less than magnificent in poor visibility or rough terrain. Basically, line is most appropriate when your biggest threat is enemy aircraft. Here's our shot at a set of standard parameters:



Line Formation

These numbers are based on an average lateral separation of 4000 feet. Use your head though...if you are medium altitude with an air threat, you might want to spread it out a bit, stack your wingie high or low, and set up a weave for visual and pod coverage. On the other hand, if the cirrus makes your partner look as though you were viewing him through a gunny sack, you might tighten it up a tad and remember, when you are low, the wingie always stacks level to high...never low). Four thousand feet of separation in the semi-gork makes your lost wingman drill a little easier, but won't do much for your two-ship employment. Ten degrees of slop is provided both fore and aft for underpowered Hogs, sun in your eyes, etc...but the closer you are to line abreast, the happier your leader will be.

To get into line, a radio call is easiest:

"Cobra, go line."

Once you are in line, you may find it necessary to turn. A couple rules of thumb apply. First, all delayed turns should be made using the same parameters...max power and 3-4 g's. Next, assume that you will be going to line from either wedge or trail. Finally, the leader should use an aggressive wing flash to signal which way the turn will go. Real life used a number of techniques for turning the flight. For our sim flying, let's keep it simple. If you are the wingman and lead signals a turn into you, then he will turn hard into you right away...you remain wings level until he approaches your wingline (roughly your 10:30 or 1:30 position) Then you turn hard to join into line. If lead wants to turn away from you, he'll first wingflash in that direction. You immediately turn hard to that direction...lead will play his turn to roll out in line using you as a reference. Turns of more than 90 degrees are handled as multiples of the 90-degree technique I've just mentioned. As a wingie, vary your g to achieve the proper spacing and line position.

Here's a further plug for tactical partnership...as a rule, he who ends up out in front is responsible for getting back into line. An example. You are waiting along as the wingie when the lead rolls into a hard 90-degree turn away from you. Other than shouting "come back, Shane"...what can you do? The OK answer is to turn to follow...and then wait for the lead to maneuver to put you back into line. After all...he put you into

a lag position...now it's his responsibility to maneuver to get you back into line. Why would he turn away like that and leave you behind? He's probably got a good reason. Let him get you back into line and then he'll probably clue you in on what's going on. Trust your lead...it's part of the contract.

One final responsibility to mention and this one's important. The wingman is responsible for collision avoidance in all turns. It may be all well and good to brief a "lead goes low (or high) procedure, but this requires both pilots to put their attention, at least momentarily, on deciding where low or high is for a given turn...and anyway, you may not want anyone to go high if it means unmasking or exposing yourself to the threat. In this instance, going wide is a better option. If the wingman is responsible, lead can concentrate on turning, navigating, and not hitting the ground. The wingman simply avoids hitting lead...in all cases. Common sense, however, must prevail. No contract authorizes anyone to be stupid.

Wedge Formation

Here's the recommended alternative when all the MiGs are in the washrack, or the weather is delta sierra, or the terrain is such that your partner wets his pants during the first delayed 90 turn. Wedge provides you the flexibility and maneuverability that may be your best defense when conditions get really lousy. It's much easier for the wingie to fly and much simpler for lead to manage. Wedge is an excellent attack formation on its own, and it can easily be converted into line or trail as conditions dictate.

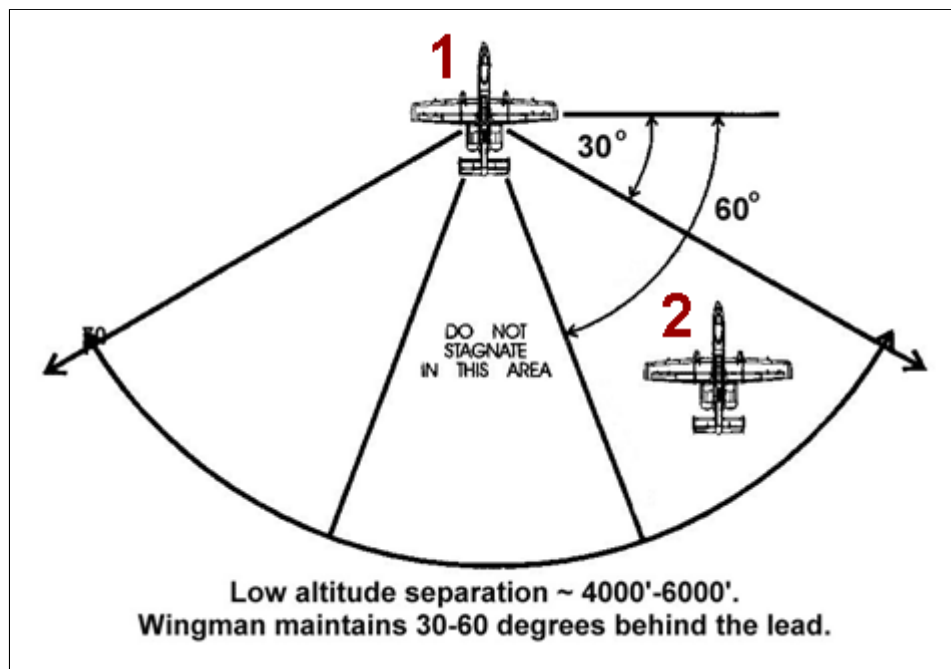
No specific signals are needed to maneuver a wedge formation...the lead turns and the wingie follows. When the turn is complete, the wingie maneuvers to regain his wedge position. The most obvious drawback to wedge is the reduced lookout coverage that lead can give the wingie. For this reason, the wingie needs to keep his own six clear and not trust lead to do it for him. Here's how to fly the formation:



Wedge Formation References
(click on the above for the full screen image)

This formation can be modified to meet the situation at hand. The wingie should strive for a line that is 30 degrees back from the leader...terrain and weather permitting. This allows the lead to keep track of him and provide some visual mutual support. However, there will be situations that require the wingie to fly further back than the 30 degree line...back to as much as 60 degrees...for example, narrow valleys, hard maneuvering, etc. The name of the game in any case is to work to hold that 30 degree position as much as

possible. The wingman is cordially invited to cross whenever that seems to be the thing to do...this flexibility gives him the cutoff needed to hold or regain his position when terrain or maneuvering forces him into lag. The next picture shows a “window” to fly wedge in. Try to keep the leader outside the canopy bow. Right next to the bow represents the maximum angle back that you want to fly...the desired is to put the lead further away from the bow. In LOMAC, you can expand the cockpit forward view to make this easier to see.



Wedge Positioning

One word of caution...getting lazy and dropping into trail is a no-no, except for a very few circumstances (weather, heavy maneuvering, tight terrain). Put yourself in the place of the ZSU shooter...miss the first guy, nail the second! The best way to avoid this is to keep lead outside the canopy bow.

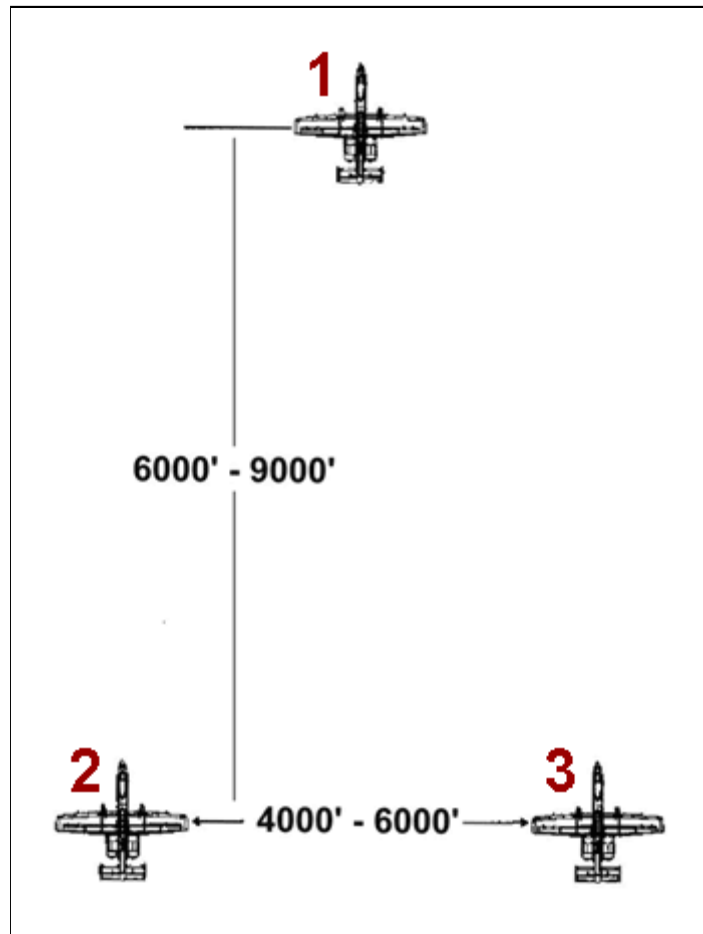
Ménage à Trois (Three-Ship)

For the uninitiated, this catchy little phrase loosely means “doing it with three”. Aside from its everyday context, it has an application in warhogging. Specifically, that situation when you, the head Hog, wind up with two wingmen instead of one. “Oh heresy”, some might say, knowing that the two ship is the standard fighting element and the backbone of our tactics. Well...back off a little. The three ship has a few things going for it. In the formation we’re about to discuss, navigation is easier...the lead has only himself to worry about. Also, you improve lookout and firepower with the addition of that extra set of eyeballs. Finally, you’ve got another buddy ready to leap into the fray when needed...he’ll have to sequence himself in, but that won’t be that hard and the extra firepower will be handy to have.

Certainly there are problems involved too. Three birds are more of a challenge to manage than two, both enroute and in the target area, but this is not an insurmountable problem. We’ve got two recommendations for getting your three ship from point A to point B...vic and wedge.

Vic

The vic formation is a nifty way to arrange your three ship. It combines navigational flexibility for the point man with a good six o’clock lookout for the trailing element. All the pros and cons associated with line apply to the element...and they have the additional responsibility to keep up with the leader. Here’s the vic:



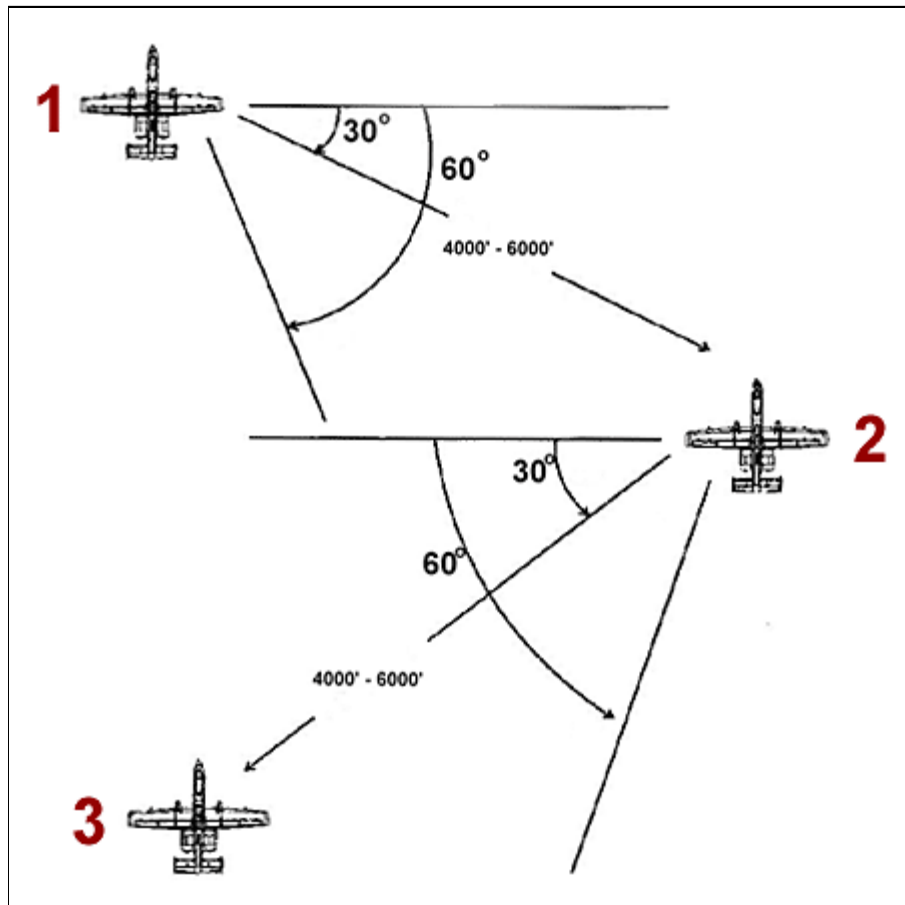
Three Ship "Vic" Formation

To the discerning tactician, this would appear to be nothing more than our standard line formation behind a singleton. Right you are! The only difference lies in the way it's managed.

First, let's discuss the point man...usually the leader. We say that because he may not necessarily be the flight lead...the best way to get the job done is to let the best navigator do the leading. That may not be the designated flight lead...he may choose to temporarily pass off the lead position to another flight member for selected portions of the mission. In this instance, the flight lead will fly as the element lead and retake command of the three ship when the situation dictates...an in-place turn of 90 degrees is all that is required to put the flight lead back in front.

Wedge

Wedge is the other option is available for maneuvering your three ship. In a three ship, wedge works exactly the same as with a two ship as far as formation positioning goes. The wingmen are free to maneuver in their 30 to 60 degree cones. The number three man places himself back off the number two and takes the same spacing that number two has off the lead. The wingmen can cross at will to maintain their spacing and position.



Three Ship Wedge Formation

Four Ship

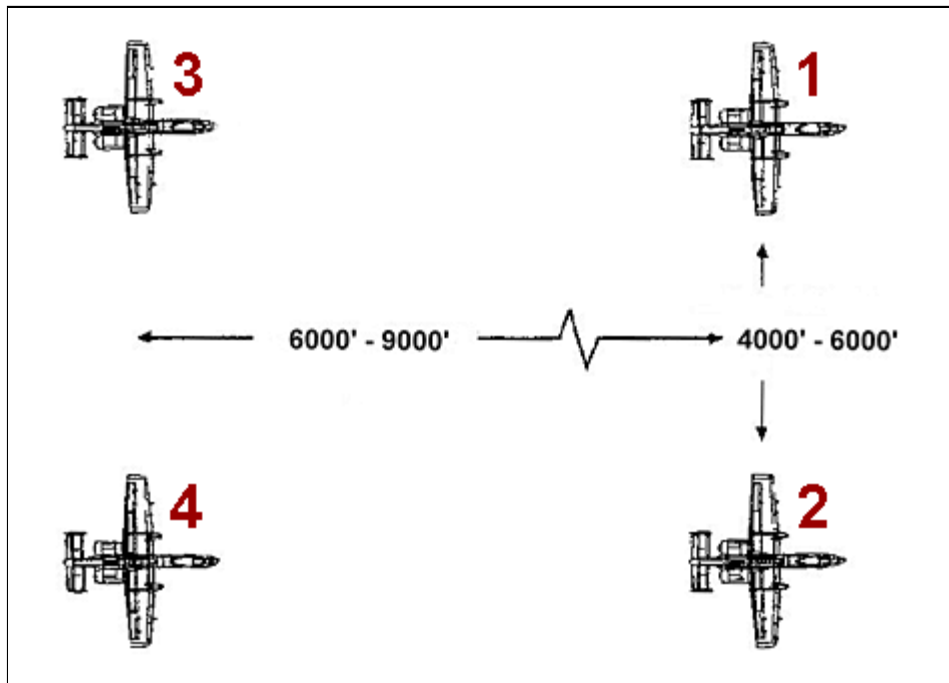
Four ship is not the favorite formation in the Hog community...our tactics are based on the two ship...so this is not an attempt to escalate our CAS missions into "thousand plane raids"...but there are situations where more firepower is needed, and you can't hack it with two. The recommendation here is to hack it with more than a single pair...we'll call it "sequenced" or "coordinated" two-ships.

It may or may not be necessary to get to a given contact point (CP) with all the Hogs at the same time. If not, your problem is solved...take your wingie and get to the CP on time. Let the other lead worry about his arrival time.

But this may not be an option. You may have to get there in a four ship. If so, then I suggest multiples of the formations already discussed (line and wedge). The rationale for choosing one over the other is exactly the same as for the two ship rationale...when navigation, terrain clearance, or weather becomes a problem, drop into wedge...otherwise, fly line.

Box (or Card)

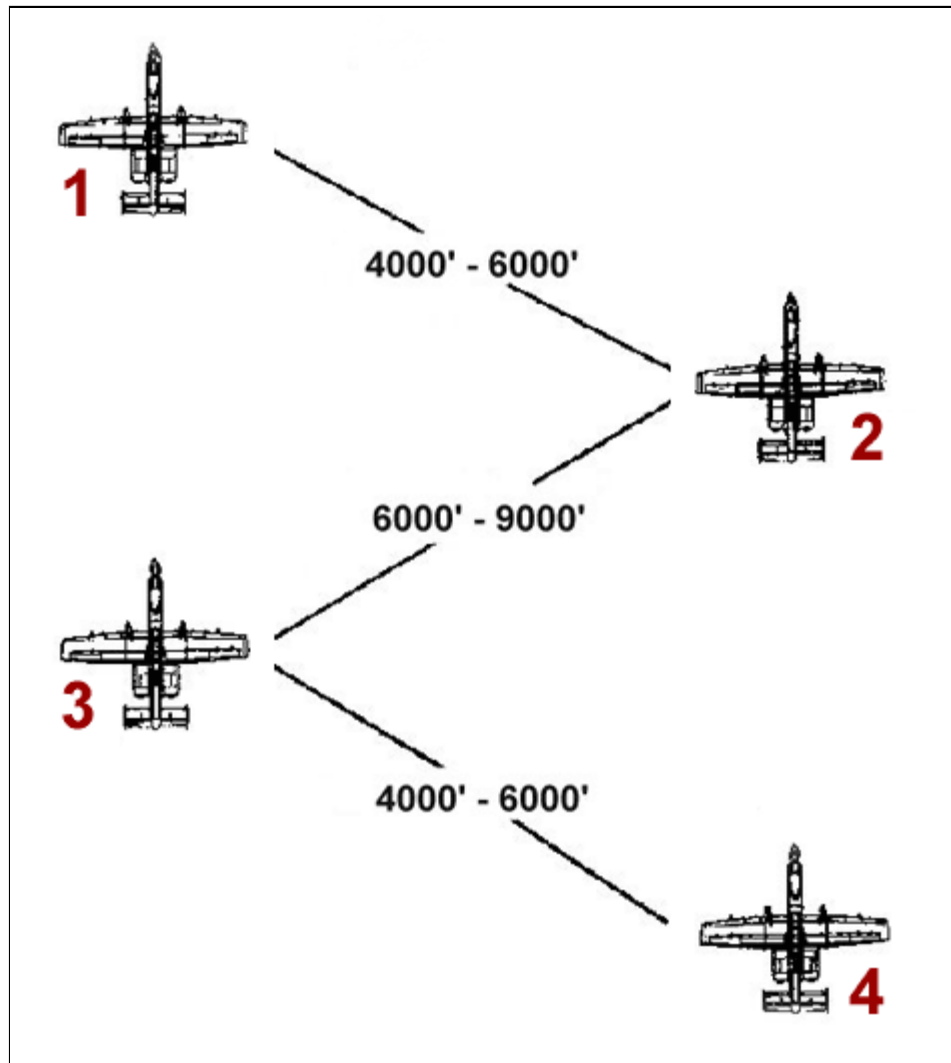
Do not fly four ship line in a line abreast formation. Instead, fly the elements in standard line and position the second element behind and offset. Call this the box or card formation.



Four Ship Box Formation

Wedge

Four ship wedge is formed much the same way...two elements in standard wedge with the second element staggered back on the wedge 30-60 degree angle.



Four Ship Wedge Formation

The Airborne Flight Planning Room

Congratulations, big guy! Through your canny use of standard formations and procedures (and your own bag of tricks at times), you've brought your Hogs to the contact point unscathed. Now the tough part begins! Unless you were fragged against a specific target and got your ducks in line before takeoff, you'll have to choreograph you act at the CP. Obviously, you'll need some more information before you can start. The standard forward air controller (FAC) briefing is the most likely source for this info... you remember its main points: target location, heading from IP, distance, time, location of friendlies, best bailout direction, wind speed and direction, the name of the FAC's parakeet, etc, etc. This can all be very helpful (well, we'll forget about the parakeet)... but the important point is this. You can plan your entire attack when knowing only the target location. Everything else is gravy.

***"You can't plan an attack
while warting along
at 100 feet or less."***

But there's one glaring limitation to this concept. You can't plan an attack while waiting along at 100 feet or less. You'll probably have to slow things down a bit and set up a holding pattern at the CP. What kind of holding pattern? We've already mentioned a couple of options...the "bone or racetrack " (crossturn holding) or the circle... take your pick. Once in the hold, use the time that is available to... (1) get the FAC briefing and plot it out on your map, or (2) if FAC instructions are not available, plot the target on your map and work out your own plan.

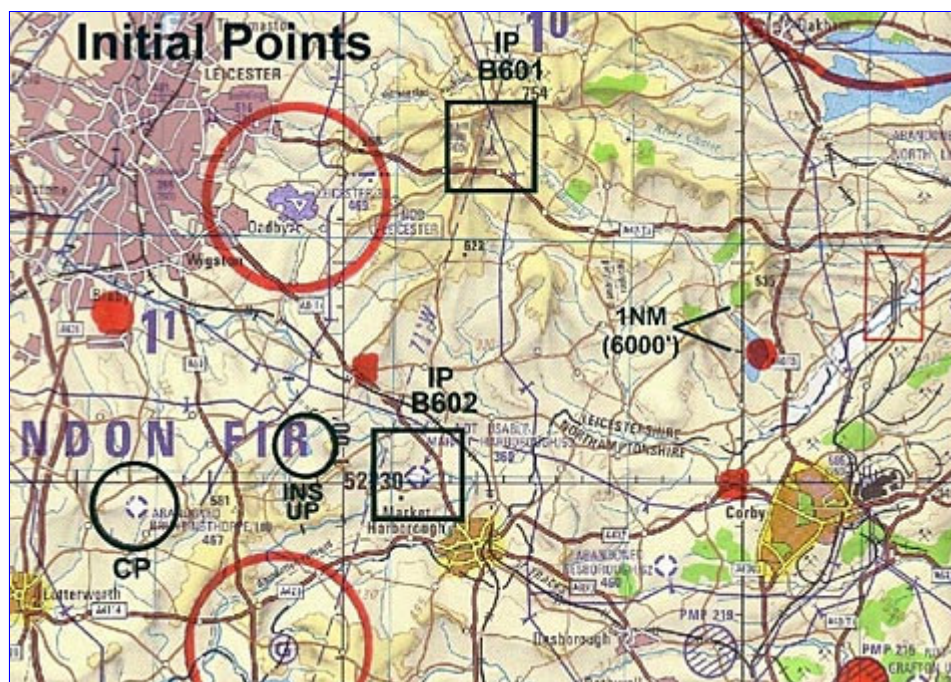
Let's talk about the second option... making your own plan.

We'll start with our flight at the CP. You are far enough from the target to allow a little planning without being distracted by glowing golf balls or flying telephone poles... as for an air threat, that's what the wingie looks out for while you are doing the planning. You've got the target coordinates... first, refold your map so that the target is centered. Now check the map for the "big picture". Since an unobserved ingress to the target is a most desirable thing, let's begin by getting a good overview of the terrain. We want to look for terrain that does two things for us... (1) allows us to remain masked for as long as possible as we approach the target, and (2) consists of readily identifiable features that we can easily find in the heat of battle.

This map study begins with the locating of the IP that we will use to begin the attack from. If possible, try to plan at least two IP's. Look for vertical terrain or features such as towers that you expect to be able to easily see when on the deck. This vertical feature does not have to be the IP... it only needs to be close enough so that you can easily find the IP.

For this article, I'm going to use a map that I had when flying Hogs in England. We used to make up practice scenarios and would fly simulated attacks from them. One of my favorites was west of Bentwaters and had some nice terrain features to work with. The following map is the exact map I used. There were real life areas that we had to avoid (such as airfields and little old ladies that didn't like jet noise). I colored these red and designated them as SAM avoidance areas or friendly no-fly zones, etc. On this map, you will see two IP's (Bravo 601 and 602). B601 is a 200' tower on the top of a hill, and B602 is an old WW2 airfield (Market Harborough). The CP is another WW2 airfield, Bruntingthorpe. Our jets had an inertial navigation system (INS), and so I included an INS update point (a small lake) that we would fly over enroute from the CP to either IP. The target in real life was a bridge, but for our scenario purposes, it could be anything we wanted. The large red circles to the east of the target (RAF airfield no-fly zones) represented enemy SAM rings, and the smaller red circles to the west of the IPs represented friendly no-fly zones.

To get an idea of the scale of this map. Look at the vertical grid lines. Those tick marks are one nm in length (6000')... so for a typical line formation, an A-10 flight would be one tick mark apart or less.



Tactical UK Map
(click on the above for the full screen image)

Ok... back to the map study. Next, check the terrain between the IP and the target. Plan an ingress route that follows the terrain... your game plan is to keep that terrain between you and the target as long as possible. That means you may not fly a straight line from the IP to the target. In fact, if you use terrain wisely, it's a good bet that this will be the case. Your heading plot to the target only gives you a general bearing to fly... it's your use of the intervening terrain that will often spell success or failure when it comes to the element of surprise.

Now, with the map features in mind, consider the type of attack formation and tactic that is best suited for your specific circumstances. Begin this assessment by looking at the target itself and the anticipated threat. The nature of the target will determine whether you fly a simultaneous or sequenced attack and will also determine the shooter and cover roles for the flight. If the target is a unitary object and is heavily defended (like a bridge), then you might choose a shooter/cover, one pass/haul ass attack. On the other hand, if the target is made up of numerous objects that are lightly defended (such as a truck convoy), then you might consider a simultaneous shooter/shooter attack.

With the general game plan in mind, now reference the map for "action points"... these will be readily recognizable features that you will use to transition from the low altitude ingress to the actual weapons delivery pass. It is the point that you typically "unmask" to begin the weapons release run in. Depending on attack delivery, this will either be the "bump" point (for gun and maverick attacks) or the "pop-up" point for dive bomb attacks. This action point varies with type of weapon and may be as close as 2nm for a gun attack to 5nm for a maverick bump. If no terrain feature is available, then plan a back-up time to fly from the IP to the action point... but this should be considered a poor second choice since timing can go bad in the heat of the moment.

Let's look at our UK scenario map again. The rising terrain east of IP B601 is a good 5nm action point, and the powerline/road intersection east of IP B602 should be easily recognizable as well.



Action Points
(click on the above for the full screen image)

Finally, plan your egress. Don't be predictable...going out the same way you came in is not nearly as good as having a different egress route that uses terrain to hide behind. This is where having more than one IP comes in handy...you ingress from one and egress to the other. With these ideas in mind, let's move on to the actual attacks themselves.

Two Ship Attack Tactics

There are several major considerations when putting an attack together. We begin with the two factors that directly pose a problem to mission success... target defenses and weather. The lethality of the target defenses determines the number of attacks as well as the type. Weather can be a problem is restricting visibility... this has a direct impact on the lead's ability to control his flight... and this then may limit lead's options in building his attack plan.

Once the leader has considered the target and weather restrictions, then and only then can he turn to crafting the actual attack. In putting this plan together, the lead has to decide on **attack formation**, **attack roles**, and **attack timing**.

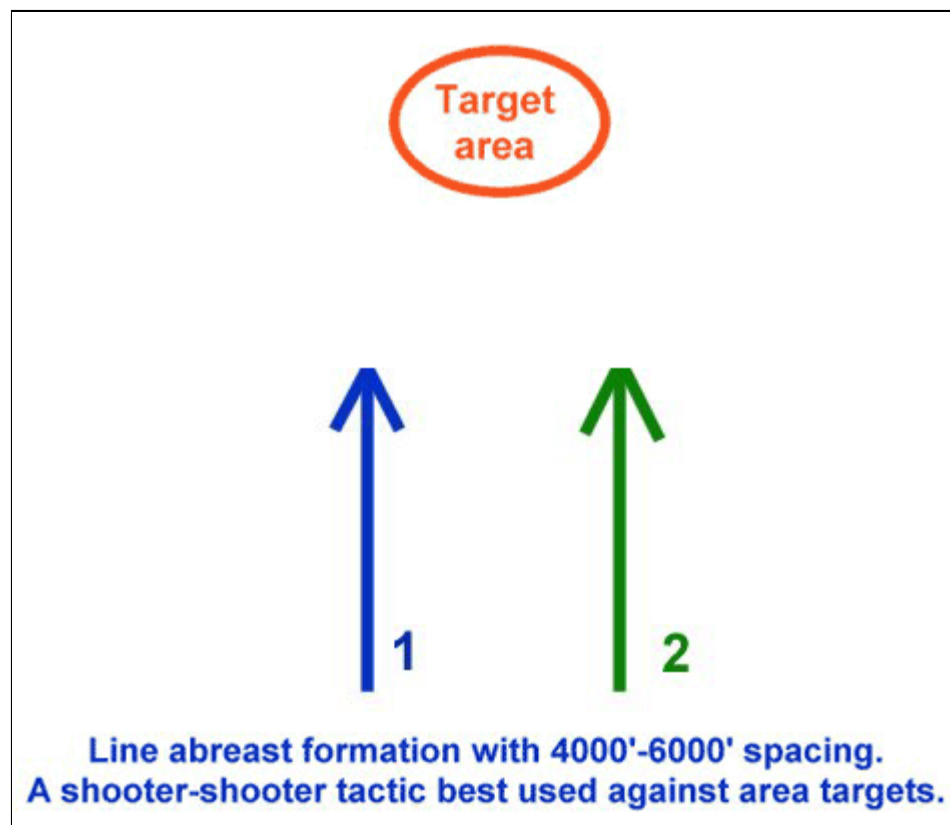
Attack Formations

There are three primary attack formations...*line*, *wedge*, and *split*. Each has plusses and minuses when we factor in target defenses, terrain, and weather.

Let's discuss the first primary attack formation, *line attack*.

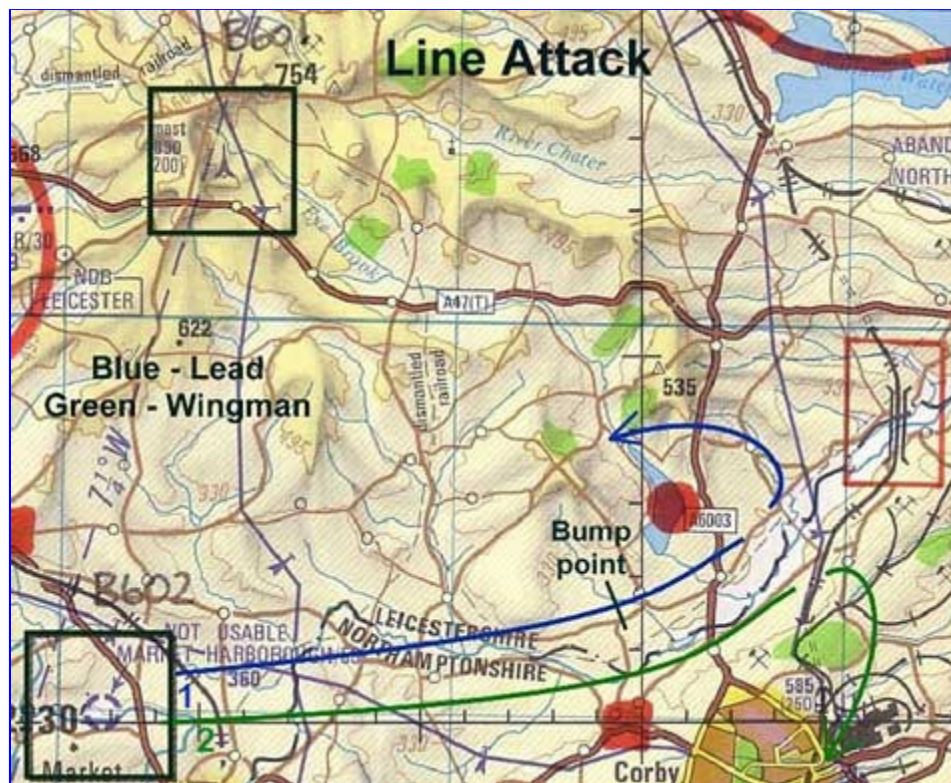
Line Attack

The line attack concept has the attackers in a side-by-side formation at the point of weapons release. This results in maximum ordnance on the target in a given period of time. This attack formation is excellent for large target areas such as truck parks and long convoys. Since flight path deconfliction is always a concern, we want the targets to be separated so that the two shooters don't run into each other! A drawback of line attack is that both shooters are concentrating on their attacks and not checking six.



Line Attack Formation

Another limitation to line attack is that the formation is hard to maneuver in difficult terrain...line is easier to manage in relatively flat terrain. Also, if the weather has resulted in limited visibility, line may be more difficult to fly. Here is what the attack looks like in general. Threat level permitting, we'll depart the southern IP (B602) and make a line attack up the relatively flat river valley, using the city of Corby as a bump point. Here I have the flight egressing opposite each other to split the threat.



Line Attack Map
(click on the above for the full screen image)

Line is best suited for gun and Maverick attacks. If planning a pop-up attack to a dive bomb delivery, you may want to consider the "split" tactic (to be covered later). Gun and Maverick max range is really a function of target acquisition and identification...in the real world, you can count on maximum gun range being no more than 2nm...and that's against lightly armored targets. To kill a tank, you'll need to get closer. Seeing the target also limits Maverick range...so use about 5nm as the number (the Maverick missile video is magnified so you can double the 2nm gun range). So for line gun and Maverick attacks, expect your action points to be about 2nm and 5nm respectively.

Let's stop right here for a moment and talk briefly about altitude and airspeeds. This article assumes a high threat, European-type scenario, typical of what we dealt with in the 1980s. European terrain varied from relatively flat in northern Germany to hilly areas in the central and southern parts of the German border. The Hog is a slow beast to accelerate when loaded up with Mavericks or other external stores...we typically got about 300-350KIAS out of the jet on a good day. Don't believe that hoopla you may see about the jet's top speed of 400+...that's a marketing number that you'll only see going straight down in a power dive! At normal ingress speeds, you'll cover about a mile every 10 seconds...keep this rule of thumb for later when you consider actual attack planning.

In this European scenario, we flew at low altitude. In this context, "low" meant below 300'. 300' might have been ok for navigation to the target area...going below that made navigation more difficult since you saw less of what was coming up and going by...and the threat of ground collision siphoned off your concentration to the point where at 100', nearly all of your time was spent on not hitting the ground. At 100', checking six and navigating over unfamiliar terrain become very tough to do.

So...for high threat, low altitude ops...plan on navigating at about 300' and 300kias...in the attack itself, you can drop down to a lower altitude as conditions permit and push it up to max speed (but don't hold your breath!). Think 300/300 and you'll be OK! Now...back to the actual attacks...

We were talking about the line attack. The lead departs the CP and navigates to the IP...the attack begins from the IP. At the IP, the lead radios that he is departing the IP...this is for the wingman and the FAC if one is being used...and the lead orders the wingman into line if needed. Because of its relative unmaneuverability, line attacks tend to be "straight in affairs"...the lead departs the IP on a heading and maintains that approximate heading all the way to the action point. From this, you may assume that terrain masking is not an item of special emphasis.

Outbound from the IP, the wingman concentrates on holding his line position and monitoring lead's navigation...which leads me to digress again!

Unlike in some other fighter types, the A-10 wingman is expected to maintain a high sense of situational awareness (SA). This means that the wingman needs to keep up with what's going on...primarily navigation. The Hog wingie has his map out and is following the route of flight at all times. There is little "welded wingman" philosophy in Hog ops..."welded wing" means the wingie maintaining his position but contributing little else to the flight. In the Hog, the wingie is expected to be a thinking member of the flight, ready to step in with whatever help the lead may need. So, if you are the wingie, leave the "fat, dumb, and happy" mentality in the o'club...once you strap the jet on, you're a 100% player!



Ok...sorry! I had to get that plug in because our Hog tactics require a very strong sense of mission involvement from all flight members. Back to the line attack!

Your separation in a line attack is the same as before...about 4000'-6000' and + or - 10 degrees off the 3/9 line. As in any formation, the wingie stacks level to slightly high off lead...doing so helps insure the wingie doesn't inadvertently hit the ground. But the ground is still a major consideration, so the wingie in the line attack should concentrate on his 12 o'clock and only crosscheck his lateral spacing and alignment...and take a peek at the flight's six every so often as well.

Why? Because in doing so, the wingie can also help navigate, check for threats in the target area...and most importantly, acquire and prioritize his target. This means the wingie should acquire the target area and then isolate a target on his side of the target formation. He does not want to accidentally focus in on a target on the lead's side because of the impending flight path conflict that may arise with the lead.

Either flight member should call the first tally of the target, noting range and clock position off the flight's nose...such as "Tally ho! Two has the target at left 11 o'clock, 5 miles". While either flight member can call the tally, the flight lead still controls the flight...if the wingie calls the tally, the lead must confirm that sighting before the flight can attack. In the case described, the lead should then look for the target and call either "tally" or "no joy". If "no joy", the wingie should continue to provide directive info to the lead. As a rule, wingie's do not attack without clearance, although the lead may brief this in specific instances. If the lead does not get a tally in enough time to meet weapons parameters, then he may well be advised to "hook out" and return to the IP for a reattack. A "hook out" is a 180-degree hard turn...in other words, a retreat!

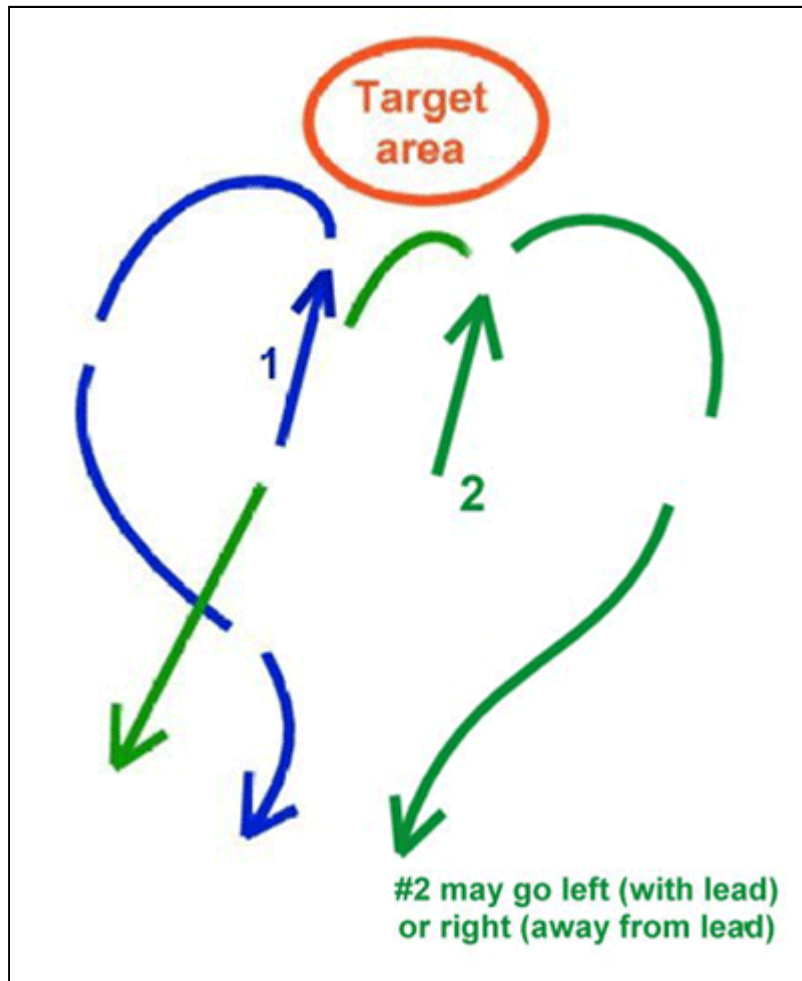
Why the trepidation? Why not give the wingie the lead and let loose the dogs of hell? Well...there may be a time when such a thing could happen. The lead may know that the bad guys are the only act in town. But in a CAS situation, this may not be the case. Any time there are friendlies around, the wise lead maintains a firm grasp on his flight. He does not want any "short rounds" (a "short round" is an inadvertent release on a friendly position...these days we call these "blue on blue" or "friendly fire" incidents). So the wingie's responsibility is to check 6, navigate, and check 12...and talk the lead's eyes on the target.

So much for the what if's...let's assume the lead has the target area in sight. He calls it out...the wingie calls the tally as well. The next thing to happen is for the flight to reach its action point...the bump up point to unmask and set up for the gun or maverick weapon release. At the action point, the lead calls "up" and begins a shallow climb. As lead unmask, so does the wingie.

Both are now focusing entirely on target selection. For both a gun or Maverick attack, now is the time for each shooter to assess the target array and select his target. The rule of thumb is AAA first and targets second, assuming more than one pass is anticipated. Each Hog driver scans his area of responsibility for threats...ZSU's, for example. RWR volume is up high enough that the pilot won't tune it out in all the excitement. Pods are nice, but an eyeball on the threat is better. Hear it, see it, kill it. Hear it, don't see it...hook out to reconsider the problem. Do not drive into an audible threat environment without a tally on the threat! Killing a truck at the expense of your wingie or lead is not an acceptable trade-off.

At some point, we'll have to break off the attack. Normally this is after taking your shot...but it could be before. How? When a flight member sees an unobserved threat to the other flight member. Or in the case of target fixation...you as the lead have taken your shot but notice the wingie continuing to bore in. This is not unusual, particularly in Maverick attacks. Sometimes getting a Maverick lock can be a challenge, and it's easy to get all wrapped up in the TVM...and lose SA big time. This is when the other flight member steps in and calls off his buddy..."Two, jink out now!!".

Whether you break off on your own after shooting or are called off, the direction you go is up for grabs. Some flight leads pre-brief this as a matter of personal preference. In a line attack, some like for the flight members to break away from each other...one goes left, the other to the right. The idea is that this compounds the enemy aiming problem. Others want the wingie to break away into the lead who will break to the outside. Breaking away can cause the flight to lose sight of each other...and breaking the same way can draw enemy fire towards the flight in a greater concentration...it's a flip of the coin. Personally, I favored the opposite break in a gun attack and went with the break into method when at the longer range of a maverick attack. In any case, the lead and wingie call the direction of their break..."One's off left".



Line Attack Egress Options

OK...that's the line attack. A number of the conventions I discussed, particularly the egress options, will apply to the other types of attacks as well.



Two Ship Attack Tactics (continued)

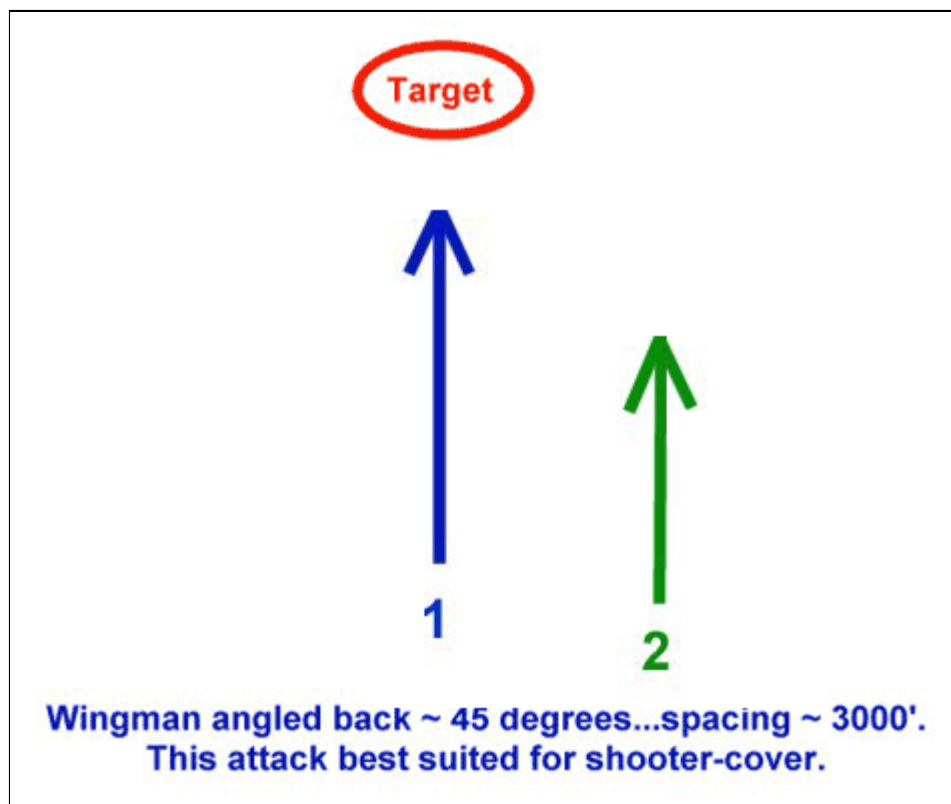
The second primary attack formation is the *wedge*.

Wedge Attack

You can do everything in a wedge attack that you did in the line attack and use the same conventions. While I stressed flying a forward wedge position when navigating a route, when it came to the wedge attack run-in, I tended to favor a slightly more rearward position for the wingie...instead of pushing the 30 degree back angle, I went with about 45 degrees...maybe as much as 60 degrees depending on the particular attack objective. Here's why.

In the previous paragraphs, we flew line as shooter-shooter...you can do the same in wedge. Most likely, you are in wedge because of terrain and/or visibility issues. Once the lead rolls out on his final heading, then the wingie needs to move forward to the 30-degree angle. At the action point, both pilots unmask and fly their attack roles as we have already described. Wedge attacks usually are limited to gun and Maverick deliveries...just as in the line attack.

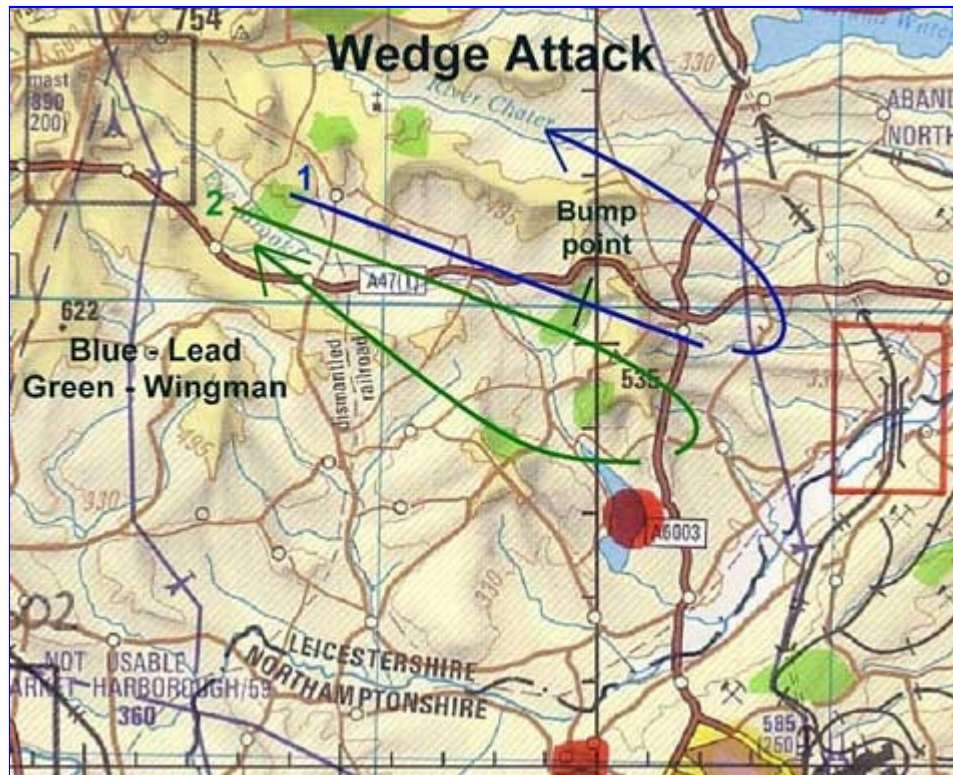
But, we can change our attack role in wedge...we can go to a shooter-cover technique. In shooter-cover, the person leading the attack (this could be either the lead or the wingie) shoots and the other flight member flies in a wedge position and usually does nothing but provide a visual lookout of the target area.



Wedge Attack

This attack technique (let's call it a tactic if you want) is well suited to high threat situations. The idea is that the shooter is going to be maxed out with getting the weapon on the target... the cover man is going to be there to keep him out of trouble. The cover man has two responsibilities...detect threats to the formation and prevent shooter target fixation. In the event either situation occurs, the cover man usually calls off the shooter and breaks him away from himself...unless that would take the shooter into the threat...then the cover will break the shooter away from the threat (and into himself). There is a second option... the cover may expend on a threat if he can do this without sacrificing his ability to cover the shooter.

Let's go back to our scenario map. This time the flight will depart the north IP (B601), ingress at low level to the southeast, and use the rising terrain just west of the target to mask their approach. The bump point is the ridge line...the flight will climb to establish line of sight with the target...and no more. As the lead crests the ridge, he should be acquiring the target.



Wedge Attack Map
(click on the above for the full screen image)

While the cover's primary job is to protect the shooter, he may shoot a threat if the situation presents itself...but he won't delay calling the shooter off just to take a shot.

I'm showing the flight egressing opposite again...but this is just an example. A good case could be made for a same direction break as well. Regardless of direction, each flight member finds some terrain to get behind, makes sure he is heading back to the IP, and then looks for the other flight member. Egress in that order... protect yourself in the pulloff, choose an egress direction that will continue to protect you... and then worry about mutual support. Getting bagged because you want to fly a nifty formation position in the egress is dumb!

Two Ship Attack Tactics (continued)

The third primary attack formation is the *split*.

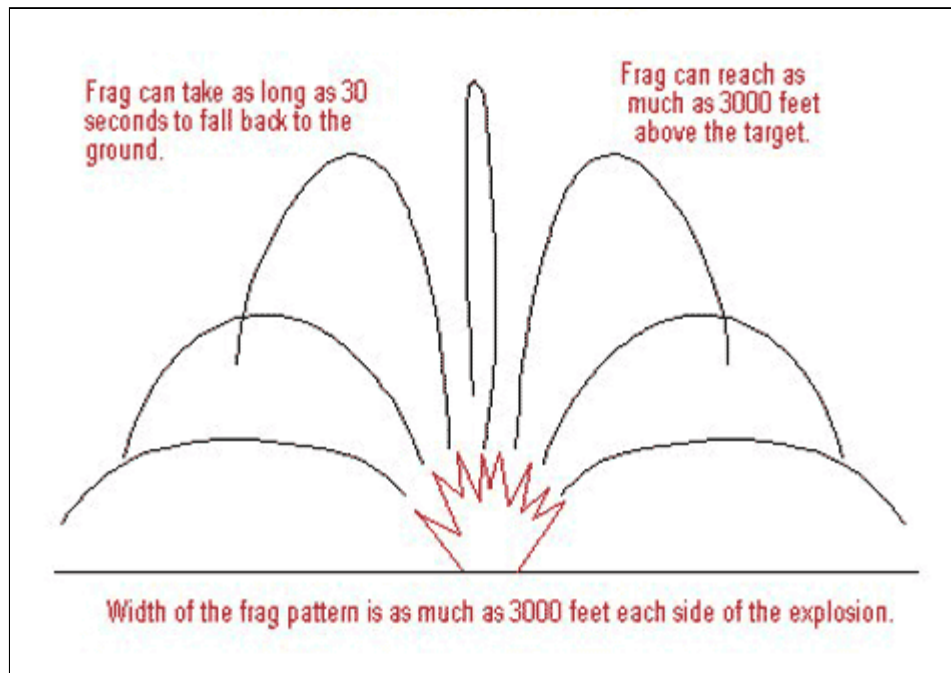
Split Attack

Up till now, we've talked only about simultaneous attacks...those where both flight members attack essentially at the same time or in the same formation. The flip side of that coin is the sequential attack...one where the flight members attack with an interval between them. This raises the question of why the need for a sequential attack.

One answer is to consider the weapons being used. In our discussion of simultaneous attacks, we only considered gun and Maverick attacks. But we have free fall ordnance as well as

forward firing ordnance. What about a bomb attack? Is there something unique about a bomb attack that sets it apart from a gun or Maverick attack? The answer is yes.

Bomb attacks present a weapons frag problem that we didn't have to be too concerned about before. In a gun or Maverick attack, we do not overfly the target as a rule...these are "stand-off" weapons. When making a bomb attack, however, you will usually overfly the target (the exception is a loft or "toss" attack). When we attack a target in pairs, we have to be concerned about our weapon frag pattern. Typical frag patterns for a single weapon have a radius of 3000' and a height of at least 1000'. Time is also a consideration...we think of a frag pattern as having a duration of about 30 seconds.



Typical Frag Pattern

With these numbers in mind, we can see that a typical line or wedge formation spacing might endanger one of the flight members. We get around this frag problem by increasing the spacing between the flight members...we do this by "splitting" the flight to increase their separation, hence the name, "split attack".

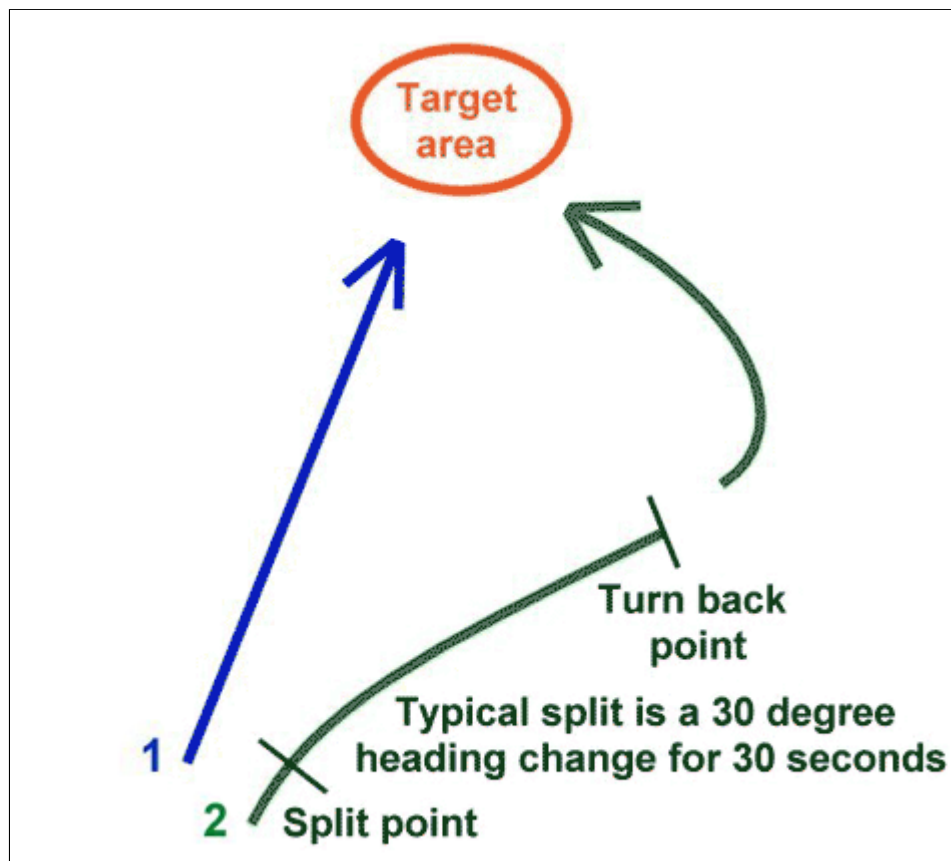
Besides solving the frag problem, the sequential attack is also useful for dividing the enemy's attention during the weapons release phase. By increasing the distance between the flight members, we make it harder for the enemy to bring them both under simultaneous fire. Regardless of objective...frag separation or deception...the way to achieve a sequenced attack is to employ split tactics.

The split attack is begun from line or wedge formation. The flight ingresses in either formation...the "split" is done at the action point. This action point is not the same as the one previously mentioned...this "split" action point is located at a greater distance from the target. Splits require considerable pre-attack planning and are best used when specifically briefed before hand. Here are some typical split attacks.

Single Split

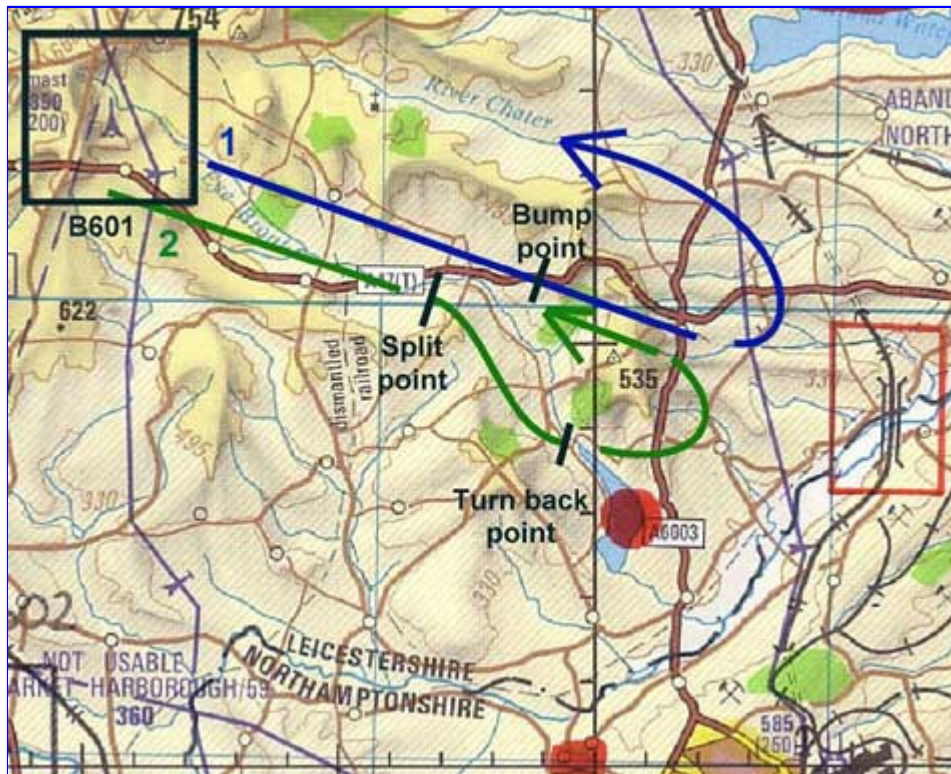
The single split attack is often flown from a wedge formation. In this attack, the lead attacker makes a direct approach to the target while the wingman splits at

the action point. The wingman's change in heading is the primary mechanism for achieving the time and lateral separation. In general, the further out the action point, the fewer degrees of heading change required. A 30-45 degree heading change that is maintained for about 30 seconds should be sufficient to give the wingman a minimum of 30 seconds spacing over the target.



Single Split Attack

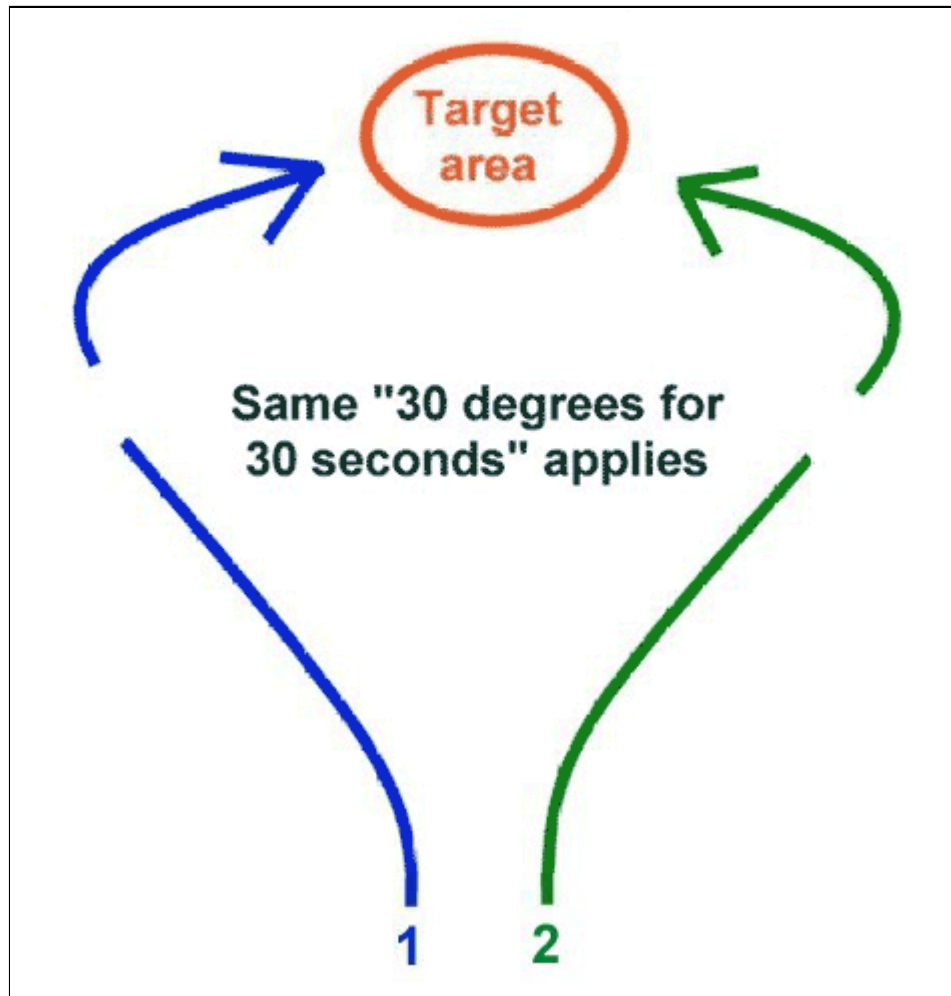
After the first attacker has made his post-release breakaway maneuver, he should turn to acquire a visual on the second attacker. In doing so, he can provide a measure of mutual support. As the second attacker comes off his attack, the first attacker is in a good position to direct the other's egress heading and get the flight back into mutual support. Looking at our scenario map, we see the wingman splitting off to the south. In this drawing, if the flight was dropping bombs, their flight path lines would extend all the way to the target...as it stands, I think you get the idea.



Single Split Attack Map
(click on the above for the full screen image)

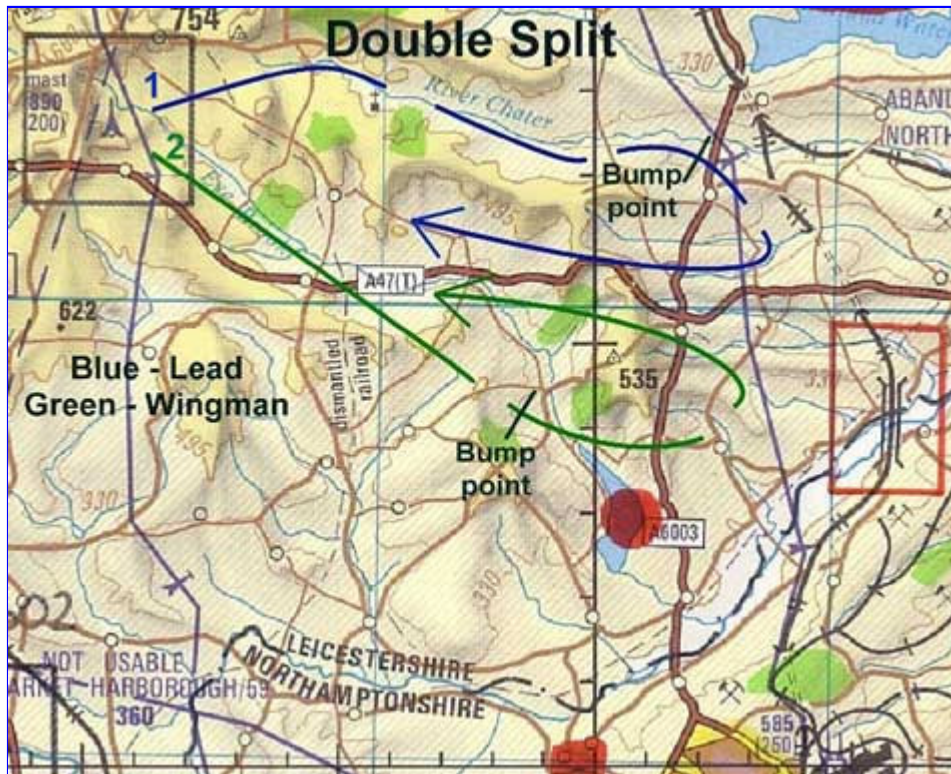
Double Split

The double split is often flown from a line attack formation. In this split, both attackers turn away from each other for about a 30-45 degree heading change. They hold the new heading for approximately 30 seconds and then turn back into the target to set up their attack bump or pop-up. This technique achieves more of a lateral separation than time...but is suitable for providing the necessary lateral frag separation as long as the attackers do not attack targets on each other's side of the target area.



Double Split Attack

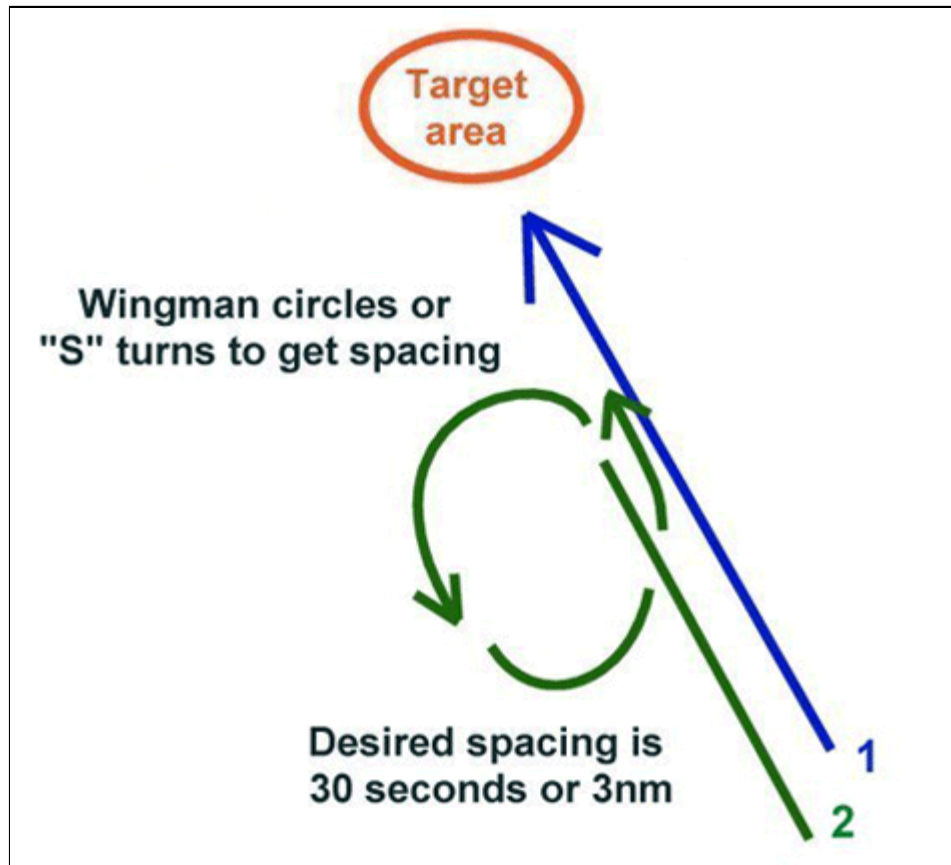
In the pull-off, the attackers may turn inward or out, depending on the threat. An inward turn may allow the attackers to regain a mutually supportive formation alignment sooner and is useful in low visibility situations. In a high threat environment, the turn away may be more appropriate. In this case, it is important that each flight member follow the briefed egress plan in order to regain sight of each other. Going again to our map, we see the flight members departing the north IP. The lead splits north and ingresses down the flat valley while the wingie splits south and uses the rising terrain to mask his approach. When they both climb up for their individual attacks, their attack axes are almost 90 apart, thereby forcing the bad guys to split their defense.



Double Split Attack Map
(click on the above for the full screen image)

Trail Split (or B'nai)

Another term for the trail split is "B'nai"...this word comes from an Israeli name for a type of trailing attack. The trail split is often flown out of wedge. This technique is particularly useful in rising terrain. The idea is that the wingman is free to take spacing at the action point. Exact headings and times are not specified. The lead essentially bores in on the target while the wingie maneuvers into a trailing position. The emphasis in this position is on time, not actual position off of lead. It is not necessary for the wingie to be behind the leader. Instead, the wingie is tasked with maintaining a visual on the lead in order to provide mutual support... and he must achieve about 30 seconds of separation over the target. Ideally, the wingman should strive to turn back towards the target and begin his run-in about the time the leader unmasks.



Trail Attack

In our map scenario, the wingie uses an “S” turn to get the needed spacing. No matter. The wingie does what is needed to get his spacing.



Trail Attack Map

(click on the above for the full screen image)

In the B'nai egress, the leader makes a hard initial turn away from the wingman's attack direction. The lead is looking to make a turn of about 270 degrees and should be in the final portion of that turn as the wingie pulls off the target. As the wingman breaks away, the lead is in a good position to quickly regain a supporting formation position.

Forward Air Controller Concepts

No discussion of CAS would be complete without a mention of the role that FACs play. There are a number of types of FACs... let's just stick with the traditional airborne or ground FAC that is supporting friendly ground forces.

Regardless of whether the FAC is in an aircraft or in a jeep on the ground... his mission is the same... provide you with the info needed to get iron on to the bad guy's heads. As you might imagine, communications are the linchpin of FAC operations... if the FAC cannot talk to you, his participation is nullified. In real life, we use a variety of methods to ensure the success of pilot-to-FAC communications. These include secure radios (Have Quick), brevity code techniques, and authentication devices.

***"...if the FAC
cannot talk to you,
his participation
is nullified."***

Let's assume that comm is not a problem... and move right into the nitty-gritty. We'll start with the FAC himself. Typically, he will be a fighter pilot on special assignment as a FAC. If not, he certainly has been schooled in fighter operations. More to the point, the FAC you encounter over the bad guys is most likely someone who has "been there and done that". He has to have his sierra in a tight little bag because a lot of folks (including you) are going to have their lives in his hands when the bombs start falling.

Long before you ever get to the target area, the FAC has gotten the situation from the local ground commander. He knows where the bad guys are... and are not... and most importantly, he knows where the good guys are. He has familiarized himself with the target area and has definite ideas about attack axes and weapons types. In a word, he's in charge.

When you arrive in the general area of the target, you should go to the contact point (CP) and do just that...contact the FAC. This is called the "fighter check in". Your message to him is very simple...what you are, how many of you there are, what you are loaded with, and how much time you have before you must return to base (playtime).

Your initial call is to authenticate the FAC...and he authenticates you. Once the authentication is done, then you provide the FAC with your flight data:

1. Call sign.
2. Mission number (if appropriate).

3. Number and type of aircraft
4. Ordnance and fuzing (for a single aircraft)
5. Playtime

This would sound something like:

"Cobra 20 is inbound with two Hogs, two Mavericks and four CBU-58, and we've got 30 minutes playtime."

His initial response will be to give you the target area basic info:

1. Abort code
2. Rendezvous info
3. Deconfliction instructions
4. Intel update
5. Altimeter setting

The abort code is often based on a common letter-based authentication system. The system works this way. A table of letter combinations is published daily. Each participant has a coding device to decipher the code. One party gives the other a two letter combination such as:

"Lima Bravo" (the names for the letters L and B).

The other party looks up that combination on their coding device...the resulting decode will come out as a single letter. That party will then answer with that letter:

"I authenticate Charlie" (the letter C).

The FAC will give the abort code as the first two letters...the fighters will then look up the proper one letter decode...that single letter will be used by the FAC if he has to order the fighters to abort (break off the attack). In this manner, no one acknowledges the abort code until it is actually used.

Often, the FAC will want to give the fighters a vector to allow them to join up with him before the attacks begin. This is the "rendezvous" part of his initial message. An important part of the rendezvous instructions are the deconfliction rules... the FAC will tell the fighter leader an altitude not to go below so that the FAC and fighters are separated in the case that they do not initially see each other.

In the intel update and altimeter part of his initial call, the FAC gives the fighters any pertinent info regarding the target area defenses as well as the local altimeter setting to be used for bombing deliveries.

With these pleasantries out of the way...and with the fighters ready to receive their specific instructions... the FAC prepares his briefing for the fighters. This is called the **"Nine Line Brief"** as it consists of nine items. The fighters will be holding at the contact point when this info is given.

The 9-line brief looks like this:

1. IP (initial point)
2. Heading to the target
3. Distance to the target
4. Target elevation above sea level
5. Target description
6. Target coordinates (TACAN radial/DME, lat/longs, or grid)
7. How the target may be marked (smoke, laser TISL code)
8. Location of friendlies
9. Egress direction

The thing to remember is that this war stuff is serious business! Now is not the time for someone trying to be cool! For example, lets imagine a 9-line that sounded like this:

"Alpha, 360, 7, 500, convoy, AB7550, smoke, east, south".

Then imagine yourself at low altitude trying to fly a holding pattern while checking your buddies' six... and copying this info. Doesn't say much, does it? When it comes to giving a 9-line brief, the FAC wants to be brief... but he doesn't want to be cryptic! With just a few more words, he can make the radio call much easier to understand:

"IP Alpha, 360 degrees for 7 kilometers, elevation 500 feet, truck convoy on north-south road, grid AB7550, FAC will mark with smoke, friendlies 2 kilometers east in town, egress south."

Which one would you rather receive?

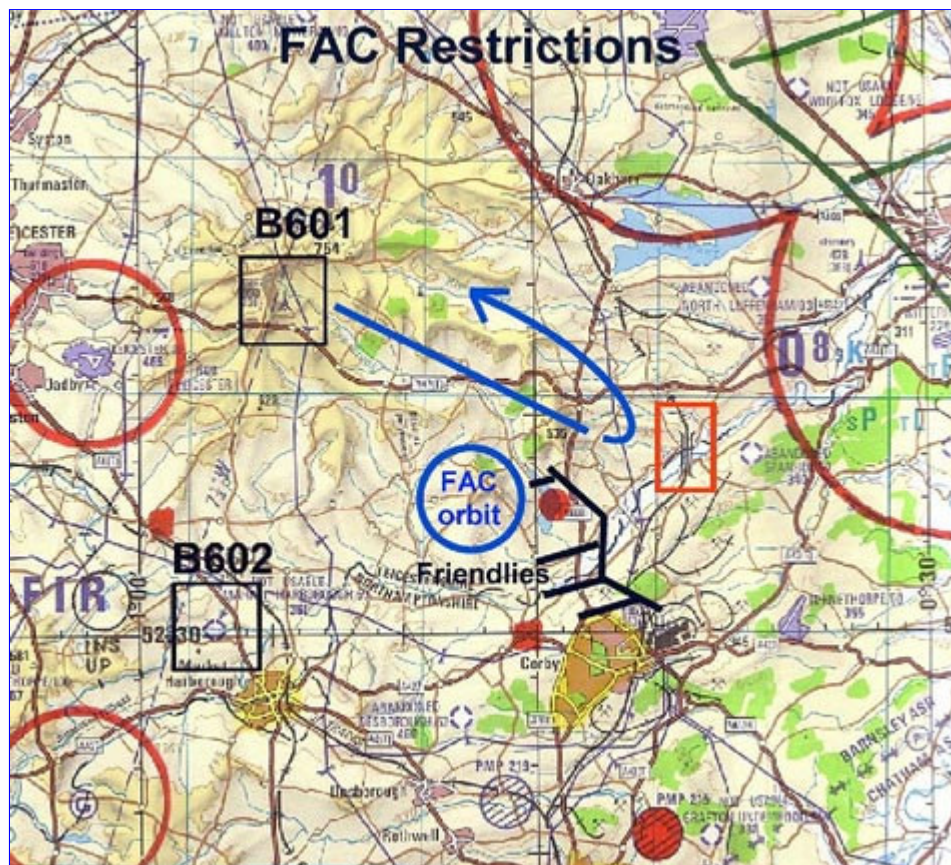
In addition to the nine items, the FAC may want to add some remarks. These include known threats, run-in restrictions, clearance rules, winds, and best bail out areas. Run-in restrictions are particularly important...the standard rule is that the fighters will not overfly friendlies on their attack runs (this is to prevent short rounds). If this is a factor, the FAC will specify that attack headings must comply with certain restrictions... such as:

"Make all attacks from the south to the north, avoid overflying friendlies in town to the east".

As for clearance rules, the FAC may authorize the fighters to begin their attacks once they reach the target area...or he may direct that each flight member will need to get an individual clearance. The FAC may also tell the fighters his location... he'll set up an orbit close enough to be able to monitor the target and also removed from the attack direction of the fighters.

Looking at our map again, we see the FAC in an orbit to the west of the lake and the friendly line of troops between the lake and the town. In a situation such as this, the FAC may direct the fighters to use the north IP, make their attacks no further south than the ridge line west of

the target, and egress with a pull off to the north.



FAC Restrictions
(click on the above for the full screen image)

Sometimes the FAC may want to mark the target with a smoke rocket...this is helpful if the bad guys are hunkered down in the trees and are hard to see. The FAC needs time to set up for his pass, so he'll tell the fighters to give him a "head's up" as they approach the target. Often this is a 30 second call (the fighters are 30 seconds out from the initiation of their attack runs). In this case, the FAC will add the remark...

"Call 30 seconds out for your mark".

In LOMAC, you will be able to mark targets with smoke rockets. Here's a shot of a FAC in for his mark.



FAC Marking With Smoke Rocket
(click on the above for the full screen image)

The Pave Penny laser identification system may be used to mark the target as well. In this case, the FAC will pass the numerical laser code for the pilot to put into his TISL panel in the Hog. LOMAC will have a TISL diamond in the game, but it will be programmed in your initial mission planning when you set up your target locations. In the sim, the idea is that the laser spot is being provided by friendly ground forces. Use the TISL as an acquisition aid...not as a firing reference in most cases.



Pave Penny TISL Diamond
(click on the above for the full screen image)

Ok! Now we're ready to get to work! Copy the 9-line while you are holding at the CP. If in a bone, do it when wings level, not in the turns if possible. Write the data down on your kneepad... in real life, we often wrote this data on the side of the cockpit canopy with a grease pencil!

Forward Air Controller Concepts (continued)

Now the stage is set for the attack. Once the fighter lead acknowledges the briefing, the FAC will tell him to call departing the IP. The FAC computes the IP-to-target flight time and maneuvers to be in position for a rocket marking pass if needed. He flies away from the fighter attack axis but close enough so that he can see that the fighters are attacking the correct target. His last call to the fighters is "*call departing*".



The fighter lead then calls *“departing”* when he leaves the IP and begins his ingress. If needed, he’ll make a heads-up call to the FAC as he approaches his action point.

From now on, the flight members including the FAC fly their respective roles. If needed, the FAC turns towards the target and fires a marking rocket at the enemy position.

He then tells the attackers to aim relative to the location of his mark... such as:

“Hit 50 meters west of my mark”.

Of course, most FACs will want to nail the target with their rocket... in this case, they’ll tell the fighters to *“Hit my smoke”!!* But the important thing is not that the FAC hit the target, but that he gets close enough so that the mark can be used as a reference. In a high threat area, the FAC may well use a loft delivery when firing the rocket... if so, the rocket will impact only in the general area of the target. Notice the tree line and road orientation in the next picture. The FAC may make things easier by designating a ground reference as oriented in a general direction... then he can make corrections off of that reference. For example, in the picture below, the FAC can tell the attacking flight to consider the road to be running north and south. He then makes all of his follow-on corrections using that reference. Using the rocket smoke as a starting point, he can direct where he wants the ordnance to go... such as:

“Hit 100 meters west of my mark”.

“West” means a 90 degree direction relative to the road... not the aircraft heading indicator.



Rocket Smoke
(click on the above for the full screen image)

The fighters will call in on their attacks:

"One's in from the south."

He may also add whether or not the FAC is in sight. The FAC then answers:

"One, cleared hot."

This means that the leader is authorized to release his weapon. If the FAC does not want the fighter to expend weapons for any reason, he'll most likely just say *"Continue"* ...and then use the abort code to order the fighter to break off the attack if needed... otherwise, he adds *"Cleared, One"* when he can see that the pilot is aimed in the proper direction.

The FAC will use the attacker's weapons impact location to cue the next attacker:

"Two, hit 100 meters south of one's bomb" or "Shack, one... two, hit lead's bomb".

"Shack" is the fighter pilot's term for "Bulls-eye"!!

Depending on target damage and playtime and ordnance remaining, the FAC may halt the attacks and brief a new target.

At some point, the fighters will be out of ammo or fuel...it will be "bingo" time. They will advise the FAC that they are leaving, and he then will give them their target results.

This is known as the "BDA" report... BDA stands for battle damage assessment. The FAC will

give the fighters their time on target (TOT), the target coordinates, weapons delivery results in percentage of hits and targets destroyed, and any observed duds (weapons that did not explode). It might sound like:

"Nice job Cobra...let's call it 1400Z, AB7550, 75% on target with four trucks destroyed".

As the fighters climb up for their flight back to base, the FAC will communicate with the local friendly ground commander to get his observations and then radio the central ground forces headquarters to give the mission results. This in turn will generate the need for additional missions to that target area if needed.



Summary

Well... this thing has run on long enough. There is probably enough here for you to get a decent start in CAS concepts for the Hog. Needless to say, there is a whole bunch more to the business of raining death and destruction down upon the bad guys... but that will have to wait for another day... and another article!

A pdf of this article is available [here](#).

Test System Specs

This is the computer that I used in this article.

- Pentium 4, 2.0 GHz processor
- ASUS P3V4X/533 FSB motherboard
- On-board sound
- 512MB RAM
- Windows 2000
- VisionTek GeForce4 Ti4400 (1024x768, 32-bit color)

- Detonator 29.60 drivers
 - Direct X 9.0a
 - HOTAS: TM F-22Pro (digital), TM TQS throttle, and TM Elite rudder pedals
-

Author's note: I'd like to thank "Mr Mudd" for his help in helping me understand the in's and out's of the FAC business. Without his assistance, the FAC info here would have been sorely lacking! Thanks also to the LOMAC staff for getting me a current build so that I could get the FAC smoke shots!

