

Formation Position “Cheat-Sheet”

“If you ain’t cheatin’, you ain’t tryin’!” – old fighter-pilot saying

This is specifically intended for 4-ship AYA/Grumman flights. It is designed to give you a “heads-up” on the keys tasks of each position, as well as detail some of the areas where we need the most improvement (*italicized portions*).

Feel free to cut & paste, or place these on 3x5 cards, or store them with your Cathouse Standards; whatever works for you.

Questions or comments? Contact any of the Flight Leads or me.

Enjoy,
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General

Briefing:

- Anything in the T-34 FFM and Cathouse Standards can be done during the flight *without specifically being briefed*. This is the main purpose of having standards!
 - Do not ask questions on anything that has not been briefed. At end of briefing Lead will ask if there are any questions.
 - Asking questions for clarification on something that has been/is being briefed is OK.
 - Do not ask about standards. If it's not briefed, *it's standard!*
 - A briefing *can* take place in-flight, over the radios. Be ready.

Fingertip:

- *Stop the wing movement (ailerons)* as much as possible. Power and Rudders are your main “flight controls”, followed by elevator. There is little-to-no need for aileron in fingertip.
- Stay on the line at all times/as much as possible, even if you need to drop or climb vertically. If you are out of position, *get to the line first*.
- Work on keeping proper wingtip spacing (4 feet laterally).
 - In the practice area, fly the proper position for your flight position.
 - Coming up initial (for the overhead), or where the public can see you, #3/#4 assumes #2's spacing. This means #2 should attempt to fly in a perfect position.
 - The worst thing #2 can do coming up initial is fly too close – there is no way #3/#4 will be able to match the tight spacing, and it will look terrible.

Rejoins:

- In practice area (single-ship rejoins)
 - Do the initial part of the rejoin (the inside of the turn) at the “cruise” power setting you're using in the area. Don't go to full power. This forces you to use angles/cutoff to rejoin, and is the desired learning experience. (#3/4 may need to add power as they cross to the outside.)
 - The rejoin line can be approximated by placing the vertical stabilizer directly over the outer/high wing. You should still be able to see the wingtip.
 - #3/4: Do not get on a rejoin line *inside* of the wingman/men ahead of you.
 - If you think you need to pull power, you are probably acute, and should turn *into* Lead to get back to the line.
 - When rejoining to the outside of the turn (#3/#4), after crossing under *get on the line first* – it looks like an echelon position – then move up into fingertip. *Do not cross Lead's six o'clock without positive overtake!*

General (con't)

Other:

- Pitchouts in the overhead pattern are 45° bank and 180° of turn. Do not float your turn or turn less than 180°. You should roll out behind or *slightly* outside the aircraft ahead of you.
 - Watch where lead turns to final (called “the perch”).
 - The turn from downwind to final is *also* a 180° turn.
 - In a perfect world, you would turn where lead turns. If you need to change your spacing, do it at the perch. For example, if you need to tighten your spacing on the aircraft ahead of you, turn earlier. And visa-versa.
- Keep the spacing tight on the downwind and final. 1,000 feet is a good guide.

Debriefing:

- Lead conducts the debriefing. Respect his comments. Remember it's not personal.
- It is not the wingman's role to comment on other flight members during a debrief. One exception: #3 can comment on #4 as it relates to the element's maneuvering.
- Questions are OK if they are questions that pertain to *your* performance - not someone else's - or if you were unclear on what Lead was doing/asking.
- Lead will end the debriefing. You are then OK to talk individually to someone else if you feel you need to (e.g. 3 makes 4 look sucked rolling out of an echelon turn), or talk privately to Lead.
- In general, what happens in a flight stays in the flight (unless it's really, really funny.... or dangerous).
- Remember that everyone makes mistakes. Everyone is at a different level of expertise and currency, so learn from your mistakes and other's mistakes and benefit from them.

Lead

The flight Lead is normally an AYA/FFI qualified Flight Lead or the most experienced person in the flight. Your job is to safely command and direct the flight from the briefing to the debriefing. Your flight is not a democracy once the briefing has started; it's your show. Take charge, in a way that inspires confidence in your flight members, not a fear of screwing up.

Your job is to maximize *and never* exceed the capabilities of your wingmen. If you ask them to do something they cannot do, it's your fault when they screw it up. For this reason, make sure in the briefing that all your wingmen are OK with all the maneuvers. Realize that we have not had a lot of formal instruction from qualified formation instructors – especially beyond the basics – so you need to take that into account.

Decide early whether your flight is a training flight, a practice flight or an “operational” flight, and tell your flight in the briefing. An “operational” flight would be an FFI/AYA checkride, an AYA photo flight, an airshow, or a practice flight before one of those events. A practice flight is a chance to hone skills, learn new stuff, try new techniques, work on certain items, or just have some fun together. A training flight is for newbies that have not attained basic proficiency in formation flying. Letting your flight know what type of mission you're going to do will help them better understand what their roles are.

There is only one Flight Lead for each flight. Be clear about the difference between the Flight Lead (you) and a tactical lead: when another wingman is "leading" (and there are good reasons to do that) *you are still the Flight Lead for the flight* and you are responsible for what happens; what you say goes. And this must be mentioned upfront in the briefing anytime you let someone else lead a portion of the flight. When anyone else is leading, they are the 'tactical lead' and you still retain all flight lead authority and responsibilities.

Realize that everyone makes mistakes. Possibly even you! What you are looking for as a Flight Lead is *how quickly* your wingmen *recover* from their mistakes. If you see the same mistake being done over and over, take control to fix it *now*. And it is your job to debrief these things – that's why *you're the Flight Lead!*

Briefings:

- *Do not brief standards.* This is a waste of time. There is also *no need* to brief what maneuvers you are doing in the area if they are standard.
 - You may wish to brief the maneuvers in a checkride situation or where there may be new/extenuating circumstances.
- Briefings should be that; *brief*. Only brief non-standard items and things not covered in the standards (positions, frequencies, etc.)
- If you have different levels of experience in your flight, and want to give “instruction”, a good technique is to brief the flight, dismiss the more experienced wingman/men, and then take some time to coach the newbies on the specific items you want to cover with them.

Rejoins:

- Element rejoins after takeoff
 - There are three things that need to happen for success.
 1. You need to go past the end of the runway before starting your turn. The recommended distance is *at least* 1 mile (I recommend 9,000 feet, or 1½ miles) after takeoff. For example, if you are using a 4,000 foot runway, go at least ½ the runway length past the end of the runway to get 1 mile spacing before turning. This will allow the second element to get cutoff for the rejoin.
 2. You need to be leveled off – or darn close to it - as #3/4 come in to give them the power to get to the outside and high wing. Recommend leveling off by smoothly pulling power to keep your speed in that 100± knot range.
 3. *Keep the turn going.* #3 will never learn to effectively rejoin if you keep rolling out! You can decrease the bank to 5-10° if you wish.
- In practice area (single-ship rejoins)
 - Take notes, for the debriefing! The kind of things you're looking for are
 1. Acute, on-line or sucked
 2. Were the proper/correct corrections made
 3. When did they first notice they were acute or sucked?
 4. Were the corrections timely or too late?

Airwork:

- In other flight areas, note deviations from “standard” and point them out in the debrief. The purpose is to make your wingies better, not to beat them bloody. You are also setting the example and showing that you are paying attention to what your wingies are doing.

Debriefing:

- If you let someone else lead a portion of a flight it is your responsibility as the Flight Lead to critique his leading -- during the debrief, in front of the entire flight. Not as a hammer, but as a notice to everyone as to the correct way to do things. Do not be shy or hesitant about doing this. You must set the example for everyone. Again, not as a personal attack, but as a matter-of-fact; "we did X, and we should have done Y. Questions?" And direct it to the entire flight, not just the tactical lead.
- You need to control the debriefs, and if any loud-mouth decides to run his/her agenda, you need to stop it immediately. Offer to meet with them afterwards, but not during *your* official debrief.

#2

Your job as #2 is to make yourself so rock-solid that Lead never even has to think about you or look at you – Lead “knows” you’re there, in position.

This starts with the check-ins. You set the “cadence” for the flight check-ins. *Be there*; be waiting for every frequency change and check-in. #2 sets the spacing and timing for the entire flight, including the radio work, so anticipate, be alert and ready. *Be there!*

- Echelon turns: You set the spacing for the entire flight; *stay forward (on the line)!* Do not allow yourself to get sucked! Fight to stay on the line! Have some pride!
- If your flight lead asks you to move out, do it and stay there. Don’t sneak back in later. He’s telling you that for a purpose (it may be because of #3 or #4).
- The biggest mistake #2 can make is flying too tight on initial. There is no way #3 and #4 will be able to match your spacing, and the flight will look terrible because of you. So it doesn’t matter how good you are, fly the correct spacing on initial.

#3

You are an element lead, and the alternate flight lead under normal circumstances. Your job is to *lead your element* so that Lead does not have to be concerned about you or #4.

#3 has a challenging position, since you are both a wingman to the Flight Lead and a lead to #4. *Your #1 responsibility is to #4.* That's why you were given the position of #3!

If you are "in position" on Lead but have lost #4, you have failed. If you take longer to do a crossunder than normal, but #4 stays with you, you are doing the right thing. Now that doesn't mean you are namby-pamby with #4, using him as an excuse.

Your job is to take #4 to 90-99% of his capabilities – and never exceeding them. This means you have to evaluate #4's performance throughout the flight and act accordingly.

Fingertip:

- #3 is not just another wingman on Lead. *Everything* you do affects #4. Always fly with that in mind.
- All movements (throttle, rudder, crossunders, etc.) should be at 80% of normal maximum, which allows #4 some breathing room. Do everything a little slower.
- Echelon turns: *Stay forward!* Do not allow yourself to get sucked! Have some pride!

Rejoins:

- Element rejoins after takeoff
 - #4 is in a very vulnerable position. If you think *you* need more power, think about #4!
 - Get plenty of lead/cutoff on the Lead element *early*. Use angles to join, not power.
 - If you get acute, solve that *right now* by coming into the Lead element.
 - Do not cross to the outside too early. Get in to a good close "crossunder" position, then cross under gently. *Keep positive overtake!*
 - Get on the line first – it looks like an echelon position – then move up into fingertip.
 - **Be patient.**
- In practice area (single-ship rejoins)
 - Do not move to "the line" until #2 has gotten on his rejoin line.
 - Do not start your cross to the outside wing until you are sure that #2 will not need to overshoot.
 - Do not cross under to the outside too early. You are going 1) to the outside of the turn, which takes more power/overtake, and 2) climbing, which takes more power/overtake. Get in there tight before crossing.
 - Get close to #2, *with overtake*, then gently start the crossunder. Remember to *keep your turn going* so you cross under at a slow, smooth controlled rate; the same rate you would use in straight-and-level flight.
 - Get on the line first – it looks like an echelon position – then move up into fingertip.
 - Note: #3 is *not* responsible for #4 on single-ship rejoins, other than to make a safe and expeditious safe rejoin.

#4

#4 is usually where the least experienced wingman goes. It's a hard position to fly well, though, which makes one sort of think about that. Your job is *to fly your position so well that #3 has a high level of confidence in your abilities.*

Fingertip:

- The most important thing for #4 to remember is *get your positioning off Lead.*
 - #4 flies off of Lead, not #3. This means that #3 can be bobbling all over the place, but #4 flies a stable position off Lead.
 - Fly #4 as if you are flying a “missing-man” formation, and #3 is not there.
 - You get your line, vertical and spacing off Lead. Especially stay forward in echelon turns!
- Now, don't take this to the ridiculous...
 - If #3 is all over the place, you are going to have to move out.
 - Also, if #3 is behind the line, you may get to a place where you will have to move to a sucked position on Lead for safety purposes. Do it, and let Lead sort it out later.

Rejoins:

- Element rejoins after takeoff
 - Think with/ahead of #3. Try to predict what he will do. For example, you *know* that shortly after takeoff #3 will start a turn to get on the rejoin line. Be ready for it!
 - Without taking your eyes off #3, watch the rejoin out of your peripheral vision. Try to predict what #3 will do based of whether you are sucked, on the line or acute.
 - Stay with #3 as he begins the cross under to the outside. Do not cross under #3 until he has *stopped* his crossunder and is on the line.
 - Get on the line first – it looks like an echelon position – *then* move up into fingertip.
- In practice area (single-ship rejoins)
 - Always take your rejoin line and vertical spacing off Lead, while keeping #2/3 in sight.
 - Never go to the rejoin line before #2 and #3 get there. In other words, if #3 is sucked, you stay sucked. Stay in a lag/sucked position until you are satisfied that everyone ahead of you is on track to make a normal rejoin.
 - Never “join” on #3 during pitchouts/rejoins (breakups/joinups) in the area. If #3 is not rejoining as fast as you are, lag – which means get off the rejoin line to a more sucked position.
 - Be patient, and *watch everyone* ahead of you. Try to predict what will happen, e.g. will #2 or #3 need to overshoot, etc.
 - There is *no excuse* for screwing up your rejoin because #2 or #3 screws up. You should be able to predict that or see that.
 - Do not cross under to the outside too early. You are going 1) to the outside of the turn, which takes more power/overtake, and 2) climbing, which takes more power/overtake. Get in there tight before crossing.