

# Formation Flight: Exploring a Unique Opportunity for COPA Members

by CRAIG ALBRIGHT

If you've been a COPA member for a while, you've probably heard the name, or even met, Mike Radomsky. Mike is president emeritus of COPA, created our successful PIC (Partner-In-Command) course for non-pilot right-seaters, is a Platinum CSIP flight instructor, and *always* seems busy doing something aviation-related. One of Mike's more recent ideas was to have a COPA formation arrival at AirVenture, which he named C2A. The Bonanza and Mooney pilot groups both arrive that way, so why not COPA? After extensive research, and more than a little training, Mike quietly created a new opportunity for pilots like me who never thought they could ever do this – *formation flight!*

Prior to attending one of Mike's clinic weekends (currently limited to the Southwest Region), I thought that formation flying was well beyond what mere mortals like myself could possibly achieve. I tended to associate that sort of flying with the incredible skills of a group like the Blue Angels or Thunderbirds. Sure, some pilots flying thunderous war birds would show up at air shows, but many of them were ex-military, as well. I figured it was something I'd never be able to do ... *happily, attending one of Mike's clinics proved me wrong!*

These clinics tend to be small events with a half-dozen pilots flying in from various locations – virtually no one was "local." Enhancing the quality and safety of the clinic, the half-dozen "newbies" (to formation flight) were paired with *experienced* right-seaters who provide real-time, in-flight coaching. The clinic, itself, is based on a curriculum that Mike created, and has continuously enhanced over the past few years, taking full advantage of the groundwork laid by the Bonanza and Mooney groups who have significant formation flight programs/activities. While being able to stage a formation arrival into EAA's AirVenture was a major motivator for Mike, I freely admit that for me, learning and performing formation flight was something new and exciting! It's certainly enhanced my piloting skills. And, while I was excited by the prospect of a formation arrival at AirVenture, participating in the clinic was a great way to spend a weekend.

Some quick comments:

This article does not address the degree to which everything was briefed *extensively* beforehand. Clarity, certainty and focus are essential to producing safe outcomes ... which the clinic does.



As this photo illustrates, well-executed maneuvers lead to some beautiful formations! A 4-ship, right echelon formation doing an echelon turn to the left. Matt/Jim are in the lead ship. The photo is being taken from ship 3 containing Keith/Will, and ship 3 is lead ship for Phil/Mike who are in ship 4. Despite Will's dramatic photo, there's no hiding the fact that ship 2 (me) is "sucked" (too far back) and low ... yet another learning experience.

**It was abundantly clear to me that getting together with a flying buddy and trying to learn formation flight by myself would probably be the last thing I'd ever attempt to do.** These clinics provided a well-controlled, safe environment for learning this particular skill/art. While there are various training activities that, as a CFI, I'm comfortable reading about and then doing by myself, this is **not** one of them.

On the above note, nothing in this article remotely constitutes flight training!

There was homework to be completed before arrival. As part of the clinic, Mike distributed "soft copies" of a training manual<sup>1</sup> written by the RedStar Pilots Association (RPA) that included both formation flight basics and more advanced concepts. At 117 pages, it contained a *huge* amount of written information and excellent, self-explanatory graphics. Luckily, complete absorption/comprehension wasn't a prerequisite for clinic attendance. (The RPA document was the source for the graphics contained in this article.)

## The Clinic

### FRIDAY EVENING

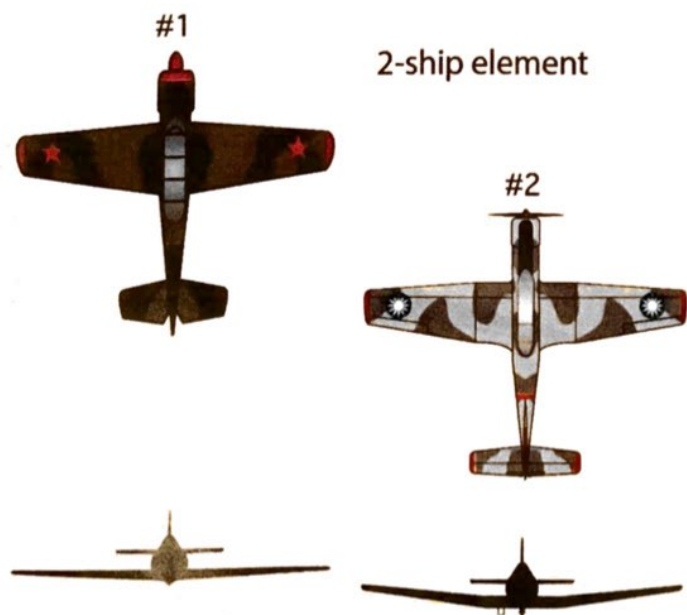
Generally, the clinics are set up with arrival on Friday, several flights ("sorties") on Saturday and Sunday, and departure on Sunday afternoon. At the Friday evening briefing, everyone participated in a well-structured,

PowerPoint presentation facilitated by Mike. Of course, this is also the first time that everyone meets as a group, so there is the usual process of getting acquainted. That included being introduced to your Safety Pilot/coach/mentor, as well as the pilots flying left-seat – a pretty straightforward process with our smaller group. The briefing itself is a soup-to-nuts review of formation flight – lots of information conveyed over several hours. Although I had some previous formation flight experience, the review was absolutely necessary. This is not a flight activity that I practice very often, so it's important to review (or learn for the first time) basic maneuvers. Also, to ensure concise, accurate communications, formation flight has a lingo all its own – the terms “sucked” and “acute” take on a completely new meaning! This briefing is the perfect time for Q&A, expressing concerns, etc. – **nothing** went unanswered. Admittedly, for those who haven't done this previously, there was still the nagging question of “can I really do this?”

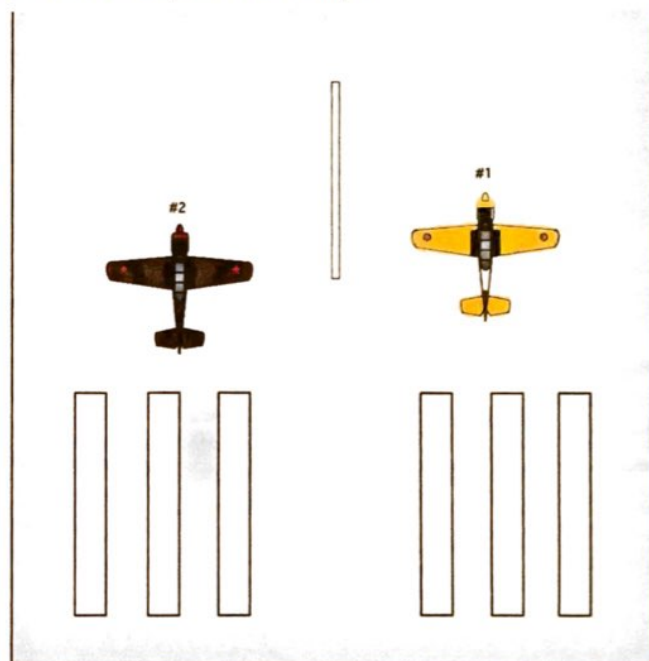
## SATURDAY

Every sortie (and there are multiple sorties each day) was preceded by a *comprehensive* briefing, usually conducted at the FBO. The exact sequence of maneuvers were defined and discussed. Radio calls, hand signals and, the “recovery procedure” (i.e., return and landing at the airport) were also reviewed. All briefing information was captured on a convenient form that Mike prepared and made available to everyone. No one left the briefing with any confusion about what will be done when and by whom.

Much of the clinic training was conducted using the basic “element” – a 2-ship formation with lead (#1) and wingman (#2) depicted in the image below. This is called a “fingertip formation,” and ship 2 can be on the left or right of ship 1. The pilot in ship 2 focuses **solely** on ship 1, following its lead. Throttle position? Airspeed? Altitude and attitude? Ship 2's pilot measures everything *visually* relative to ship 1's position and attitude. About the only time the wingman gets a chance to look at the gauges/panel is when the element “kicks out” to route formation.



One of the training tasks we wanted to accomplish was an “element takeoff.” In this example, “lead” is on the right. Of course, the clinic introduced this particular exercise in calm winds. Initially, sharing the runway is challenging enough without having to worry about any serious crosswinds! After positioning on the runway, the pilot of ship 2 focuses *solely* on the lead ship, adjusting throttle and lateral spacing to maintain relative position. Yes, that means ship 2 is not looking down the runway! For most of us, this was unique.



*Two-ship runway line-up: #2 forward of the normal bearing line sight picture with a minimum of 10 feet of lateral wingtip separation*

Once in the air, virtually all of the time on Saturday was spent practicing fundamentals, some of which included: forming up (achieving fingertip formation), station keeping, fingertip turns, echelon turns, cross-unders, kickout and rejoin, lead changes, etc.

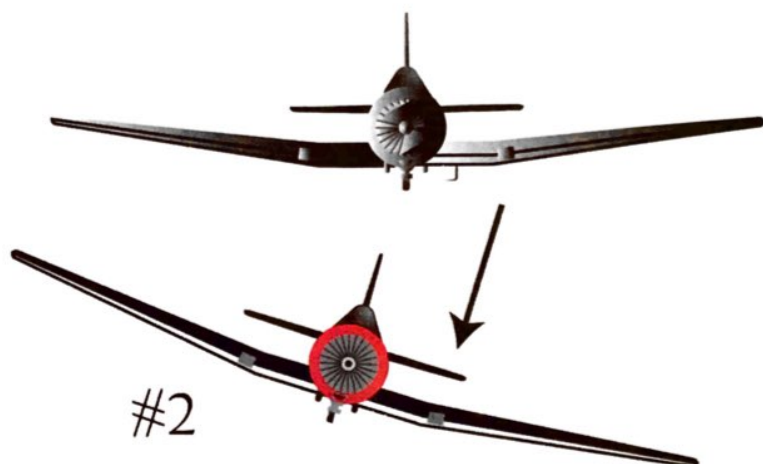
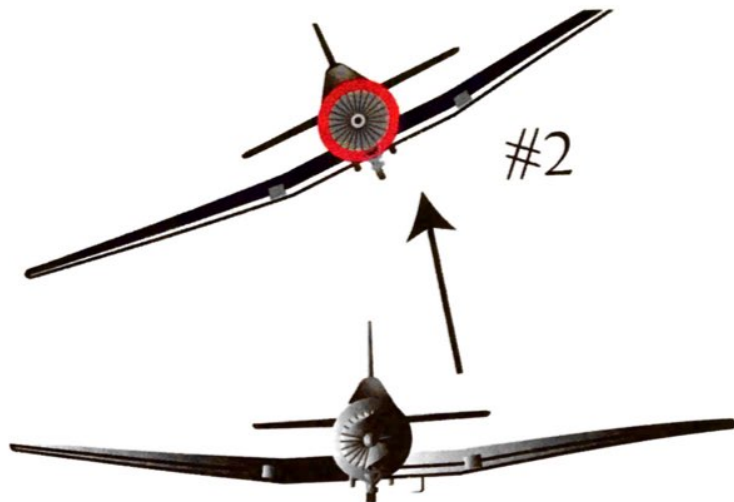
The following are some images showing what things should look like if properly executed:



*Phil Friedman keeping station in fingertip formation. The camera is not zoomed in as much as you may think! Mike Radomsky was Phil's safety pilot on Saturday and Sunday; this was Phil's first time flying formation!*

## Fingertip Turns

turn away from wingman



turn into wingman

Regarding fingertip turns, notice that the aircraft remain in the same geometric plane and turn as if their wings were welded together. In fact, fingertip turns are often referred to as "welded wing."

#1



2-ship echelon turn

#2

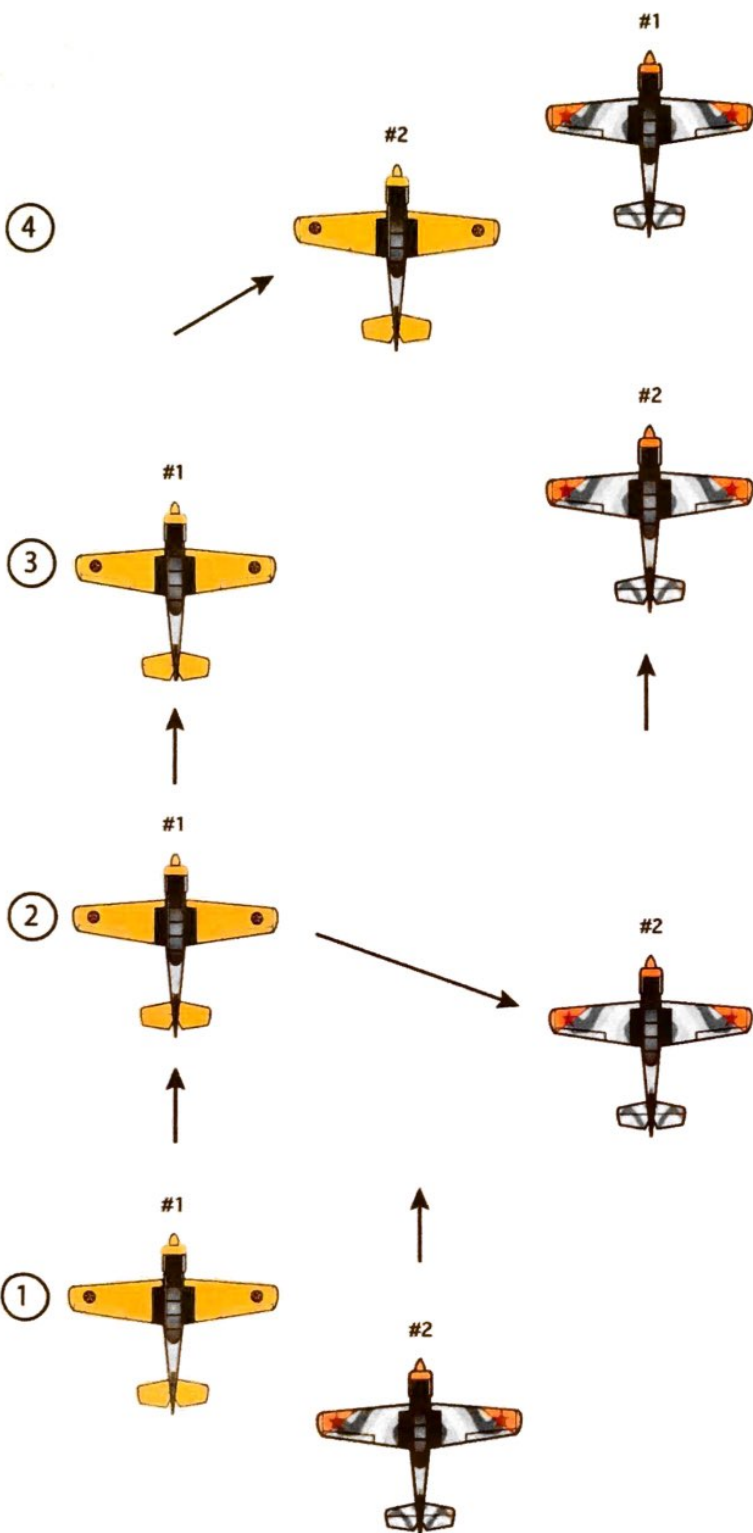


## Echelon Turn (always away from wingman)

Echelon turns are quite different, even though they are done in fingertip formation. The geometric plane shared by the element remains horizontal, and both aircraft stay at the same altitude; their relative vertical positions do not change.

## Lead Change

Ship 1 doesn't get to have all the fun while leading ship 2 on a merry chase across the countryside! Besides working (very) hard to stay in position as wingman, ship 2's pilot also needs to gain experience as lead ship, so periodically, ship 1 can call for a "lead change."



In this simple, but carefully choreographed, maneuver, ships 1 and 2 change roles and call signs. Shown on the image, starting from a normal fingertip position (reference 1), ship 2 moves into a route position (reference 2), accelerates past ship 1 (reference 3), and assumes the lead. After the lead change, the former ship 1 becomes ship 2 and moves into back fingertip position. In this example, the "new" ship 2 would be off ship 1's left wing.

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(Left) Matt Klein performing a fingertip turn. Sitting right-seat is Jim Anderson, Matt's safety pilot during the clinic.

(Right) Here is the view from inside Keith Lamb's cockpit. Keith was ship 3 in our "fingertip strong right" formation. Will Garber served as Keith's safety pilot over the weekend and took this photo. Ships 2 and 3 are even with one another; I'm flying solo on the left-hand side of the formation. Keith is not looking at me; both of us are focused on ship 1. As mentioned earlier, pilots maintain their visual focus on the lead ship throughout the flight while in fingertip formation. Location-wise, they have no clue where they are and, except for seeing the scenery beyond the lead ship, they don't even know their flight attitude! For everyone but the lead ship, throttle and yoke are constantly moving.

On Saturday, we flew three sorties – two in the morning and one in the afternoon. Each began with a thorough briefing and closed with a debriefing. As you can imagine, no one had any trouble sleeping on Saturday night.

#### SUNDAY

On Sunday morning, we flew two more sorties before heading home. The first was basically a review of what we did on Saturday – airwork with 2-ship elements. The second sortie involved something new – a 4-ship formation! The following is a 4-ship formation in "fingertip strong right."

Ships 1 and 2 form one element, and ships 3 and 4 form a second element; ship 3 follows ship 1's lead.

Of course, the graphics are interesting, but what's really incredible was to see our planes in flight – COPA members exploring new possibilities!

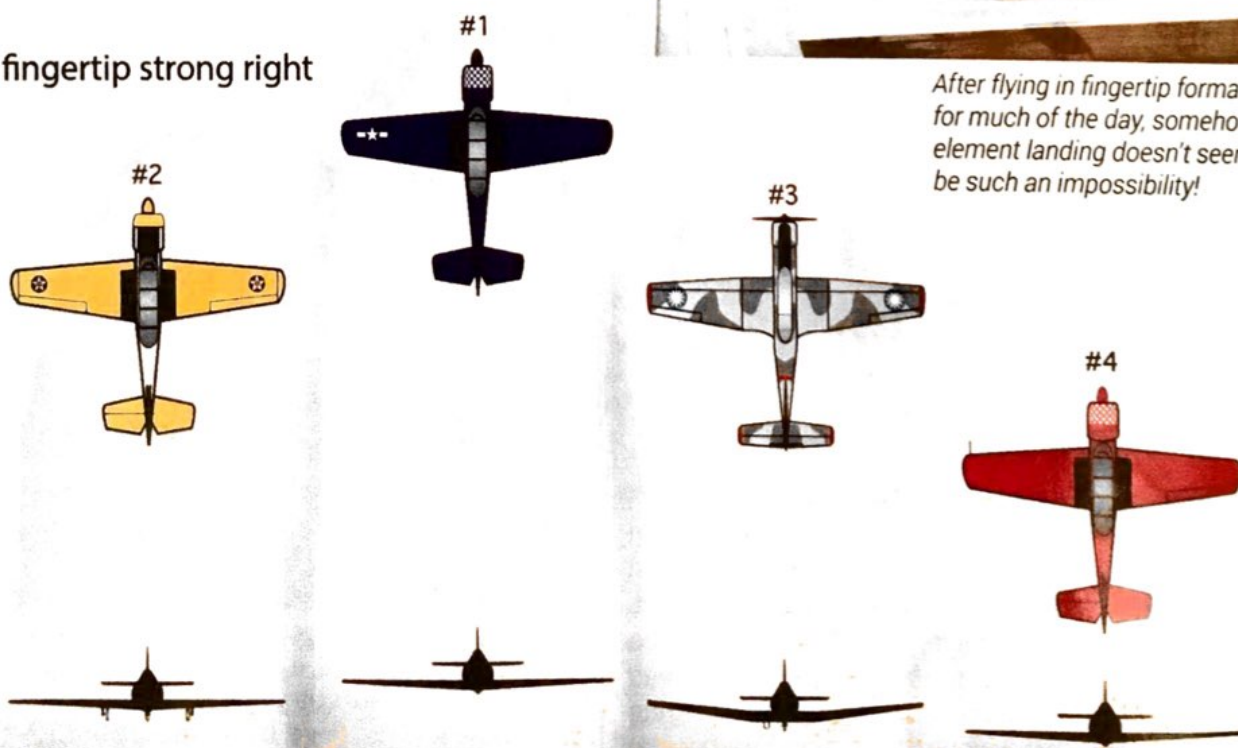
#### The Un-clinic

So, what's next after you have a few formation flying clinics under your belt? Mike already has the answer – the un-clinic! Pilots who have developed the requisite knowledge and skill can plan impromptu get-togethers and practice the formation flying skills they have learned.

If some portion of this article has whet your appetite for something new (or perhaps to renew a previous pastime), ►



fingertip strong right



After flying in fingertip formation for much of the day, somehow an element landing doesn't seem to be such an impossibility!

why not contact Mike Radomsky ([mike@radomsky.org](mailto:mike@radomsky.org)). Who knows? There may be a formation flying clinic coming to an airport near you. And, we'd enjoy having you join us for a formation arrival at AirVenture! ⊕

Notes:

<sup>1</sup> REDSTAR FORMATION Fundamentals and Advanced Concepts, Ver. 4 (draft) published by the Yak Pilots Association.

*A group photo: Taking a knee in front is Mike Radomsky, chief instigator/ researcher/author/instructor of COPA's formation clinics. Standing left-to-right are James Buck (former military pilot with many years of formation flying experience), me, Phil Friedman, Jim Anderson (COPA's SW Regional Governor and CFI with lots of experience in formation flight), Will Garber (current military pilot and battalion commander with oodles of formation flying experience), Keith Lamb, and Matt Klein.*

*I cannot emphasize enough the value provided by having pilots like James, Will, and Jim assist during the clinic. Like any safety pilot, they act to keep the ship safe from harm. The real-time, in-cockpit coaching they provided adds invaluable depth and perspective to the briefings and sorties.*



## JOIN THE C2A FORMATION ARRIVAL!

This year will be the third C2A (Cirrus to AirVenture) arrival, and we would love to have you join us. Almost everyone who tries formation flying gets hooked! It is exciting, demanding, exhilarating and very satisfying; and what a way to arrive at Oshkosh for AirVenture! Whether you've never flown formation before, or have or have not flown into AirVenture, once you experience a C2A at AirVenture, you will agree that there is NOTHING like arriving in formation.

There are two ways for you to participate: As Pilot In Command, after you attend one of our C2A clinics, where you will "learn the ropes;" or you may accompany a formation-trained pilot from Australia, who will fly in the left seat of your airplane while you sit in the right seat to get a feel for this amazing activity.

This year, we will be meeting at a location (TBD) near Oshkosh on Friday, July 22nd. Friday and Saturday are practice days; our formation arrival into OSH is on the morning of Sunday, July 24th. AirVenture officially kicks off the next day, Monday July 25th.

At this AirVenture, C2A participants will have the choice of camping together. For more information on any aspect of C2A, call, text or email Mike Radomsky. Email: [mike@radomsky.org](mailto:mike@radomsky.org) Phone: +1 (702) 810-8128 See you at OSH!

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