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PHOTO CREDIT ANDY SEGAL

Precision in the Skies: Inside the World of COPA Formation

by Laurie Einstein Koszuta

Just inside the double doors of the Hangar Hotel's Officers' Club lounge in Fredericksburg, Texas (T82), several dozen formation pilots gathered, deep in conversation, eagerly awaiting the daily morning briefing for the COPA Formation flying clinic, previously known as C2A (Cirrus to AirVenture). The atmosphere was electric with anticipation for the day's upcoming sorties. It wasn't the usual casual chatter as everyone was laser-focused on the information they would hear and discuss.

Origins of COPA Formation

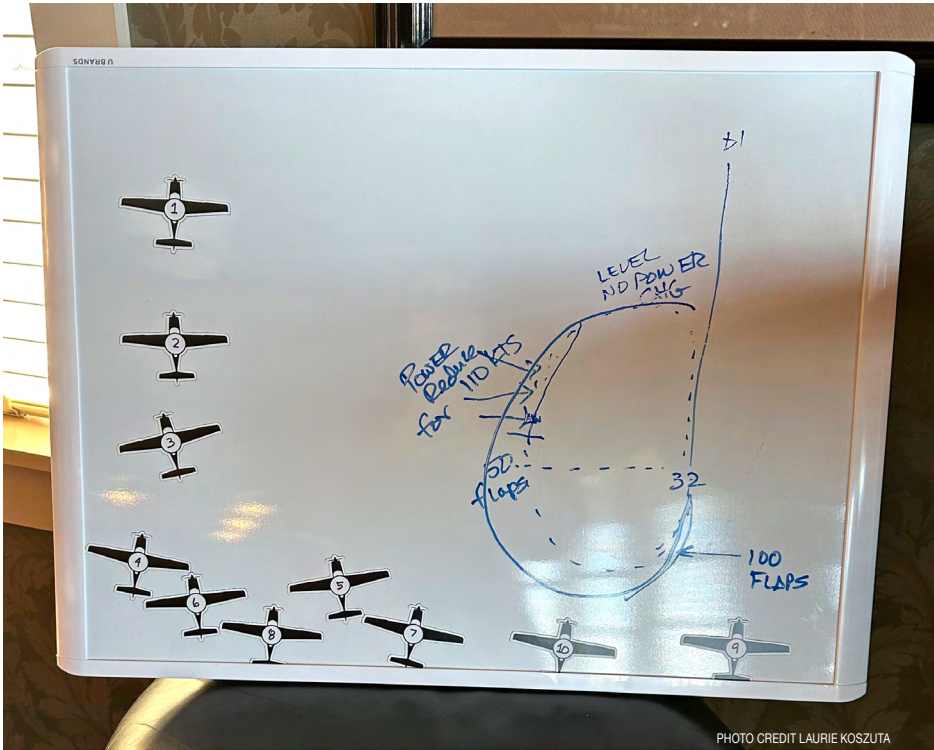
COPA Formation was initially established to train pilots for a mass arrival at EAA's annual Oshkosh AirVenture. In 2015, pilots wanted to fly together into the event. However, given Oshkosh's high traffic volume and rapid pace, attempting a mass arrival in formation without proper training posed significant risks. That was when the idea was born to hold multiple COPA Formation training clinics in various locations throughout the year leading up to Oshkosh.

This Texas COPA Formation clinic, organized by COPA Treasurer Jim Grace and supported by experienced formation pilots, was designed for new formation pilots (NFPs) and established solo pilots who desired continued training. This year, the training

clinics will culminate in a mass 50-airplane formation flight into Oshkosh. The Fredericksburg clinic started Thursday, with NFPs and solo pilots completing an intensive ground school covering the fundamentals of formation flying. They also watched a demonstration flight showcasing veteran pilots performing many of the same precise maneuvers they would fly. I was invited to watch it up close and personal as a non-pilot and friendly observer.

Brief for Success

Finally, as the voices in the lounge quieted down, the leader for this clinic, Will Garber, started the briefing by projecting weather maps and the day's sortie assignments onto a large



« **Safety pilot** Andy Brown's visual display used to portray the positions of the aircraft in an upcoming sortie.

“While safety is the top priority, formation flying is also about skill development, teamwork and discipline, and in the end, we want pilots to enjoy the experience.”

screen. Every NFP was paired with an experienced safety pilot (SP). Garber walked through wind conditions, any expected changes and potential risks. The discussion was collaborative, with pilots contributing crucial details, like the location of towers and terrain. Such observations are essential since formation flying is conducted entirely under Visual Flight Rules (VFR).

As I sat and listened, it became clear just how much preparation, precision, accountability and teamwork go into formation flying. There is a detailed 28-page standard operating procedures (SOP) manual with strict parameters for every contingency that all pilots must be familiar with before formation flying. The pilots describe the experience as challenging and exhilarating and understand that safety and communication remain the highest priorities for each sortie and maneuver.

After Garber wrapped up the main briefing, the pilots broke out into smaller groups of six to eight, each led by an SP. They meticulously reviewed radio frequencies, power settings and

speeds for each phase of flight and assigned who would be the lead pilot and the numbered positions for the others in the formation. The maneuvers have names like Echelon, Diamond, Fingertip and Trail. Each pilot had to understand and clearly communicate their responsibilities during each maneuver and transition to ensure that all pilots understood and could verbalize what would be executed in the air.

Hands-On Approach

In one group, Andy Brown, a longtime aviator and safety pilot, used airplane-shaped magnets on a board to visually display the upcoming sortie in detail. “We will start in a diamond pattern,” he explained as he shifted the magnets to demonstrate the precise positioning of each plane. As he spoke, the NFPs listened attentively and asked questions about their roles within the formation. Elsewhere in the room, two other groups, each preparing for different sorties and led by an SP, were engaged



» **Taxiing out** to run-up.

in similar discussions. All the pilots studied charts, jotted down notes, and exchanged insights and any concerns as they prepared for their flight.

The Walk Through

Before departure, all the sortie groups could be seen on the tarmac literally walking through their entire pre-planned maneuvers. “Every maneuver, from engine start to shutdown, is meticulously walked through on the ground,” noted Grace. “It is a really important part of this process, and we will do it repeatedly until everyone is clear. Any walkthrough errors on the ground will show up in the air.”

My group of four planes, which included a pilot lead, NFPs and safety pilots, spent at least 25 minutes rehearsing as if we were already



airborne – arms out like wings, snaking around to perform the planned patterns. It was serious business and everyone remained completely focused. When a pilot had a question, everyone stopped, got clarification and started again. Pause. Repeat. Pause. Repeat. “What happens down here is what happens up there,” one of the safety pilots in my group reminded me.

» **Sortie groups** on the T82 tarmac walking through the maneuvers they will be executing in the air. This practice is an important part of the formation flying process.



PHOTO CREDIT JO HUNTER

Formation Flying Basics

Formation flying involves two or more airplanes, called ‘ships,’ flying in close proximity and following a predetermined and well-defined pattern. One pilot serves as the lead, while the others act as wingmen. The lead is responsible for selecting and maintaining the route, transitioning between formations, maintaining altitude and airspeed and managing emergencies. Wingmen are designated as numbers two through four in a four-ship formation. They are expected to keep their position relative to the lead using visual references and make the precise adjustments needed to stay in formation. In larger formations, pilots are grouped into smaller units called elements, each with a designated lead.

Formation flying has its roots in nature, as migrating birds fly in organized patterns. The military adopted this practice to enhance defensive capabilities and it is a demanding and precise skill. Extending this to general aviation, the core principles of formation flying demand the same teamwork, precision and communication.

Unlike general aviation, which relies on an autopilot for much of the flight, formation flying is a hands-on skill that requires pilots to master stick-and-rudder techniques. They must learn to refine their pitch and power combinations, rudder skills and develop a keen sense of spatial awareness to maintain precise positioning in relation to other aircraft.

The Mental Shift in Formation Flying

Derek Rowan, an experienced COPA formation pilot and press information officer for this clinic, highlighted that there is a definite mental shift that comes with transitioning from solo flying. “When you’re the pilot in command flying alone, every decision is yours. In formation flying, pilot decisions and movements are based on the formation and must account for others in the flight.”

Rowan added, “We call it ‘safety, smiles and skills.’ While safety is the top priority, formation flying is also about skill development, teamwork and discipline, and in the end, we want pilots to enjoy the experience.”

Stepping Into the Formation as a JAFO (Just Another Friendly Observer)

After watching the morning briefings and hearing about the multiple sorties from the sidelines, I was offered the chance to experience formation flying firsthand. My answer would have been a definitive no in the past, but seeing how meticulous and serious these aviators were, I pushed my nerves to the side. We did our walkthrough on the ramp, and when the pilots were ready, we all climbed into our respective airplanes.

Once onboard, pilots of the four planes started their engines simultaneously upon command from the lead. Each completed a preflight checklist and announced completion over the radio. When the lead pilot gave a thumbs-up, the formation began taxiing in unison, emulating the precision of the Thunderbirds and Blue Angels. At the end of the taxiway, each aircraft executed a 45-degree turn for final run-ups, using this pause to double-check for any potential problems of their own or in the airplanes next to them. Once all aircraft gave a thumbs-up, the formation lined up on the runway, ready for takeoff.

We were the third to depart, each sequencing six seconds behind the plane in front. The takeoff was straightforward and exciting. As we ascended, the lead plane looked to be hovering, but in reality, it moved rapidly, and the rest of us pushed full power to catch up and move into our assigned positions.

I glanced out my window and saw another Cirrus just 20 feet off our wing. The turbulence from the windy conditions was noticeable and my pilot made constant minuscule adjustments to pitch, power and rudder to stay aligned. For the first time, I was close enough to read the tail numbers of other airplanes around me, a closeness that most general aviation pilots (and passengers like me) like to avoid.

Executing Maneuvers

Soon, I heard the lead pilot announce a maneuver change. All pilots quickly radioed back in sequence and number, signaling their understanding as we began crossing under another aircraft. I watched my pilot keep his eyes focused outside, adjusting the power by feel alone. Once completed, the lead called for a position break, and each plane briefly spaced out to bring their gaze into the cockpit and assess gauges

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and stability before proceeding onto the next maneuver.

Before long, we were in the fourth position and entered the “trail” maneuver, falling into line with a precise eight-second spacing behind each other. My pilot called out “sausage,” confirming everything looked smooth with all the aircraft ahead. Finally, crossing over the center of the airport, the lead initiated a 45-degree banked turn, followed by the second and third aircraft. When it was our turn, my pilot verbally counted the agreed-upon six-second interval and followed suit. The sudden and precise steep 45-degree bank churned my stomach but was actually mesmerizing. I watched the formation bank in unison while descending into a half-circle approach to the runway. After landing, all four planes taxied back in formation. Upon signaling from the lead, when we reached our marks

for parking, all turned 90 degrees, shut down, opened the doors and turned off the lights in unison.

Debriefing: Lessons and Feedback

Once we were back in the Hangar Hotel lounge, it was time to shake off the adrenaline, grab drinks and sit down for the debriefing. “We always aim for respectful but direct feedback,” said Rowan. “We need to be honest about what went well and what improvements are needed. You have to be able to take criticism to learn and improve.”

To test that skill, at the end of the last full clinic day, a friendly competition challenged pilots to fly and execute the tightest, most precise formations. The pilots were judged on alignment, spacing, smoothness of transitions and time on

target (TOT). No trophies were at stake other than \$100 for the winning team. Yet, no incentives were needed as these aviators were eager to display their newly refined skills and build relationships that will carry on long into the future.

Looking Ahead

For those interested in joining, COPA Formation has many more clinics planned before its mass C2A arrival into Oshkosh in July (see page 1 for dates/locations). The mission is to instruct, challenge and motivate pilots to refine their skills and, in the process, forge strong friendships and camaraderie in the COPA community. As Ron Backnick, a safety pilot from the leadership team, said, “COPA Formation is a social group with a formation flying problem.” ☺

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