Going

F.A.S.T.

Pitchouts, rejoins, and trail: Two's in!

BY JULIE K. BOATMAN

PHOTOGRAPHY BY MARK SCHAIBLE

The four-ship stack of airplanes slaloms through the sky in extended trail over the Chesapeake Bay. Two Nanchang CJ-6As couple with two Yakovlev Yak 52s and follow the leader as though through gates down a snow-covered ski run. But it's a May afternoon, and the hot sun barges through the haze. The ocean air slips through a gap in the canopy, a steady breath keeping cockpit temperatures in check.

My heart sinks into my gut as I try to follow Lead through an aileron roll, carrying the weight of a watermelon. "I've lost him." My instructor, Mike Filucci, takes the stick as I search the sky for Lead, who *was* flying a Yak 52 that *was* ahead of us. I have to readjust my sunglasses after Filucci pulls us into a barrel roll in an attempt to keep sight of Lead. Instead, we lose him and break out to ensure separation from the rest of the flight. A few moments later, Lead calls for a turning rejoin, and we find him far on the horizon, cutting an arc that we cross in his exhaust, tucking once more into the number-two position on his wing. Three and Four follow us into formation, and the training mission continues.

Formation flying is serious business. "It's not something you just go out and hop in a plane and do."

Formation flying is serious business. "It's not something you just go out and hop in a plane and do," says Brian Lloyd, Formation and Safety Training (F.A.S.T.) clinic instructor. "When you roll onto the runway in that element takeoff, there's always the feeling that it could all go wrong."

What compels pilots to join up, then? In military practice, air forces determined that a pack of ships flying together was better protected in battle and behind enemy lines than airplanes flying solo. But on clear, sunny days, civilian pilots of warbirds and other unarmed craft like Beechcraft Bonanzas and Grumman American Tigers find plenty of reasons to fly 20 feet from each other—photo missions, demonstrations, and sheer camaraderie among them. Another reason comes into play, however: This special kind of flying introduces a level of discipline and precision that is difficult to achieve elsewhere.

F.A.S.T.—an umbrella committee that sets common formation protocols and standards for all civilian warbird organizations—has been around for less than a decade. Before F.A.S.T.'s first set of bylaws was adopted in 1994, pilots conducted civilian formation flying using a wide variety of procedures. "We spent hours arguing at Oshkosh on whether Two should be on the right or left side of the leader," remembers Bill Cherwin, current president of F.A.S.T. At the 1993 National Warbird Conference in Galveston, Texas, the FAA expressed concerns about the safety of warbird formation flights conducted in waivered airspace—specifically the airspace set aside for demonstrations at airshows and fly-ins.

Various groups within the warbird community had developed their own ways of flying formation, including hand signals, basic maneuvers, and procedures for managing the flight. Most stemmed from techniques learned during the participating pilots' military service. While at first this may seem to foster a structured environment, a large discrepancy came to light: Pilots trained in different branches of the service used different techniques. In a formation, where every move must be calculated, minor differences lead to big problems.

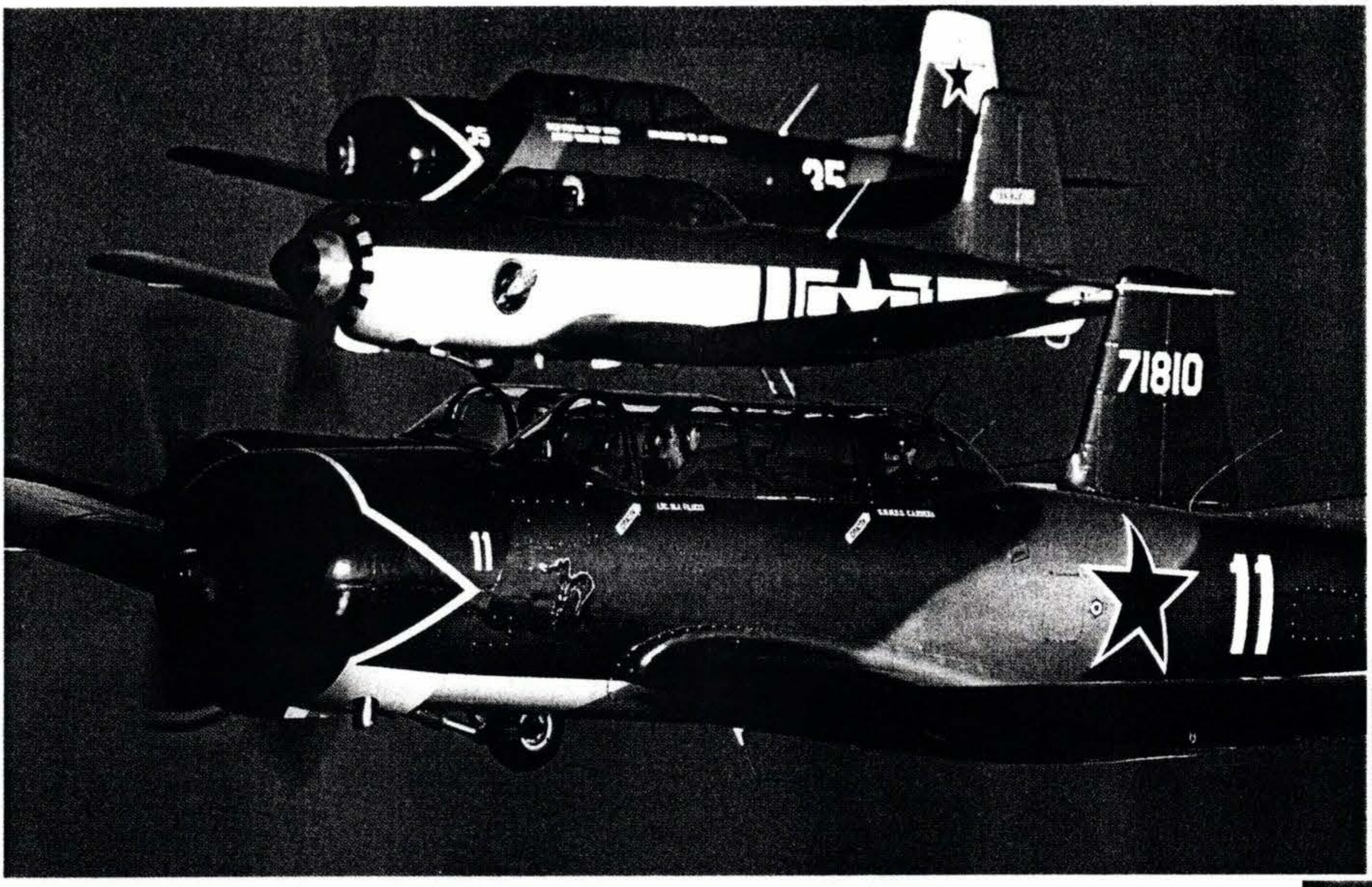
A three-ship in fingertip formation crosses Lake Winnebago (far left). As a pilot flying on a Nanchang CJ-6A's wing, you aim to stay on the bearing line—an imaginary reference line that extends from Lead's canopy bow through the trailing edge of his aileron (below). The Yak Pilots Association includes aficionados of all Yak-type designs, such as the CJ-6A (left) and the Yak 52.

One group, the T-34 Association, was recognized for having developed a highly professional set of standards. "The T-34s had put up crisp formations," says Cherwin, also the current flight leader for the T-34 demonstration team Lima Lima. "Because of this, they had a lot of credibility." The association's standards were adopted, with healthy input from other sources, as the foundation for a formation flying system.

The T-34 pilots make up just one group adhering to F.A.S.T. standards. Several other signatory organizations present at the initial warbird conference signed on, such as the North American Trainer Association. Others have joined more recently such as the Yak Pilots Association (YPA). The New Zealand Warbird Association came on board a year ago, and the Civil Aviation Authority of New Zealand has "embraced" the program, according to Cherwin.

At a subsequent warbird conference, Edwin Robinson, then the national airshow coordinator for the FAA, approached F.A.S.T. about a way to issue a recognizable credential for identification of qualified pilots wishing to fly in airshows. The main regulation covering formation flight in the federal aviation regulations is 91.111, and it's short for an FAR. You cannot operate so close to another aircraft as to create a hazard, you cannot carry passengers for hire, and you must make arrangements with the pilot in command of each airplane prior to the flight. However, there are further restrictions regarding formation flight in airshows and other waivered airspace.

Waivered airspace is created by the grant of a waiver—or exception—from specific FARs, such as altitude and speed restrictions, within airshow boundaries. The FAA agency writing the waiver for a specific airshow can include special provisions in the waiver documentation, and here the FAA outlines the requirement for a F.A.S.T. card or equivalent in order to fly formation in the airspace. The International Council of Airshows (ICAS) handles approval of pilots flying aerobatics in airshows.



While the F.A.S.T. program works for pilots flying warbirds, pilots of other aircraft types may also wish to perform flyovers and other maneuvers during airshows. Early on, it was determined that only low-wing, bubble-canopy-type warbird airplanes would be included in the F.A.S.T. program. That left out a lot of production and experimental aircraft. However, pilots of these aircraft have the option to attend whatever training they choose and then pass a checkride administered by Formation Flying Inc. (FFI), operated by Stuart McCurdy, a retired Air Force pilot. FFI uses the same standards as F.A.S.T. to evaluate pilots on their formation skills and issues a similar card. McCurdy has learned that even pilots not specifically flying in airshow formations appreciate the service. "Pilots would like to feel comfortable that everyone in the formation has been evaluated. It demonstrates a level of proficiency," says McCurdy.

Among the groups participating in FFI's evaluation program is the American Yankee Association (AYA), a collection of owners and pilots of all models of American, Grumman American, Gulfstream, and American General light air-craft. Several members of AYA took checkrides with McCurdy last fall.

Vernon Ricks and his nonprofit corporation, The Airmen Inc., in Greenwood, Mississippi, hold F.A.S.T. formation clinics that pilots of both warbird and nonwarbird aircraft can attend. Pilots flying certain warbirds are issued cards after completing checkrides at Ricks' clinic; otherwise pilots have to complete certification through FFI.

Terry Calloway, a newly rated wing pilot, credits both Ricks' clinic and those put on by the YPA for his level of proficiency. "I'm a better pilot for having attended different clinics. They're not diverse enough to make [the transition] unsafe," he notes. "Some things you don't really understand until you hear them again and again." Calloway participated in Ricks' clinic in his 1964 Beechcraft Bonanza and, once he purchased his CJ-6A, joined up with fellow Yak pilots to complete his training.

To learn more about the F.A.S.T. program, and in pursuit of my own formation training, I attended F.A.S.T. clinics and YPA get-togethers over several months. While I had flown formation in the lead airplane on a couple of occasions before, the fact that I was approaching an entirely different level of flying became immediately apparent from my first e-mail exchanges with Filucci—my future instructor, a F.A.S.T. check pilot, and the current YPA president.

On the surface, the pilot flying Lead may appear to require the least experience; after all, he doesn't need to maintain position, just fly smoothly so that others won't have problems station keeping (the formation term for holding position) off his wing. However, when you consider the multiple duties that must be juggled by the leader, including keeping a constant overview of the flight, it becomes apparent that a thorough understanding of formation dynamics, as well as superior navigation skills and aircraft familiarity, is required. Therefore, the leader should be the most experienced pilot in the flight (unless, for training purposes, a new leader is undergoing evaluation and other, more experienced instructor pilots are flying in wing aircraft).

Pilots train first by flying the Two and Four wing positions. (In a fingertip formation, Two flies off of Lead on one side, and Three flies off of Lead on the other, with Four flying on Three's wing.) Considering that typical warbird owners are

When you find that special place—that sweet spot in both your position and skill—the meditation begins.

A four-ship formation lines up in echelon for the return to base (far left). After the flight, a debriefing allows each member of the flight to recount what happened from his or her perspective (left).

experienced pilots, an attitude shift often takes place. Cherwin had 15,000 hours of flight time under his belt when he began formation training in 1980. "You're used to being in command of that airplane. When you get on somebody's wing, you give up 99 percent of that."

The wingman mentality is appropriately humble and very different from that of a typical pilot in command: *I'm a new guy and I don't know enough to be anything else. I go where my leader goes. I do what my leader does. I do what I'm told to do. When the going gets tough, I move in a little closer and press on. If my leader gets in trouble, I stick with him. I watch him and try to learn from him because someday I want to be a leader.*

Pilots learn these skills and become potential leaders in regional F.A.S.T. clinics held several times during the year. Since the training is based upon flying with aircraft of the same type, members of the various signatory organizations flock together. In 2001, the clinics sponsored by the YPA included ones in Deer Valley, Arizona; North Platte, Nebraska; and Manitowoc, Wisconsin.

Whether at a larger clinic or a smaller get-together, ground school kicks off the weekend to bring the neophytes onto the same page as those with some formation background. The YPA conducts lessons from its own formation training manual, developed from countless hours of flying and discussion by Jeff Linebaugh, Mike McCoy, and Filucci as a type-specific course for pilots flying Chinese and Russian Yak aircraft, such as the CJ-6A and the Yak 52. It supplements the F.A.S.T-approved T-34 manual and video series by Darton International, *Formation Flying—The Art.* While the ground school is informal, and questions pepper in with banter from all quadrants, the message is serious: From engine start to engine shutdown, everything is planned, rehearsed, and discussed.

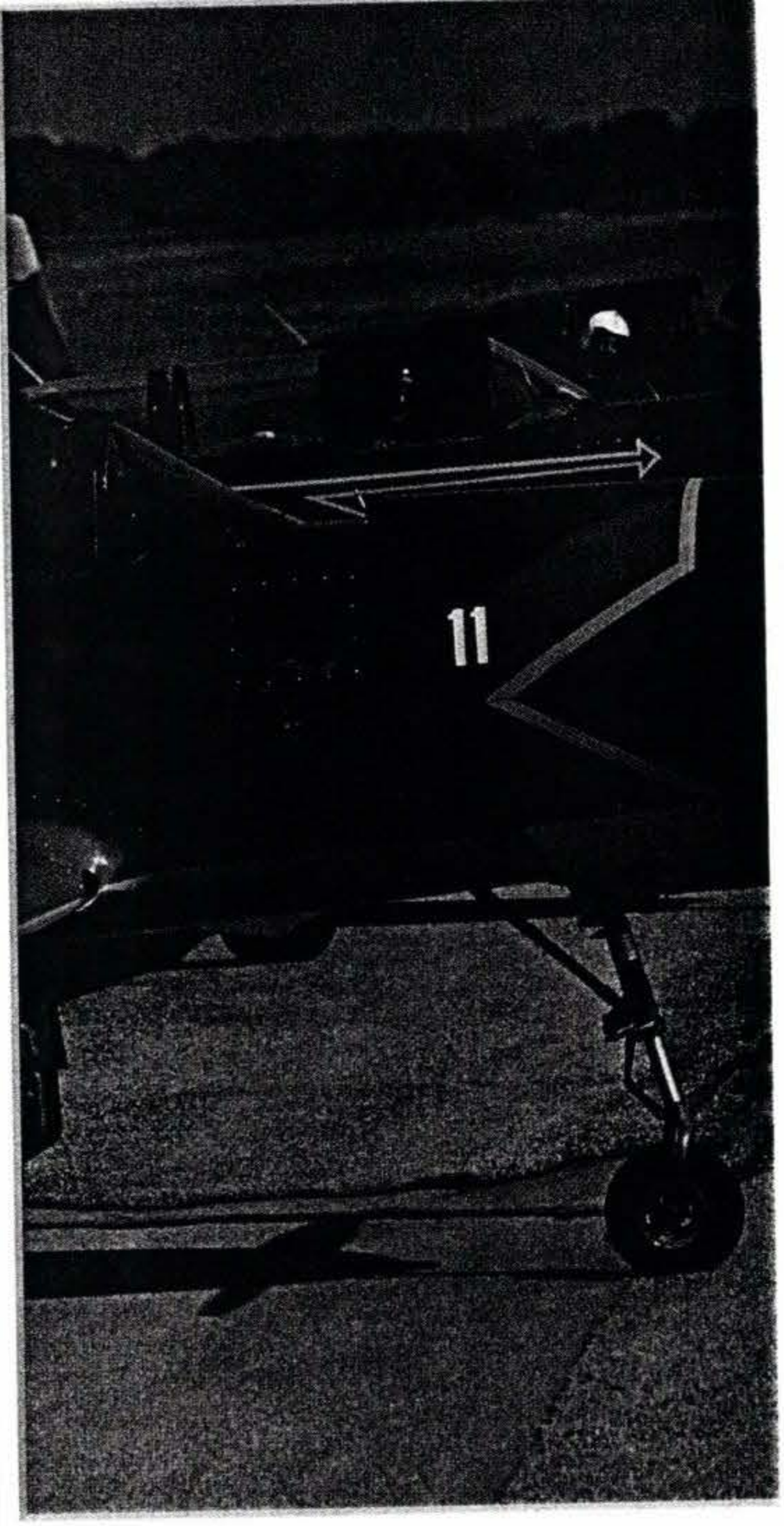
Over and over, the importance of premeditated, conscientious effort comes through. As stated in the manual, "The briefing is the single most important part of the flight." One of the truisms heard during the clinics I attended, "If you don't have time for the briefing, you don't have time for the mission," rang particularly true before a flight staged earlier this year in Virginia. The flight was a photo mission, and seven pilots were attempting to combine several aircraft types for a particular shot. The briefing felt rushed, and disagreements arose as to what power settings and maneuvers would be appropriate. Just as the tension in the meeting room of the FBO reached electric proportions, an experienced check pilot calmly said, "I'm not flying in this mission." Like dandelion seeds taking to the wind, pilots backed out of the flight until a more reasonable four-ship mission remained. The relaxed, professional briefing that followed set a far better tone.

Once the game's on, instructors and students fall out to the various aircraft, with a hack time set for engine start. This allows aircraft to start up together regardless of where they're parked on the ramp. Every facet of the flight from that moment on is an opportunity to practice precision and coordination.

An element consists of two aircraft, Lead and Two, or Three and Four, who begin the takeoff roll at each other's wing tip. The two elements then join up in a shallow turn during the climbout, the second pair using the geometry of the turn to close in on the lead element. When joined up, the flight accomplishes whatever maneuvers are on the slate for that day. Common practice sessions include formation changes, such as moves from fingertip to diamond or echelon formation. Cross-unders allow Lead to move aircraft in the formation from one side to the other, and wing work consisting of lazy 8s helps fledgling wing pilots practice station keeping, maintaining a constant position relative to Lead.

Some of the most fun that can be had flying is found in trail. Lead becomes an attitude indicator—albeit an exhaust-spewing, constantly moving one—in the wing pilot's windscreen. The idea is simple: Keep the airplane centered in your canopy. The execution, however, may involve wingovers, 60-degree banks, and aileron rolls—so hang in there!

When the tick list is completed, it's time to head back to base. After the Manitowoc clinic, held prior to EAA AirVenture last summer, I had the opportunity to fly a mission out of Oshkosh on day one of the fly-in. Returning to base involved following Lead, flown by Charlie Lynch, a F.A.S.T. instructor, via the Warbird Arrival, with a pitchout—or breakaway—over the numbers on Runway 36 at Wittman Regional Airport. To emphasize the concentration it takes a new formation pilot to keep station, I didn't realize fully where I was until I had almost touched down. From the backseat, Filucci said, "How does it feel to be landing in front of 8,000 people?" Chunk! I hit the asphalt firmly and lost spacing on Lynch ahead of me. The



mission isn't complete until everyone has taxied back and tied down.

Though its nature is different, the postflight debriefing is no less important than the preflight briefing. Everyone in the flight participates in the discussion, with the opportunity to assess others' performance along with his or her own—whether the flight has been primarily for training, practice, or display.

The harmony of the group speaks clearly in the tone of the critique: If comments are evenhanded, direct, and fair, each pilot gains from the mission. This is no time for coddling, but it's also inappropriate to dress down someone for the sake of another pilot's ego. Instead, the debriefing allows for each pilot to serve as an instructor. That attitude is a compliment to the F.A.S.T. leaders, some of the best instructors flying, who know that every voice in the formation is valuable.

One fact illustrates the success and dedication of pilots participating in the

Formation discipline begins before the props turn, with precision and attention to detail a matter of pride. Members of the flight look to Lead for the hand signal to start engines (left).

F.A.S.T. program: There has never been a F.A.S.T. formation accident, according to Cherwin. "We've prevented a problem," he says. "And there's a much larger interest in formation flying than there used to be."

For pilots looking to increase their overall skill and precision, formation flying offers serious rewards that must be earned, not purchased. "Just because you own an airplane—just because you have money—doesn't mean squat," says Sean Carroll, who received his wing pilot F.A.S.T. certification earlier this year. "It's that discipline that keeps us alive."

While a pilot outside the formation fraternity may scoff at this assessment, there is truth to it that cannot be ignored. The intense focus required in flying formation is not artificial—it's based on crude survival. No rationalization takes away the fact that, in these clinics and at airshows, a pilot flies less than 20 feet from another airplane moving at 100 to 150 knots.

Raw flying aside, there's another aspect of formation flying that develops with experience. When you find that special place—the sweet spot in both your position and skill, where that intense focus comes naturally—the meditation begins. Though the image of a guru in loose pants sitting in a mountain retreat at first clashes with four oil-breathing Nanchang CJ-6As in tight formation, for a pilot who has found this zone, the peace is the same.

What Filucci refers to—with a wink—as "the meaning of life," Lynch calls "a blast," and Carroll simply speaks of as "sacred" is the spirit of excellence that these pilots have found flying together. I had the good fortune to join up with them, and I look forward to the time when I can again call, "Two's in." AOPA

i Links to additional information about formation flying may be found on AOPA Online (www.aopa.org/pilot/links.shtml).

E-mail the author at julie.boatman@aopa.org