



FFI FORMATION GUIDELINES AND STANDARD PROCEDURES

March 15, 2020 Version 3.2

The **FFI Formation Guidelines and Standard Procedures** manual was written in order to combine information taken from various sources into a single reference document for use as a study guide for clinics or as a standardization tool for training. This Guideline is intended for RV type aircraft, but serves well as a standard for other civil aircraft when used in conjunction with aircraft specific supplemental materials (Bonanza, Mooney, etc). This manual reflects, in a short format, the Formation Flying, Incorporated (FFI) standards. Additional references include, but are not limited to, the Formation Pilot's Knowledge Guide and the FAST Formation Guideline series.

POLICIES, PROCEDURES AND TECHNIQUES

Policies and procedures create predictability and consistency.

- Policies are broad specifications about how the FFI Program and FFI Leadership expect operations to be conducted to minimize risk. FFI Program Philosophy, Policy and Principles are set forth in the FFI Program Manual.
- Procedures dictate the manner in which the FFI Program and FFI Leadership intend to have various tasks performed. Pilots are expected to accurately follow the procedure methodology during FFI formation operations.
- Techniques are individual methods or behaviors. Techniques must be compatible with established policies and procedures, and are only effective if they do not interfere with the expectations, situational awareness, or effectiveness of the other pilots in the flight. Techniques that violate FFI Policy, or alter FFI Standard Operating Procedures, are not authorized, unless there is no safer course of action.

VISUAL SIGNALS

Visual signals, both aircraft signals and hand signals, are used to the maximum extent possible to keep radio calls to a minimum. Any non-standard aircraft or hand signals will be thoroughly briefed before flight. All members of the flight are expected to be familiar with all aircraft and hand signals to be used. Aircraft malfunctions or safety related issues will be communicated over the radio.

AIRCRAFT SIGNALS

The following aircraft signals, when initiated by Lead, are commands for all Wingmen in the flight:

WING ROCK: Lead uses rapid aileron inputs to mildly rock wings. The flight will rejoin in Fingertip, from Route, Diamond, or Close Trail. If joining from wings level Close Trail, #2 is expected to join on Lead's left wing (or as pre-briefed), and #3 and #4 will always join on the opposite side. If in a turn during the wing rock, #2 would join to Lead's inside wing, #3 and #4 would take the opposite side. If joining from Diamond, #4 is the only aircraft who will reposition, and will always return to the same side as his element / section lead (#3). From Route, each wingman closes to Fingertip spacing. If in Echelon with Route spacing, the wing rock would signal to close the spacing while remaining in Echelon. If joining from Extended Trail, Lead uses a large wing rock and Wingmen conduct a standard rejoin by going out on the rejoin line.

FISHTAIL: Lead uses small movements of right and left rudder to move Wingmen from any formation to Route, 2-4 ship widths wide.

PORPOISE: Lead gently porpoises his airplane several times using elevator inputs to move Wingmen from Fingertip to Close Trail. #2 will slide back and behind Lead, #3 moves behind #2, #4 moves behind #3. This also applies during taxi, to signal a move from stagger to trail. During taxi, Wingmen all need to pass this signal by rocking their elevators in the same manner.

LANDING FROM THE BREAK (PITCHOUT)

After touchdown, it is important for the lead aircraft, (and subsequent Wingmen, if the flight consists of more than 2 aircraft), to avoid normal ground braking. Let the aircraft roll longer than the typical rollout to provide sufficient spacing for the aircraft following.

LANDING OPTIONS

Option 1: Centerline - Cold or Hot - Cold

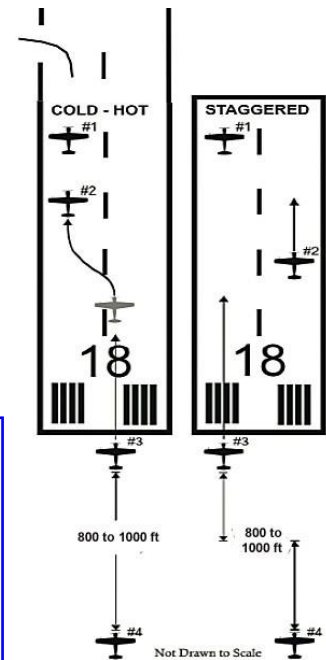
- Land on the centerline of the runway and, when “under control”, move to the **Cold Side**, which is the side of the runway the aircraft will exit from. This method provides for the **Hot Side** to be always available for passing or go-around, if necessary. This is the RV preferred method. It is also a valid technique to land on the hot side and transition or “fade” to the cold side when under control. Lead should brief the procedure to be used.

FLY YOUR AIRPLANE!

ALWAYS BE PREPARED FOR WAKE TURBULENCE

Option 2: Staggered

- All members land on alternate sides of the runway with a flight member on the Cold (Turn Off) Side calling “(Call Sign), **Cold**”, or “**3’s Cold**” to a member in front on the Hot Side when speed and closure is appropriate to cross over.
- The lead aircraft must NEVER turn to cross the path of the wingman as he (she) exits the runway, without being assured that the wingman has his (her) speed under control.



VFR PATTERN ENTRY - DOWNWIND BREAKUP

When a normal VFR pattern is required, Lead configures the flight in echelon away from the runway, maintaining an airspeed slightly above flap speed. A downwind entry is preferred, but a shallow 45 degree entry may be used. It is important to minimize any turns into the echelon. Lead will ‘kiss off’ the flight prior to the Perch, as he (she) prepares to turn to his (her) base leg. Each member then takes their own interval as they turn to base. Flaps will be lowered as each aircraft departs the Perch on the turn to base. Proper airspeed control is critical.

FORMATION LANDINGS - LANDING AS AN ELEMENT (SECTION)

Both aircraft will enter the pattern together as a flight of 2, in compliance with normal pattern rules. Lead should slow earlier than normal and configure the element / section sooner than normal. Plan to be at 87 KIAS / 100 MPH by mid-field downwind, with flaps extended.

- Extend Flaps to at least 10° on downwind. Flaps should be in their landing configuration prior to turning to base.
- Standard speeds to be flown:

Downwind	87 KIAS / 100 MPH
Base	78 KIAS / 90 MPH
Final	70 KIAS / 80 MPH
- Speeds other than those listed above may be briefed by Lead to suit the requirements of participating A/C.
- Lead may consider using less than full flaps, while Wingman uses full flaps, creating a drag advantage for Wing.
- Flap extension will be prefaced with a hand signal: **thumb and fingers together, opening and closing followed by a head nod to execute.**
- Approaches shall be flown wide and shallow and with power ON. Lead will limit angle of bank and rate of descent.

Only the title page and page pertinent to the investigation are included in this excerpt.