

# FFI Formation Guidelines and Standard Procedures

## Mooney Supplement (28 Dec, 2018; Rev 12)

This document describes formation flight differences between RV and Mooney aircraft. In conjunction with the *FFI Formation Guide*, this Supplement establishes the "Mooney Standard." Procedures contained in these documents need not be briefed, but Flight Leads always have the option of briefing alternate procedures and airspeeds as required.

**Element Take-Offs:** 100' minimum runway width. Flown no-flaps for J and earlier models. Takeoff flaps are recommended for K and later models. For elements of matched HP and weight, Lead will give the Wingman a 3" manifold pressure (MP) advantage. More or less MP may be briefed for aircraft of differing horsepower (HP). Wingman automatically retracts gear with Lead and then automatically transitions to fingertip.

**Interval Takeoffs:** Interval as briefed (as seconds or "air under the wheels"). Aircraft may use take off flaps, if desired, and full power. Gear up at pilot discretion. Straight-Ahead or Turning Rejoin, as directed by Lead.

**Rotation speed:** 70 KIAS to 80 KIAS.

**Climb-out:** Quickly accelerate to 100 KIAS and climb at 500 FPM. Climb rate may be decreased appropriately (as needed) if any 180 HP Mooneys or dissimilar aircraft are in the flight, but Lead will maintain 100 KIAS.

**Interflight Calls:** Radio calls may be used *in lieu of hand signals* in flight due to visibility issues within the cockpit of a Mooney. Radio directives will be acknowledged by wingmen. Alternatively, plane signals may also be used, if briefed.

**Pitchouts / Breaks:** Use 45° Angle of Bank (AOB) and five (5) second intervals for landings, use three (3) seconds for Rejoins, and use two (2) seconds for Extended Trail (ET). Left Breaks are favored for the two (2) second breaks to ET.

**Rejoins:** Lead maintains a constant 20° to 25° AOB for Turning Rejoins.

**Rejoin Reference Line:** *Trailing* edge of Mooney rudder aligned with the *leading* edge of the wingtip gives a 45° aspect angle reference line.

**Cruise speed:** 120 KIAS. (*Note: Lead may adjust for maneuvering with dissimilar or 180 HP aircraft in Flight, if needed.*)

**Maximum speed:** 150 KIAS

**Echelon Turns:** Maximum Bank angle 30°.

**Lazy Eight Maneuvering (Fingertip / Diamond / Close Trail):** Lead should work the formation up to maximum maneuver limits of  $+20^{\circ}$  /  $-10^{\circ}$  of pitch and at least  $30^{\circ}$  of bank. Avoid excessive nose down pitch. Due to the visibility restrictions inherent in cross-cockpit (wingman on left wing) flying, pilots need to develop proficiency in cross-cockpit Lazy Eight maneuvering.

**Extended Trail Entry:** Two (2) second spacing and  $45^{\circ}$  AOB. Lead will roll out after  $180^{\circ}$  to wait for the "4's In" call. With visual on all preceding aircraft and appropriate spacing, 4 may call "In" prior to rolling out in trail. (Note: May be entered from either Echelon or Close Trail, and Left Breaks are favored.)

**Extended Trail Maneuvering:** Lead should work the formation up to  $\pm 15^{\circ}$  pitch and at least  $45^{\circ}$  AOB, but should not exceed maximum maneuver limits of  $\pm 20^{\circ}$  pitch and  $60^{\circ}$  AOB. Excessive negative pitch should be avoided as this could lead to an overspeed of wingmen.

**Close Trail Spacing:** One ship length between aircraft, with adequate stackdown.

**Mooney Landing Profile (for Overhead Breaks, Element, and Single Ship Landings):** Pick an Aim Point that will allow landing 500 to 1,000 feet beyond the approach end of the runway. **Fly a stable, on speed (90 KIAS) approach with an approximate  $3^{\circ}$  glideslope, and avoid shifting your Aim Point.** At approximately 100 feet AGL (crossing the fence), begin a **SLOW, SMOOTH** power reduction. *Note: If performing an Element Landing, your wingman will mirror your actions, and Lead should not go to full idle (Lead leaves 1" of power in).* Do not flare aggressively, but rather just hold the nose off as you approach the runway. Touchdown will actually occur at 70 to 75 KIAS, approximately 500 feet beyond your Aim Point. **This is a NO FLAP landing.**

**Overhead Breaks:** Minimum two (2) miles for the Initial.  $45^{\circ}$  AOB with five (5) second intervals for landings. Wingmen will match bank angle of plane ahead with the goal of rolling out in trail on the downwind at 90 KIAS and with gear down. All aircraft make a "Perch, gear down" call for final check and to aid Lead's situational awareness. Then, use Mooney Landing Profile per above.

**Element Landings:** 100' minimum runway width. Wingman automatically extends gear with Lead and moves to acute, 10' minimum wingtip separation, level-stack position after gear extension and established on final. (See Mooney Landing Profile above).

## Mooney Fingertip References

These references give a 45° sight line that matches other FFI sight lines (e.g. RV, Bonanza). Larger images are available at <http://bit.ly/mooney-ffi>

**Note:** This is a change from the previous reference using the first flap hinge on the spinner.

- 1: Trailing edge of **second** flap hinge on cowl seam
- 2: Spinner slightly visible below wing
- 3: Opposite elevator visible



### Detail: 2nd flap hinge on seam

This is slightly out of position to show details.

The correct position is when these two points are touching.

## Mooney Takeoff / Landing References

Align Wingman's leading edge of wing with Lead's trailing edge of wing, and with sufficient wingtip clearance to ensure that each aircraft can clear the other in case of an abort or a blown tire. Put Lead's head on the horizon.



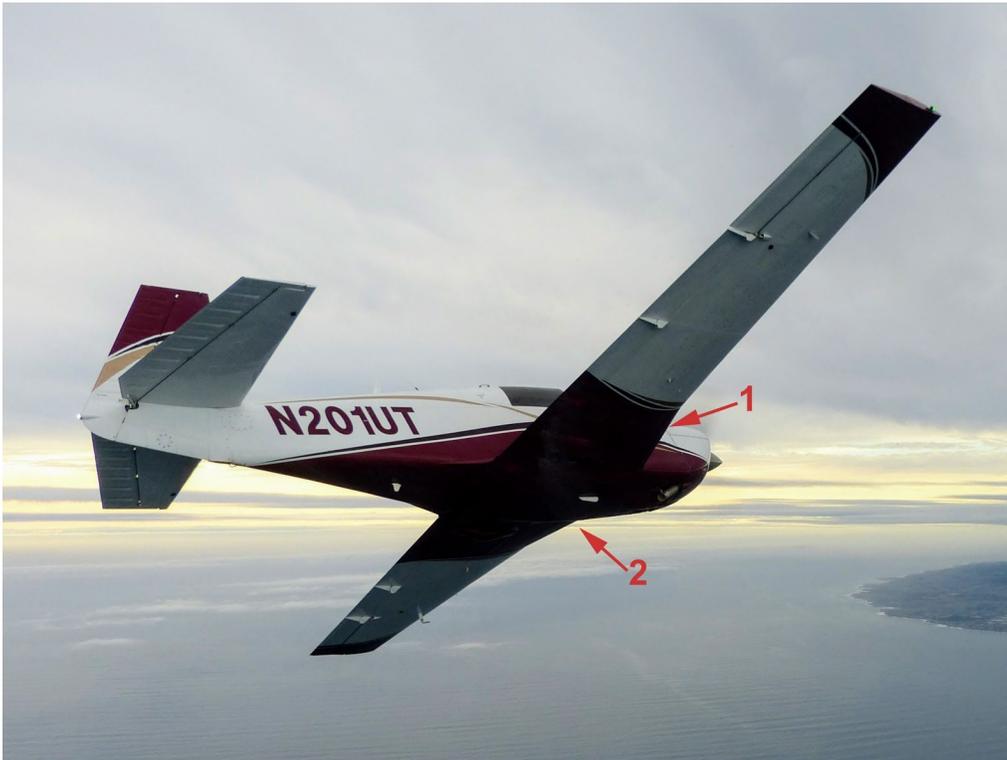
## Mooney Route Position References

Align lead's near wingtip on spinner. Some horizon visible below lead.



## Mooney Echelon Turn References

- 1: Leading edge of wing on vertical cowl seam
- 2: Sliver of horizon visible under belly



## Mooney Close Trail References

- 1: Put tail light at top edge of your windscreen
- 2: Center on lead by keeping the fuselage sides symmetrical
- 3: None of the upper wing visible

