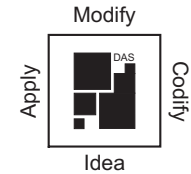


Phase II (Intermediate) Precision Aerobatics Introduction

The Mission: To efficiently build up the advancing aerobatic pilot's proficiency and enjoyment beyond the typical plateau of most flyers.

DAS System: 1. Add refinements to the basic looping and rolling maneuvers already performed routinely. 2. Feature rudder applications to counter the unwanted effects of wind and engine torque. 3. Anticipate corrections before deviations occur. 4. Refine and adapt the correction inputs to varying wind conditions. 5. Utilize all refinements to maintain a well positioned continuous aerobatic sequence in any condition.

I, David A. Scott, developed this *Precision Aerobatics* flight training system (Phase II) as the follow up to our accelerated *Sport Aerobatics* program (Phase I): After basic looping and rolling maneuvers have become routine, one can more effectively build in the natural progression of refinements required to fly those maneuvers with greater precision, and thus keep his or her R/C flying experience forever new (by prevailing over the ever changing conditions) and therefore more enjoyable. Flying is, after all, more fun when doing well and making progress!



DAS Precision Aerobatic Efficiency Requirements:

- A good airplane and airplane setup.
- A crawl-walk-run approach to teaching and learning.
- Understanding control effects upon aerobatic flight.
- A foundation of straight and level lines flown parallel to the runway.
- Situational awareness (wind direction and strength).
- Anticipating wind's effect upon the airplane.
- Maintaining proper entries into maneuvers.
- Sequencing individual maneuver steps.
- Continually questioning *why*, and the ability to *reflect* (learn by example).
- Solid basics to fall back on.

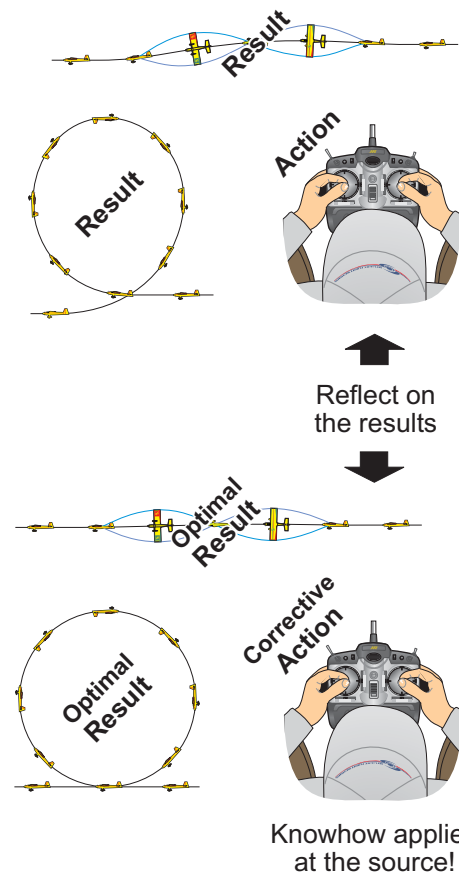
Outline of Instruction - Reactor v/s Controller (Part II)

The techniques featured in this program were developed from observing the two primary *types* of R/C flyers: *Reactors* base their actions in response to what they see the airplane doing; that is, using eye->to->hand coordination. These individuals, by definition, are slightly behind the airplane and typically wait to see a deviation before it occurs to them that a correction is or was needed. With little time to think, at best they struggle to make corrections, and at worst they make wrong corrections and whole maneuvers unravel. In view of the compound effect a deviation has on the rest of a maneuver, their skills tend to plateau at a point where reacting to deviations *after the fact* is already too late to perform any maneuver really well. If persistent, those who do get better at correcting deviations and their mistakes require great amounts of time and fuel to do so.

Controllers are knowledgeable, executing each maneuver using predictable commands with the plane following along. When a deviation is encountered, they take that opportunity to determine why it occurred. From that point forward they are able to anticipate the appropriate correction(s) to prevent the deviation from happening, before it happens. In other words, they learn to think *ahead of the airplane*.

The decisive quality here being that while reactors are often too busy attempting to correct deviations to really learn what's causing them in the first place, the controllers that this program is based on utilize their initial practice to pinpoint what's needed to make significant strides in just a few attempts!

Of course reacting has its place, and by first identifying what needs correcting, we are setting the stage to begin picking up on those final touches to perform all our maneuvers nearly perfect.



About the Manual

The objectives of this flight training manual are: To organize a logical lesson sequence and present the information in a way that can be quickly accessed while studying at home or practicing on a simulator or at the flying field — hence, each page can stand on its own and features a summary Key Point To Remember (KPTR) at the bottom to aid retention.

Instructor's practice note: At this stage it is easy to overly focus on refinements. Most of the challenges you will experience will not be with the refinements, but caused by rushing or overlooking one or more fundamentals that got you to this point, such as the position and quality of the maneuver's entry! Thus, if you experience difficulties adding a refinement, go back and reestablish your comfort with the basic Phase I version of the maneuver again, and it will then become easier to add. Always remember, a refinement only helps to perfect an otherwise good maneuver. Fundamentals dictate whether a maneuver is successful or not! So, if an attempt is botched, concentrate on your setup and basic step by step maneuver sequence. If it is close, but not quite there yet, you will get it soon with practice.

From its inception, 1st U.S. R/C Flight School has been driven to learn from its experience. This teaching system consists of the approaches and techniques proved over the course of training hundreds of R/C flyers whose interest in precision was in many cases not for purposes of competition, but to elevate their sense of control, accomplishment, and flying with purpose that only precision offers. That is clearly the type of flyer this program is aimed at, as well as those looking to compete and win 😊





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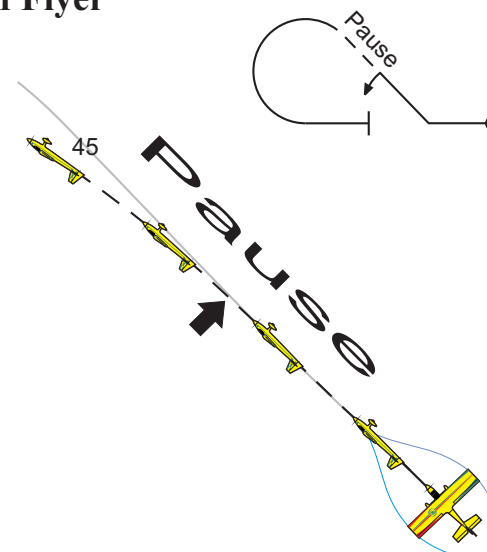
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Sequencing Revisited - and - A Third Type of Flyer

In *Sport Aerobatics* we laid the foundation to support the introduction of refinements through the practice of sequencing a *pause at neutral* between each basic step of the maneuvers. These pauses are now our opportunities to start recognizing what refinements we will need to add and when.

Example 1: During a reverse Cuban, after completing the half roll to inverted and pausing at neutral on the 45° upline, the airplane might be observed dropping out of the 45 slightly, requiring forward elevator pressure to hold the 45 next time. But wait! Upon further reflection, it did not start dropping right away, therefore the correction is not needed immediately.

So the pause at neutral and taking a moment to reflect would have taught: 1. If we don't have to worry about it dropping right away, all our attention can be kept on completing the half roll precisely. 2. The deviation was slight, thus only a slight amount of forward elevator pressure is needed, and not until about half way along the upline after the roll. In effect, we are learning to do more with less (initially).

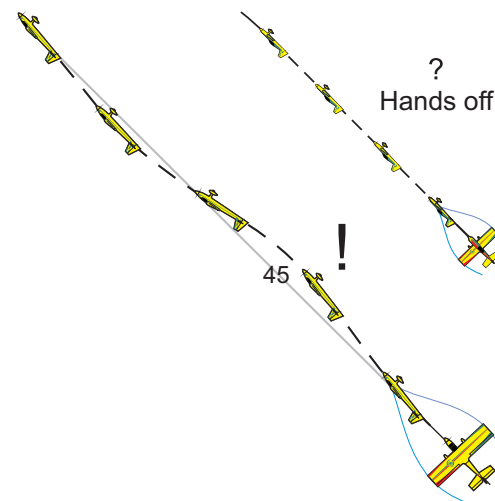


Now let's briefly consider one more *type* of flyer, and thus avoid a common stumbling block. Many flyers (esp. in competition circles) struggle with corrections they have been told are necessary without having determined to what degree they are needed, if at all.

Example 2: During a reverse Cuban, presuming the airplane will drop after rolling inverted, forward pressure is applied prematurely, requiring further corrections to return to the 45. But wait! Maybe the airplane is so "neutral", light, and/or powerful, that it would have held the 45 hands off?

In this example, when the results turn out not to be what the person was expecting, yet assuming that what he is trying to do is called for, this flyer is likely to view the deviation as the need for more practice and better reflexes. Consequently, he persists in making so many corrections that he does not catch on to the fact that he is having to fix his own fixes!

The point is: The airplane will show you where you need to apply your refinements, if you give it a chance, i.e., have cemented a solid step by step Phase I foundation.



Phase II Refined Aerobatic Maneuvers Group



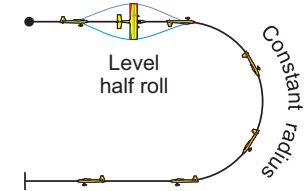
1. Horizontal Aileron Roll

A quick bump up immediately followed by holding in aileron all the way around. Bump forward elevator rolling through inverted.



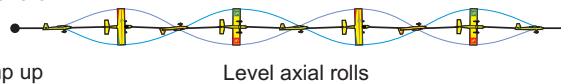
6. Reverse Immelmann (Split S)

A quick bump up elevator immediately followed by a half roll to inverted, followed by *floating* the pullout from 12:00 through 2:00—increasing the elevator to the normal loop amount at 2:00 through 6:00.



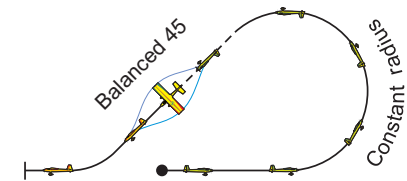
2. Consecutive Horizontal Rolls

A quick bump up immediately followed by holding in aileron. Bump forward elevator rolling through inverted. Bump up elevator rolling through upright.



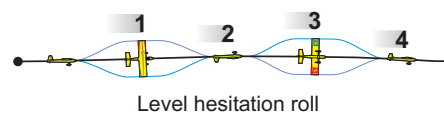
7. Half Cuban 8

Pull up elevator and hold. Reduce the elevator slightly at 2:00 through 10:00 and *float* over the top—neutral. Hold a 45° downline for equal lengths before and after the half roll to upright.



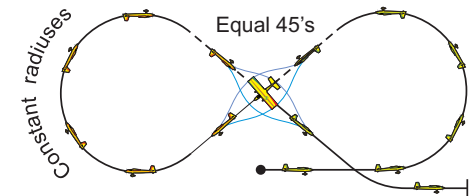
3. Horizontal 4-Point Roll

A quick bump up immediately followed by 4 aileron 1/4 rolls. Bump forward elevator at the inverted 2nd-point.



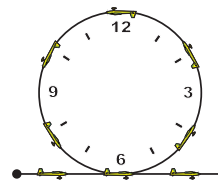
8. Cuban 8

One half Cuban 8 followed by another. *Float* over the tops. Equal length 45's before and after the half rolls to upright.



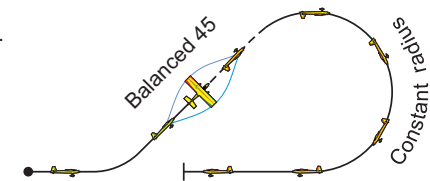
4. Round Inside Loop

Pull up elevator and hold. Reduce the elevator slightly at 2:00 through 10:00 and *float* over the top—returning the elevator to the initial amount at 10:00 through 6:00.



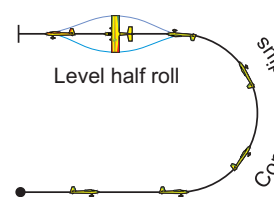
9. Half Reverse Cuban 8

Pull up to a 45° upline. Roll inverted. Hold the 45 for equal lengths before and after the half roll to inverted. *Float* the pullout from 10:00 through 2:00—increasing the elevator to the normal loop amount at 2:00 through 6:00.



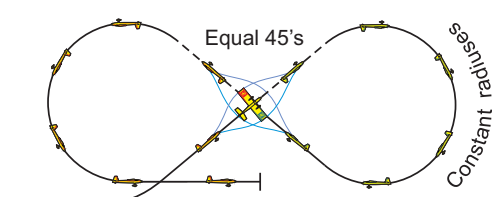
5. Immelmann

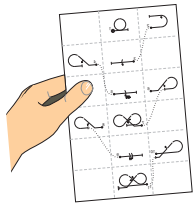
Pull up elevator and hold. Reduce the elevator slightly at 2:00 through 12:00, followed by a quick bump of forward elevator and a half roll to upright.



10. Reverse Cuban 8

One half reverse Cuban 8 followed by another. *Float* over the tops. Equal length 45's.





Aresti Symbol Basics Revisited

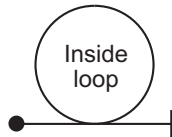
Graphics in this program are facsimiles of how the maneuvers will appear when flown and the Aresti system of diagramming aerobatic *figures* (maneuvers). Note: Utilizing Aresti (aerobatic shorthand) to map out your flights on paper beforehand is a great way to help cement your intentions, significantly improves your ability to remember things in the air, and serves as a review aid to make more meaningful assessments of your practice and track your progress.

1. A dot (●) signifies the start of a maneuver, and a cutoff line signifies its end.



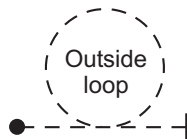
2. A solid line represents *positive* flight. E.g., if you were in the plane gravity or centrifugal force would be pulling you into your seat, as in upright normal flight or when pulling up elevator in a positive inside loop.

Note: While from your perspective on the ground the plane is upside-down (inverted) at the top of a loop, because the elevator is pulled back and the loop is positive throughout, the loop is drawn/symbolized with a solid line throughout.

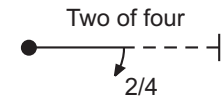
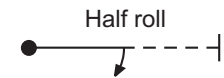
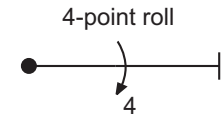
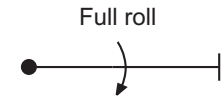


3. By comparison, a dashed line represents *negative* flight. E.g., if you were in the plane gravity or centrifugal force would be trying to pull you out of your seat, as in inverted flight or pushing forward elevator in a negative outside loop.

While at the top the airplane may be upright, because the elevator is pushed forward and the loop is negative throughout, it is drawn with a dashed line throughout.

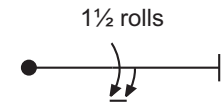


4. A full arrow running through a line signifies a full 360° aileron roll. A 4 or 8 next to it indicates it's a 4 or 8-point *hesitation* roll.

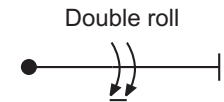
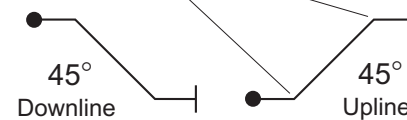


5. A shorter half arrow originating from the line signifies a half roll. A 2/4 or 4/8 fraction next to it indicates it's half of a 4 or 8-point hesitation roll.

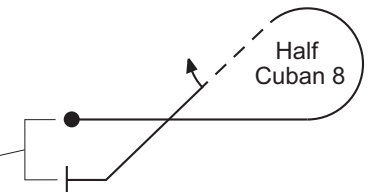
6. Consecutive rolls are illustrated with multiple arrows connected by a line at the arrow points.



7. Aresti is simplified by not drawing a radius when the pitch change is relatively brief, e.g., pulling up to a 45° upline. Note that these radii should be flown the same as any other partial or full loop, i.e., smoothly.



8. The offsetting of lines in some Aresti figures is intended to aid clarity by separating the entry from the end of the maneuver. Preferably, the entry and exit altitude of these maneuvers will be flown the same.



KPTR: Utilizing Aresti will help you to enter your flights with a more vivid understanding of what to do and track your progress afterward.