

Two Oceans Slope Soarers Aerobatic Event Rules 2016

With permission, from Radio Controlled Soaring Digest November 2015

Sportsman's Class Manoeuvres

| | Manoeuvres | K factor |
|----|--------------------------|-----------------|
| 1 | Split S | 5 |
| 2 | One inside loop | 5 |
| 3 | One roll | 5 |
| 4 | Stall turn | 6 |
| 5 | Immelmann | 6 |
| 6 | Half reverse cuban eight | 7 |
| 7 | Half cuban eight | 7 |
| 8 | Straight inverted | 7 |
| 9 | Two inside loops | 8 |
| 10 | Two rolls | 8 |
| 11 | Three turn spin | 8 |
| 12 | Double Immelmann | 9 |
| 13 | Outside stall turn | 9 |
| 14 | Three inside loops | 10 |
| 15 | Vertical eight | 10 |
| 16 | Reverse cuban eight | 10 |
| 17 | Cuban eight | 11 |
| 18 | Slow roll | 12 |
| 19 | Inverted eight | 12 |
| 20 | Barrel roll | 12 |
| 21 | Rolling loop | 12 |
| 22 | Square loop | 12 |
| 23 | Four point roll | 13 |
| 24 | Horizontal eight | 13 |

The K factor is the multiplying factor for the scoring and is a measure of the difficulty of the manoeuvre

Mandatory Manoeuvres

1. Split S. The model flies S & L, performs one half roll, immediately followed by one half loop, and then flies S & L. **K5**



2. One Inside Loop. The model flies straight and level (S & L), performs one inside loop and then flies S & L.

K5



3. One Roll. The model flies S & L, rotates smoothly around its longitudinal axis and then flies S & L.

K5



4. Stall Turn. The model flies S & L at 90 degrees to the centre line and just past the centre line, performs one-quarter of an inside loop (to a vertical attitude, and at a position about 45 degrees from the centre line from the viewpoint of the judges), continues to fly vertically upwards for a short distance, yaws (into wind) through 180 degrees, flies vertically downwards for a short distance, performs one-quarter of an inside loop, then flies S & L at the same altitude but on the opposite heading to the start of the manoeuvre. **Note:** A score of zero should be given if the model falls more forward or backward than sideways.

K6



5. Immelmann Turn. The model flies S & L, performs one half loop, immediately followed by one half roll, and then flies S & L.

K6



6. Half Reverse Cuban Eight. The model flies S & L with the manoeuvre starting before the centreline, performs one-eighths of a loop up the 45° line and half roll to inverted on centreline into five eighths of a loop then flies S & L at the same altitude but opposite heading to the start.

K7

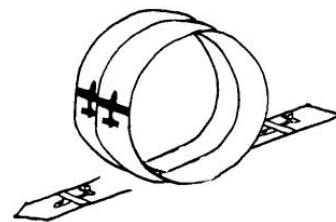
7. Half Cuban Eight. The model flies S & L, performs five-eighths of a loop (to an inverted 45° diving attitude), performs one half roll (the centre of the half roll being at the height of the centre of the loop), performs one eighth of a loop then flies S & L at the same altitude but opposite heading as the start. **K7**

8. Straight Inverted Flight. The model flies S & L, performs one half roll, flies S & L inverted for about five seconds, performs a second half roll, performs a second half roll, and then flies S & L.

K7



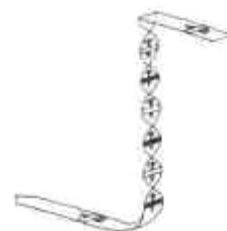
9. Two Inside Loops The model flies S & L, performs two consecutive inside loops and then flies S & L.
K8



10. Two Rolls The model flies S & L, rotates 720° around its longitudinal axis and then flies S & L.
K8



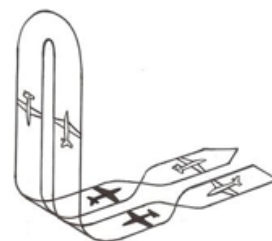
11. Three Turn Spin The model flies S & L into wind, slows down until it stalls and, in a fully stalled condition, falls into a spin. At the end of three revolutions the model recovers from the spin, flies vertically downwards to regain flying speed, performs one-quarter of a loop, and then flies S & L in the same direction as the start of the manoeuvre.
K8



12. Double Immelmann The model flies S & L and performs one half loop, immediately performs one half roll, flies S & L for about one second, performs one half outside loop, immediately performs one half roll then flies S & L at the same altitude and heading as the start of the manoeuvre.
K9



13. Outside Stall Turn The model flies S & L then rolls 180° to inverted on the centreline. The model then pushes to vertical and performs a stall turn. Push to inverted level attitude on the base line and roll 180° back to wings level and upright on the centreline. Model exits flying S+L.
K9

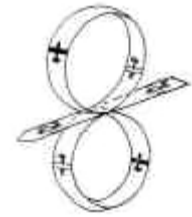


14. Three Inside Loops The model flies S & L, performs three consecutive inside loops and then flies S & L.
K10



15. Vertical Eight The model flies S & L, performs one inside loop, immediately performs one outside loop, then flies S & L at the same altitude and heading as the start of the manoeuvre.

K10

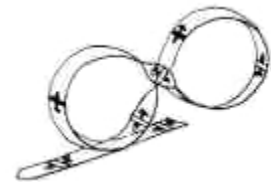


16. Reverse Cuban Eight The model flies S & L with the manoeuvre starting before the centreline, performs one-eighths of a loop up the 45° line and half roll to inverted on centreline into three quarters of a loop, up the 45° line and half roll to inverted on centreline, performs five eighths of a loop then flies S & L at the same altitude and heading as the start.

K10

17. Cuban Eight. The model flies S & L, performs five-eighths of a loop (to an inverted 45° diving attitude), performs one half roll (the centre of the half roll being at the height of the centre of the loop), performs three quarters of a loop (to an inverted 45° diving attitude, with the centre of the loop at the same altitude as the first loop), performs one half roll (the centre of the half roll being at the height of the centre of the loop), performs one eighth of a loop then flies S & L at the same altitude and heading as the start.

K11



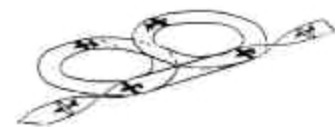
18. Slow Roll The model flies S & L, performs one roll then flies S & L. The roll shall be at a uniform rate and shall take approximately five seconds. **Note:** A significantly faster roll should be downgraded proportionately, e.g. a roll executed in approximately 3 seconds should be downgraded 50%, and a roll executed in 1 second scored zero.

K11



19. Inverted Eight The model flies S & L across wind, performs one half roll to an inverted attitude, turns (into wind) through 90°, immediately turns in the opposite direction through 360°, immediately turns in the first direction through 270°, performs one half roll, then flies S & L at the same altitude and heading as the start of the manoeuvre.

K12



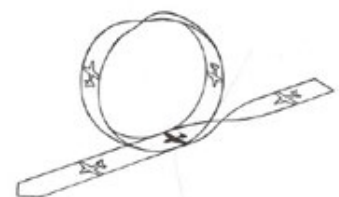
20. Barrel Roll The model flies S & L then rotates at a constant roll rate around both the longitudinal and vertical axes (i.e. outside loop and roll at the same time). The model should enter and exit the manoeuvre on the same heading, but should be flying at 90° to this heading when the model crosses the centre line at the highest point of the manoeuvre. The model exits the manoeuvre by flying S & L at the same altitude and heading as the entry.

K12



21. Rolling Loop The model flies S & L then rolls 180° to inverted on the centreline and immediately pushes half an outside loop. At the top the model rolls 180° to inverted and pulls the second half of the loop to exit wings level and upright. Model finishes by flying S & L.

K12



22. Square Loop This is a variation of the basic loop. The two vertical lines and the horizontal line on top have to be of the same length. The exit line at the bottom has to be at least as long as the other three sides. The quarter loops that connect the four sides have to have the same radius at each corner.

K12

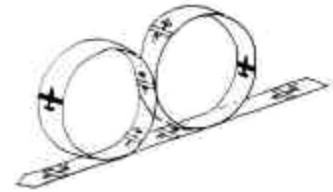
23. Four Point Roll The model flies S & L, rolls through 90° to a knife-edge attitude, hesitates briefly before repeating the quarter-rolls and hesitations back to a wings-level attitude, then flies S & L.

K13



24. Horizontal Eight The model flies S & L, performs three-quarters of an inside loop (to a vertically downward attitude), performs one outside loop (to a vertically downward attitude), performs one quarter of an inside loop then flies S & L at the same altitude and heading as the start of the manoeuvre.

K13



Expert Class Manoeuvres

| List A | | |
|---------------|---------------------------------|-----------------|
| | Manoeuvres | K Factor |
| 1 | Three turn spin | 8 |
| 2 | Outside stall turn | 9 |
| 3 | Alternating roll | 12 |
| 4 | Slow roll | 12 |
| 5 | Four point roll | 13 |
| 6 | Three rolls | 13 |
| 7 | Ching ching chong chong | 14 |
| 8 | Four point toss roll | 14 |
| 9 | Eye of the tiger | 15 |
| 10 | Figure M | 15 |
| 11 | Thread the needle | 15 |
| 12 | Sharks tooth | 15 |
| 13 | Damian roll | 16 |
| 14 | Eight point roll | 17 |
| 15 | Rolling stall turn | 17 |
| List B | | |
| | Manoeuvres | K Factor |
| 1 | Three inside loops | 10 |
| 2 | Vertical eight | 10 |
| 3 | Reverse cuban eight | 10 |
| 4 | Cuban eight | 11 |
| 5 | Downward six | 12 |
| 6 | Rolling loop | 12 |
| 7 | Three outside loops | 12 |
| 8 | Square loop | 12 |
| 9 | Horizontal eight | 13 |
| 10 | Outside reverse cuban eight | 13 |
| 11 | Outside cuban eight | 14 |
| 12 | Twisted loop | 14 |
| 13 | Outside barrel roll | 14 |
| 14 | Horizontal eight with half roll | 17 |
| 15 | Sunny side up | 17 |

LIST A

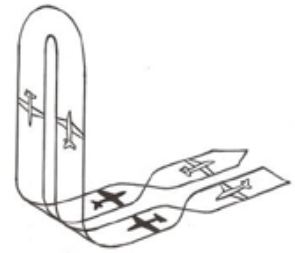
1. Three Turn Spin The model flies S & L into wind, slows down until it stalls and, in a fully stalled condition, falls into a spin. At the end of three revolutions the model recovers from the spin, flies vertically downwards to regain flying speed, performs one-quarter of a loop, and then flies S & L in the same direction as the start of the manoeuvre.

K8



2. Outside Stall Turn The model flies S & L then rolls 180° to inverted on the centerline. The model then pushes to vertical and performs a stall turn. Push to inverted level attitude on the base line and roll 180° back to wings level and upright on the centerline. Model exits flying S+L.

K9



3. Alternating Roll The model flies S & L then rolls 180° to inverted, hesitates then rolls 360° in the opposite direction back to inverted, hesitates and then rolls 180° again in the original direction back to wings level and upright and exits flying S & L. Half way through the 360° roll must be on the centre line.

K12



4. Slow Roll The model flies S & L, performs one roll then flies S & L. The roll shall be at a uniform rate and shall take approximately five seconds. **Note:** A significantly faster roll should be downgraded proportionately, e.g. a roll executed in approximately 3 seconds should be downgraded 50%, and a roll executed in 1 second scored zero.

K12



5. Four Point Roll The model flies S & L, rolls through 90° to a knife-edge attitude, hesitates briefly before repeating the quarter-rolls and hesitations back to a wings-level attitude, then flies S & L.

K13



6. Three Rolls The model flies S & L, performs three consecutive rolls, and then flies S & L.

K13

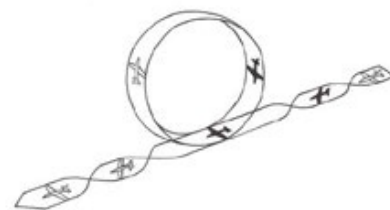


7. Ching - Ching - Chong - Chong The model flies S & L then performs 2 out of 4 of a four point roll with hesitations at 90 degrees and 180 degrees then rolls in the opposite direction to perform another 2 out of 4 of a four point roll with a hesitation at 90 degrees to bring the model back to the upright position then flies S & L.

K14

8. Four Point TOSS Roll. The model flies S & L then performs two points of a four point roll, on the centre line the model performs an outside loop followed by the remaining two points of the four point roll. Model exits flying S & L.

K14



9. Eye of the Tiger Eye of the Tiger is a triangle standing on its head. The model flies S&L, on the centre of the base line the models pulls to a 60 degree up line, at sufficient height to create a presentable size triangle, the model is pulled through 120 degrees to fly level and inverted. Once the model has flown an equal length leg, it is again pulled through 120 degrees to fly a 60 degree down leg, once the model reaches the centre point of the base line, it is pulled through 60 degrees to exit the manoeuvre flying S&L.

K14

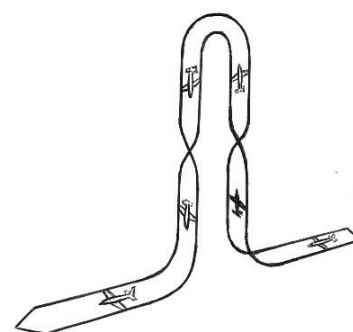
10. Figure M The model flies S & L, performs one quarter of an inside loop, continues to fly vertically upwards for a short distance, yaws (into wind) through 180°, flies vertically downwards for a short distance, performs one half of an outside loop, continues to fly vertically upward for a short time, yaws (into wind) through 180°, flies vertically downward for a short distance, performs one quarter of an inside loop, then flies S & L at the same altitude and heading as the start of the manoeuvre. **Note:** A score of zero should be awarded if, in either stall turn, the model falls more forward or backward than sideways.

K15



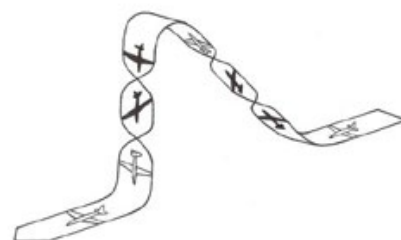
11. Thread the Needle The model flies S & L, performs one-quarter of an inside loop to a vertical up-line on the centre line. The model then rolls through 90° so that the top side (canopy side) of the model is facing the judges. The model continues on the vertical up-line then jaws through 180° as per stall turn manoeuvre. The model travels halfway down the vertical down-line before rolling through 90° followed by a second equal length down-line before performing a one-quarter of an inside loop, then flies S & L at the same altitude and heading as the start of the manoeuvre.

K15



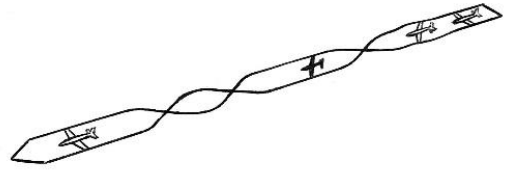
12. Sharks Tooth The model flies S & L then pulls to a 45° up line. Half way to the top the model performs two points of a four-point roll. At the top of the 45° line, pull a tight radius (as on a square loop) to a vertical down line which must be on the centreline. Half way down the model must perform two points of a four-point roll and then is pulled to wings level and upright on the base line. Model finishes by flying S & L.

K15



13. Damian Roll. The model flies S & L, rolls through 90° to knife-edge attitude, hesitates briefly before rolling in the opposite direction through 180° to knife-edge attitude, hesitates briefly, then rolls in the opposite direction through 450° to a wings level attitude, then flies S & L.

K16



14. Eight Point Roll The model flies S & L then performs eight 45° rolls with equal hesitations between each 45° ending with wings level attitude and flying S & L. Plane must be horizontal inverted when on the centre line.

K17



15. Rolling Stall Turn The model flies S&L on the base line, at the centre it performs a half roll to inverted, after 2 seconds the model is pushed to a vertical up line. Half way up, the model performs a half roll, at the top of the vertical line, a stall turn is executed, half way down the vertical line, the model again performs a half roll. The model is pushed to straight and inverted on the base line and when reaching the centre point, the model performs a final half roll to exit the manoeuvre flying S&L.

K17

List B

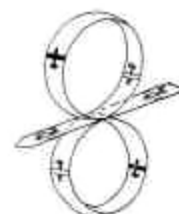
1. Three Inside Loops The model flies S & L, performs three consecutive inside loops and then flies S & L.

K10



2. Vertical Eight The model flies S & L, performs one inside loop, immediately performs one outside loop, then flies S & L at the same altitude and heading as the start of the manoeuvre.

K10

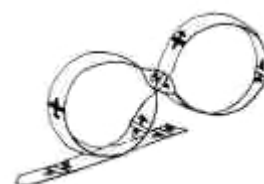


3. Reverse Cuban Eight The model flies S & L with the manoeuvre starting before the centreline, performs one-eighths of a loop up the 45° line and half roll to inverted on centreline into three quarters of a loop, up the 45° line and half roll to inverted on centreline, performs five eighths of a loop then flies S & L at the same altitude and heading as the start.

K10

4. Cuban Eight The model flies S & L, performs five-eighths of a loop (to an inverted 45° diving attitude), performs one half roll (the centre of the half roll being at the height of the centre of the loop), performs three quarters of a loop (to an inverted 45° diving attitude, with the centre of the loop at the same altitude as the first loop), performs one half roll (the centre of the half roll being at the height of the centre of the loop), performs one eighth of a loop then flies S & L at the same altitude and heading as the start.

K11

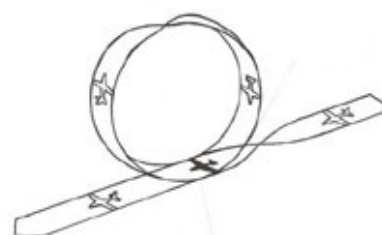


5. Downward Six. Flying with wings straight and level near the top of the box, half roll to inverted. At the end of the leg, pull to a vertical down line on the centre line. Before reaching the bottom of the box, pull ¾'s of a loop exiting inverted. A second later, half roll to upright and finish with wings straight and level. NOTE: The top radius must be the same radius as the ¾ loop. **K12**



6. Rolling Loop The model flies S & L then rolls 180° to inverted on the centreline and immediately pushes half an outside loop. At the top the model rolls 180° to inverted and pulls the second half of the loop to exit wings level and upright. Model finishes by flying S & L.

K12



7. Three Outside Loops. The model flies S & L, performs three consecutive outside loops (downward) and then flies S & L.

K12

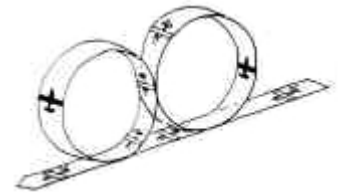


8. Square Loop This is a variation of the basic loop. The two vertical lines and the horizontal line on top have to be of the same length. The exit line at the bottom has to be at least as long as the other three sides. The quarter loops that connect the four sides have to have the same radius at each corner.

K12

9. Horizontal Eight The model flies S & L, performs three-quarters of an inside loop (to a vertically downward attitude), performs one outside loop (to a vertically downward attitude), performs one quarter of an inside loop then flies S & L at the same altitude and heading as the start of the manoeuvre.

K13



10. Outside Reverse Cuban Eight The model flies S & L, rolls inverted before crossing the centerline and continues level inverted briefly, then performs 1/8 of an outside loop (to an inverted 45 degree climbing attitude), performs 1/2 roll (the centre of the 1/2 roll being at the height of the centre of the loop), performs 3/4 of an outside loop (to an inverted 45 degree climbing attitude), performs 1/2 roll (the centre of the half roll being at the height of the centre of the loop), performs 5/8 of an outside loop then flies level inverted for a brief moment before performing 1/2 roll to upright and flies S & L to complete the maneuver.

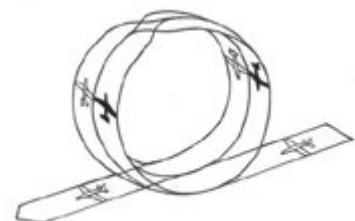
K13

11. Outside Cuban Eight The model flies S & L, rolls inverted before crossing the centerline, performs 5/8 of an outside loop (to an upright 45 degree diving attitude), performs 1/2 roll (the centre of the 1/2 roll being at the height of the centre of the loop), performs 3/4 of an outside loop (to an upright 45 degree diving attitude), performs 1/2 roll (the centre of the half roll being at the height of the centre of the loop), performs one eighth of an outside loop then flies level inverted for a brief moment before performing 1/2 roll to upright and flies S & L to complete the maneuver.

K14

12. Twisted Loop The model flies S & L, on the centreline pull half a loop. At the top of the loop the model rolls 180° to upright then performs one full outside loop where at the top of the loop again the model rolls 180° to inverted and pulls half a loop to finish wings level and upright on the centre line. Model exits flying S & L.

K14



13. Outside Barrel Roll The model flies S & L then rolls 180° to inverted then rotates at a constant roll rate around both the longitudinal and vertical axes (i.e. outside loop and roll at the same time). The model should enter and exit the manoeuvre on the same heading, but should be flying at 90° to this heading when the model crosses the centre line at the highest point of the manoeuvre. The model exits the manoeuvre by rolling 180° to upright then flying S & L at the same altitude and heading as the entry

K14

14. Horizontal Eight with Centre Rolls Enter with wings straight and level, before the centre line, pull the first $\frac{1}{4}$ of a loop and perform a half roll which is on the centre line. Continue by pushing a complete outside loop and again on the centre line, perform a half roll. Push $\frac{5}{4}$'s of an outside loop to exit upright and with wings straight and level.

K17



15. Sunny Side Up The model flies S & L, starts $\frac{1}{4}$ inside loop then rolls $\frac{1}{2}$ roll as the model approaches vertical and continues to push $\frac{1}{2}$ an outside loop until the model approaches vertical then does $\frac{1}{2}$ roll and pulls $\frac{1}{4}$ inside loop then flies S & L to complete the manoeuvre.

K17