

3DX Singapore 2009 format

3DX Singapore format – entrants will be asked to fly 5 Set Maneuvers from the list in Annex A, and will also have to fly a 3 minute Freestyle sequence.

3DX Singapore will be organized as a regional 3D R/C helicopter competition. All 3D pilots from Singapore and regional countries are invited to take part in this exciting competition. There will only be a maximum of 15 entrants for this competition. Successful registration is on a first come basis.

Competition categories

Entrants have to choose to compete in either category A or B.

For category A entrants, they are to choose 5 set maneuvers that sums up to a K factor score ranging from 5 to 8.

For category B entrants, they are to choose 5 set maneuvers that sums up to a K factor score ranging from 8.5 to 14.5.

Scoring

Competitors have to choose 5 set manoeuvres with total K factor of 5 or more. For example, if pilot A chooses 5 manoeuvre (all K=1) and his score is 10,8,8,7,8.

Then his overall score is 41.

If pilot B chooses 5 manoeuvre (K=1,1,1,1,2) and his score is 10,8,8,6,3x2.

Then his overall score is 38.

The score will not be normalised to 100 points.

For freestyle, Pilot A scores 29 out of 50 and Pilot B scores 40 out of 50.

The final score for A is $41+29=70$ and B is $38+40=78$. And B wins.

In summary, the pilot can maximise his score by choosing a higher k factor, provided he can do it well."

Technical specifications of a 3DX R/C helicopter

Motor maximum piston engine displacement 15 cubic cm two cycle or 20 cubic cm four cycle or 25 cubic cm gasoline only. Electric motor is limited to a maximum no load voltage of 42 volts for the propulsion circuit. The use of gyros for the purpose of a flybarless rotorhead is allowed. All metal main and tail rotor blades are not allowed. The weight of the R/C helicopter without fuel / with batteries must not exceed 6 kg. The length of the main rotor blade measured from the root to the tip must not exceed 750mm.

Annex A – Set Manoeuvre

No	'K'	Manoeuvre	Judges Notes
1	1	Travelling Backwards Flip	With the aircraft travelling forwards along the flightline, a backwards flip is performed. The manoeuvre will be flown at medium speed maintaining constant height, direction and speed throughout.
2	1	2 x 4 point Backward Roll	With the model moving backwards at medium pace, the model will be aileron-rolled twice, each roll being clearly delineated by 4 hesitation points.
3	1	540 Bounce	This manoeuvre consists of 2 inverted stationary 540° pirouettes, 1 in each direction with the minimum hesitation at direction reversal. The manoeuvre will be entered from a stationary hover and should start and finish nose-in.
4	1	Stationary Metronomes	This manoeuvre consists of a repetitive metronome with 6 pitch-reversals. The manoeuvre will be symmetrical about the centreline and of consistent height and speed. The manoeuvre may be performed tailboom vertical or horizontal.
5	1	Pie Dish	The helicopter will prescribe remote circuits centred on the contest centreline. The model will maintain an acute angle while flying sideways at constant speed, altitude and attitude. There will be at least 4 complete revolutions, skids in, skids out, nose up or nose-down.
6	1	Figure 8 Inverted Circuit	The model should describe a uniform Figure 8 at a slow pace with consistent height and correctly centered.
7	1	Backwards Loop	While traveling along the flightline in a backwards direction, the helicopter will perform a single backwards loop. The judges will be looking for a good 'round' loop, centring, and consistent entry and exit points.
8	1	Stationary Fwd/ Bkwd Flips (2)	The stationary forward / backward flips will be marked on good positioning and consistency, not necessarily the lowest altitude.
9	1.5	Tumbling Loop	The model will perform continuous Forward or Backward tumbles while it describes a Forward or Backward Loop in the sky. The Loop will be centred and the rate of tumbling will be uniform.
10	1.5	Knife-edge Pirouette	The knife edge pirouette should be entered from medium / fast-forward flight and top scores will be generated from accuracy and good positioning.
11	1.5	Inverted Backward Loops	This manoeuvre consists of 2 consecutive inverted backward loops entered from backward inverted flight.
12	1.5	Sustained Chaos	The chaos should be sustained for a minimum of 10 seconds, up to a maximum of 30 seconds. The Manoeuvre will be stationary in front of the pilot and accurately centred.
13	1.5	Inverted Nose-in Circuit	The circuit will be flat and slow with consistent height and properly centred on the pilot and judges.

14	1.5	Snake	This snake-like manoeuvre should be performed along the flight line and consist of at least 4 joined crescents, tailboom-horizontal, switching skids-in to skids-out and vice-versa between crescents.
15	1.5	Elevator Slapper	This manoeuvre consists of a series of tailboom-vertical metronomes with a half aileron roll between the metronome stop points. 6 pitch reversals are required, and the model will retain constant tailboom orientation. The roll will be centred at the mid-point of the arc.
16	1.5	Forward Rolling Loop	The forward rolling loop consists of a loop while performing a minimum of 2 consecutive rolls. The manoeuvre shall have a consistent roll rate with a circular loop centred on the judges eye-line.
17	1.5	Death Spiral	The Death Spiral consists of a minimum 50m vertical drop with Elevator Rolls while descending on knife-edge. The vertical path should be on the judges eye-line and recovery shall be as low as the pilot is comfortable with and inverted.
18	1.5	Pirouetting Roll / Flip	The 2 pirouetting rolls / flips will be executed as a travelling manoeuvre continuously with no hesitation.
19	1.5	Backwards Rolling Circle	A horizontal circle performed with backward aileron rolls. The manoeuvre will be centred on the judges eye-line and exhibit accurate positioning and height control with a consistent rate of rolling.
20	1.5	K 1.5 Auto*	The K1.5 auto consists of an autorotational landing with a 360° Aileron Roll. The manoeuvre will show consistent height loss, uniform forward speed and land as close as possible to a marker positioned 3m in front of the pilot on the field centreline.
21	2	Backwards Rolling 8	A horizontal figure 8 performed with backward aileron rolls. The lobes of the 8 will be centred on the judges view line. The manoeuvre will exhibit accurate positioning and height control with a consistent rate of rolling.
22	2	Tumbling 8	A horizontal figure 8 performed with either forward or backward tumbles. The lobes of the 8 will be begin and end on the judges eye line. The manoeuvre will exhibit accurate positioning and height control with a consistent rate of tumbling.
23	2	Chaos Loop	The judges will be looking for an accurate progressive loop made from a travelling chaos. The Chaos pirouette rate should be fast and the more chaoses through the loop the better.
24	2	Cracking Chaos	A Sustained Chaos (10-15 seconds) performed while cyclic cracking. Artificial aids to cracking are NOT permitted, it must be done using the transmitter control stick.
25	2	Woggle	A forward-rolling horizontal circle joined at the farthest point from the judges to a vertical forward-rolling circle. Entry point is immediately in front of the pilot.
26	2	K2 Auto*	The K2 auto consists of an autorotational landing beginning with a 360° Aileron Roll, followed by a further half roll to inverted, and ending with a Forward Elevator Flip. The manoeuvre will show consistent height loss, uniform forward speed and land as close as possible to a marker positioned 3m in front of the pilot on the field centreline.

27	2.5	Pirouetting Waltzer	This manoeuvre is a series of at least 4 tight dynamic Pirouetting Walls of Death joined together to form a circle. The helicopter must complete one complete circle centred on the judges eye-line.
28	2.5	Drunken Sailor	Backwards aileron-metronoming horizontal 8. With the tailboom horizontal and the helicopter moving backwards, the machine is made to prescribe a horizontal figure 8 while height is maintained by a series of aileron/pitch metronomes.
29	2.5	Serpent	A Pirouetting Snake flown as a series of arcs along the flightline with a 180 degree turn-around followed by the same number of arcs in the reverse direction down the flightline. At least 4 arcs in each direction, all arcs to be the same size, height and speed and the pirouette rate to remain constant.
30	2.5	Pirouetting Globe	This is a succession of Pirouetting Loops, but with the axis of the loop rotating by degrees for each loop until an imaginary globe in the sky has been prescribed. Exit from the manoeuvre should be the same as the point of entry, but with the helicopter moving in the opposite direction. The Manoeuvre will consist of at least 4 loops.
31	2.5	Singapore Sling 09	Pirouetting Metronome with a stop and reversal of pirouette direction at each arc reversal. The Tailboom position at the point of reversal must be the same at each reversal of pirouette direction. At least 6 reversals are required to complete the manoeuvre. Judges will be looking for consistent stop points, accurate height control and at least 2 complete pirouettes per arc required.
32	2.5	Wheel of Fortune	Metronoming Vertical Circle. The helicopter will begin the manoeuvre from a stationary elevator metronome at sufficient height to complete a downwards vertical circle, with the nose pointing vertically down and the full rotor disk presented to the pilot and judges. The helicopter shall then prescribe a complete vertical clockwise metronoming circle with the helicopter nose always pointing towards the centre of the circle.
33	2.5	4 Leaf Clover	Entered from horizontal pirouetting flight at the centre of the manoeuvre, the helicopter will fly a vertical erect 8 and a vertical sideways 8 to create a four leaf clover shape in front of the judges.
34	2.5	K 2.5 Auto*	The K2.5 auto consists of an autorotational landing beginning with a Pirouetting Flip, followed by a 360° Aileron Roll, a further half roll to inverted, and ending with a Forward Elevator Flip, which should be as low as the pilot is comfortable with. There must be a minimum fall of 10m in autorotation before the Pirouetting Flip begins. The manoeuvre will show consistent height loss, uniform forward speed and land as close as possible to a marker positioned 3m in front of the pilot on the field centreline.
35	3	Clock Tower	The manoeuvre is entered from forward horizontal flight with a pull-up to vertical followed by a quarter roll to present the rotor disk to the judges. As the model loses upwards momentum, a Big Ben manoeuvre is flown, followed by a tail slide, quarter roll and push-out to leave the manoeuvre from the opposite side to entry and at the same height.
36	3	Anaconda	Serpent with pirouetting direction reversed at each arc. A Pirouetting Snake flown as a series of arcs along the flightline with a 180 degree turn-around followed by the same number of arcs in the reverse direction down the flightline. The judges require at least 4 arcs in each direction, all arcs to be the same size, height and speed and the direction of pirouette to reverse at the end of

			each arc.
37	3	Pole Star	Pirouetting Globe with Pirouette direction reversal at South Pole. This is a succession of Pirouetting Loops entered at the South Pole, but with the axis of the loop rotating by degrees for each loop until an imaginary globe in the sky has been prescribed. The direction of pirouetting will reverse at every successive South Pole as the manoeuvre progresses. Exit from the manoeuvre should be the same as the point of entry, but with the helicopter moving in the opposite direction. The Manoeuvre will consist of at least 4 pirouetting loops.
38	3	Death Spinner	A vertical descent with the rotor disk vertical and rotating on a vertical axis with the helicopter pirouetting also. Judges are looking for a perfect vertical descent through at least 50m with a recovery as low as the pilot is comfortable with.
39	3	Sidewinder	A horizontal circle flown at constant height with the helicopter continuously performing pirouetting metronomes. The axis of the pirouetting metronomes must always point towards the centre of the horizontal circle. The entry to the manoeuvre may be from a travelling or fixed pirouetting metronome.
40	3	Reversing London Eye	A vertical circle in front of the pilot/judges prescribed by a succession of sustained pirouetting metronomes with the full rotor disc at all times visible to the pilot/judges. The direction of rotation of the pirouette must reverse after each double metronome.