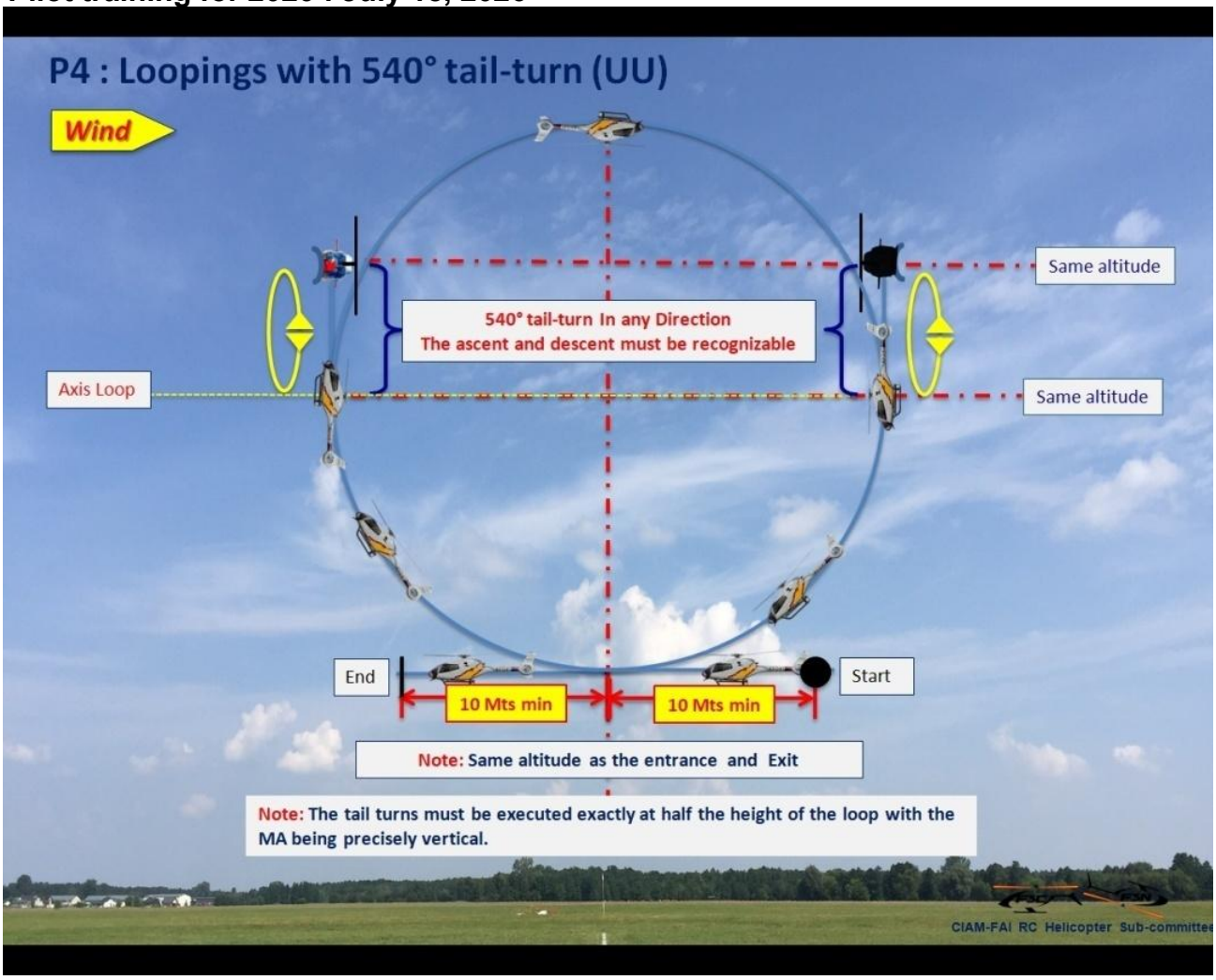


Presentation created by Eladi LOZANO and LACÔME Roger

P4 : Loop with 540° Tail Turns (UU) **K=1.0**

Unofficial but precise and clear description.

Specificities :

● The rotation of each tail turn must begin and end as soon as the MA crosses the horizontal axis of the loop.

● After completing each half of the tail turn (270°) the longitudinal axis of the MA must be horizontal.

Description :

MA flies in a straight horizontal line over a minimum distance of 10 m, as soon as MA crosses the center line it performs a 1 1/4 loop.

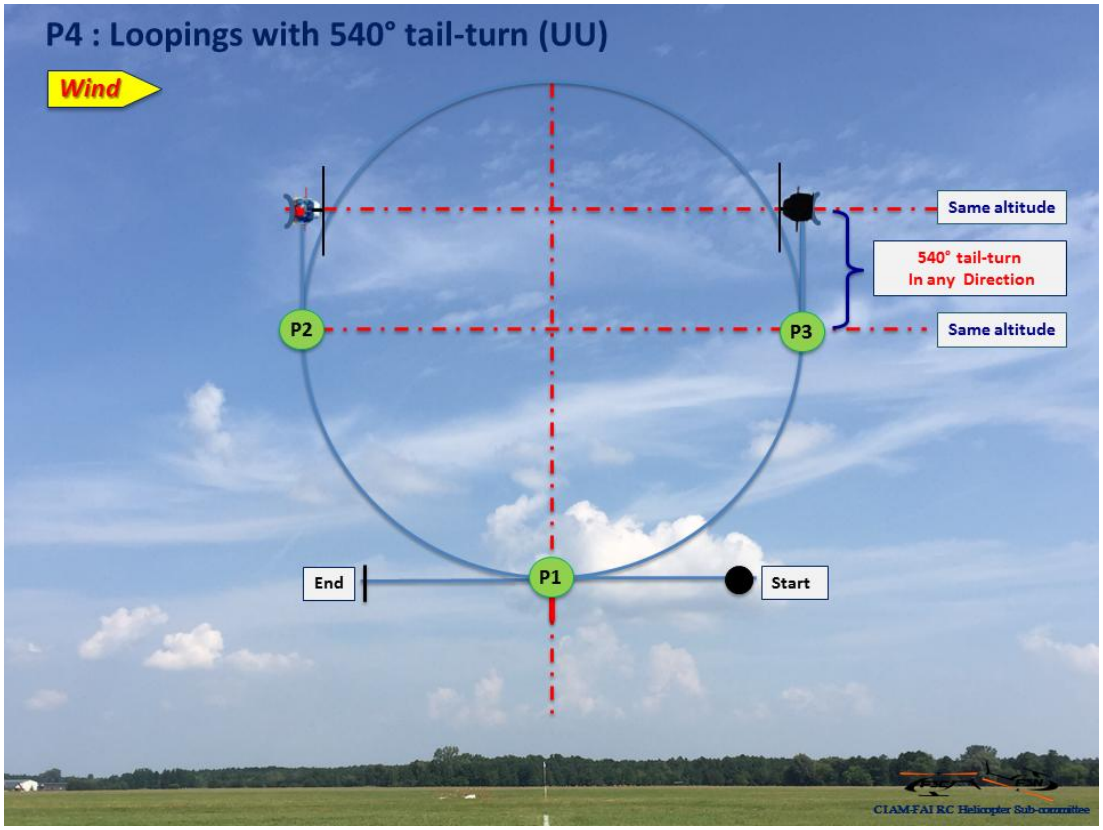
When MA crosses the horizontal axis of the loop MA performs immediately a 540° tail turn followed by a half inside loop in the opposite direction.

When MA crosses the horizontal axis of the loop MA performs immediately a 540° tail turn followed immediately by a quarter inside loop which must end on the centre line and at the same altitude as when entering figure then MA flies a straight horizontal line for a minimum of 10 m.

Reminder of the penalties for the tail turn:

● If the tail turn only starts at the end of the vertical ascent, a penalty of 2 points will be applied.

● Depending on the altitude difference between the start of the rotation and the end the penalty will range from 0.5 to 1.5 points.



This figure has several key points that are very difficult to meet, namely :

P1 : MA must pass over this point 4 times :
- 1st time : at the beginning of the loop.
- 2nd time : at the end of the complete loop.
- 3rd time : half of the half loop (opposite direction).
- 4th time : at the end of the quarter loop.

P2 : MA must pass over this point 3 times :
- 1st time : at the end of the first quarter of the loop.
- 2nd time : at the end of the 1/¼ loop.
- 3rd time : at the end of the first 540 ° tail-turn.

P3 : MA must pass over this point 3 times :
- 1st time : When the helicopter has completed 3/4 of the loop.
- 2nd time : at the end of the half-loop (opposite direction).
- 3rd time : at the end of the second tail-turn.

During these ten passes, the helicopter must maintain the same altitudes, the same distance from the centre line for the ascents of the two 540° turns, and as if that were not enough, it must always remain in the same plane.

This is how a figure that is relatively simple in terms of piloting becomes very difficult to execute correctly.

One might think that it is easy to perform a round loop, but this is not the case at all because when the helicopter is at the top of the loop it is flying tailwind, which very often results in the waypoint "P3" being further from the centerline than the point "P2", this induces a fault for the half-loop which remains to be performed because the radius will be larger than at the beginning, the consequence is that the passage at the point "P2" is slightly further from the centerline and slightly higher then because this point is further from the centerline the half-circle in the opposite direction which must be performed after the tail-turn has an even larger radius and this is how when the helicopter returns again to the point "P3" it is even further to the right and higher.

It's clear that the loop needs to be perfectly round, otherwise it will cause complications for the rest of the manoeuvre.

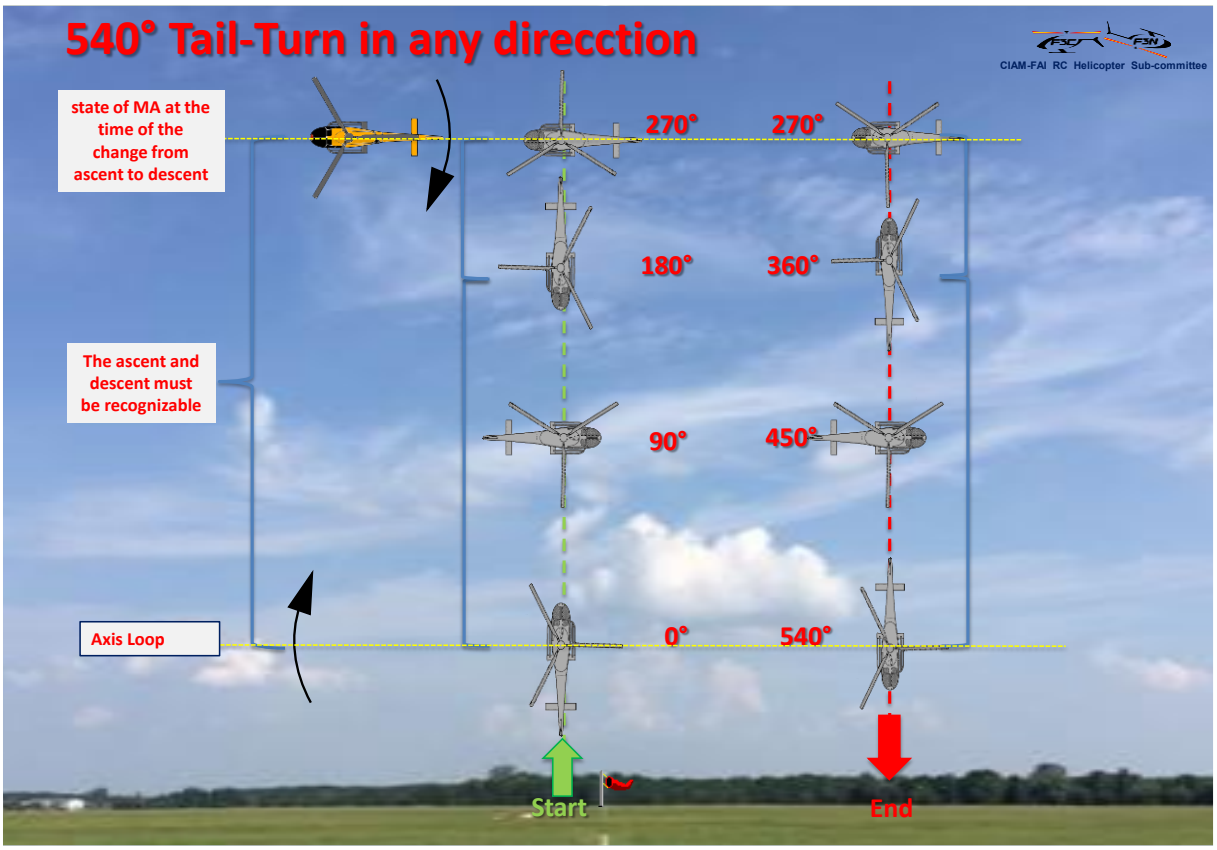
To limit these cascading problems, some pilots use a device that records the helicopter's trajectory during the execution of a manœuvre ; it's a very effective way to improve.

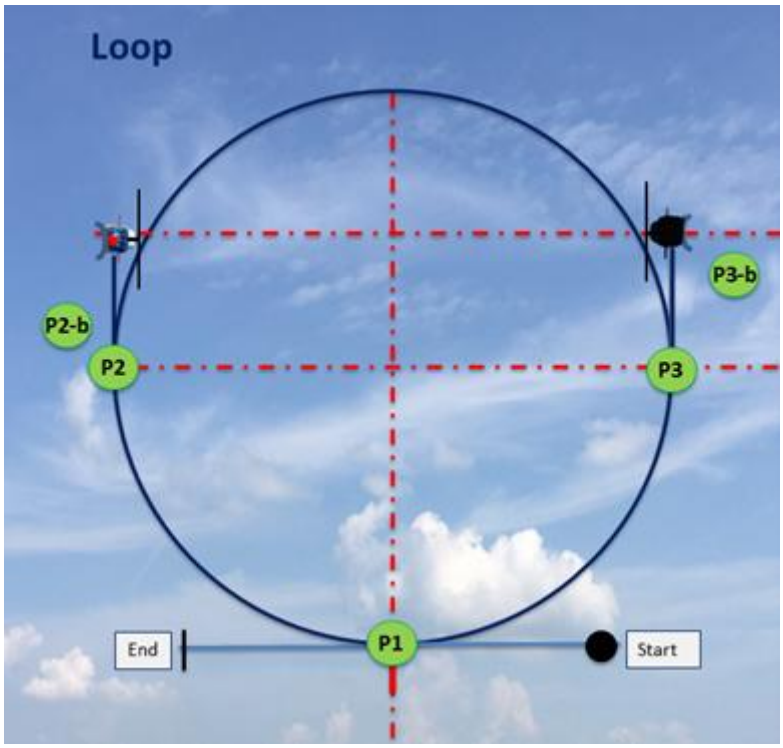
Here too, the device that records the trajectories is very interesting.

A quick reminder regarding the execution of a tail turn :

The helicopter must perform a 270° rotation during the ascent and 270° turn during the descent ; we immediately notice on the following drawing that the fuselage must be horizontal at the end of the ascent.

Then, everyone does as they see fit, either with a large radius or in a more compact area ; it's really the pilot's choice.





To limit the phenomenon, some pilots have a device that records the helicopter's trajectory during the execution of a manœuvre ; this is a very effective way to improve.

Another detail that should not be overlooked is the quarter loop after the second tail turn, which must end on the centre line.

Summary of the main key points :
First the roundness of the loop needs to be worked on because when the helicopter is to the right of the centre line it is pushed by the wind.

Secondly, you need to work on the start of the tight turn ; the rotation must absolutely begin as soon as the helicopter crosses the horizontal axis of the loop. This is very difficult to achieve

Thirdly, the rotational speed of the tail rotor must be fast enough to ensure that the fuselage is perfectly horizontal at the end of the vertical trajectory.

Thanks for your interest