

# TUMBLING

>> Pilot: Mike Küng

**Tumbling is definitely one of the most exciting acro manoeuvres. It is really a SAT, but with several axes shifted by applying a different entry time and particularly by initiating it in the opposite direction to the preceding manoeuvre. The pilot flies backwards around his canopy as with a SAT, but this time vertically! Two or sometimes even more almost vertical rotations over the canopy are possible, depending on the characteristics of the wing and its loading.**

In competitions this is one of the top scoring manoeuvres. If the rotation is perfectly vertical and the exit precise, it can score you a lot of points.

## REQUIREMENTS

Tumbling should generally be flown in the upper weight range of your wing. Slow, good-natured wing profiles quickly lose energy and often allow only one rotation of Tumbling. The manoeuvre requires a very high level of previous experience and knowledge and only very experienced pilots – those who can do all the basics blindfolded- should try it.

## HOW DOES THE MANOEUVRE WORK?

Tumbling requires maximum speed. Normally the pilot builds up speed via Asymmetric Spiral. Once momentum is sufficient, the pilot - e.g. instead of a Loop or an Asymmetric SAT – enters a SAT in the opposite direction.

It is very important, as always, that the wing and pilot are perfectly aligned straight ahead at the lowest point of the pendulum of the Asymmetric Spiral and there is no curve or spin tendency anymore!

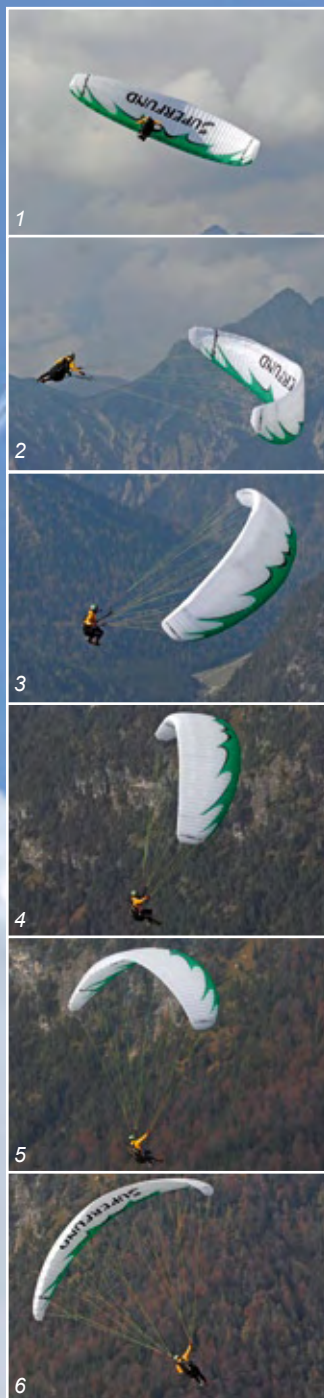
Exactly when the body is at the bottom of the pendulum, the pilot briskly enters a SAT to the opposite side. Extremely strong G-forces arise, as in the Asymmetric SAT. Centrifugal forces want to push the body to the outside, which must be resisted by strong support from the outer riser.

Tumbling feels similar to a very high Asymmetric SAT, which is an absolute must as prerequisite manoeuvre.

## VARIANT FOR ADVANCED PILOTS

In order to fly your Tumbles even more vertically over the canopy, you can slightly delay the time of entry. With perfect timing the canopy can already dive absolutely vertically under the pilot on only the second rotation. Only pilots who have mastered Rhythmic SAT can upgrade this manoeuvre to Infinite Tumbling.

It is possible with modern acro gliders to try entering a Tumbling from a normal steep Spiral Dive, the same as for Loop. However, here the pilot must be able to put the glider absolutely straight at the deepest point of the pendulum, which requires perfect timing and above all extreme precision in weight shift.



ENTRY



GETTING SPEED  
photo: gudrun behst