Locked into a flat spin

*Knowledge and skill saved **Neil Spooner's** life when his Tipsy Nipper took him into unknown territory*

Up until the afternoon of the 13th August 2007 I had thought that the flat spin was the province of much more thoroughbred aircraft than the Tipsy Nipper. I also believed it was a manoeuvre that required positive actions to enter. On both counts I was quite wrong.

My normal entry into a spin in the Nipper was by a semi-flick, which gave predictable and stable entry. However, having read up on club level aerobatic competition, today I would enter from a wings level, fully stalled condition. Throttle closed at the stall, I sharply applied full right rudder, full left aileron and full back stick. Within half a turn I noted the higher nose attitude and rate of rotation. Within a full turn I knew the spin had gone flat.

Application of full opposite rudder, centred ailerons and progressive full forward stick did nothing. After a couple of turns I centred the controls, checked throttle fully closed and reapplied spin recovery. This too had no effect. During these inputs there was little or no control load.

I had read that the flat spin was entered by application of power with opposite aileron and progressive back stick, so I really did not want to use power. However, locked into a manoeuvre that I did not know how to recover from, anything was game. Tentative applications of power against anti-spin rudder seemed to have no effect. When I decided to give a longer burst of power, the engine stopped. I had no starter motor, but I considered this to be the least of my problems.

With no parachute the chances of survival at a descent rate of about 3000ft/min were slim. Over marshland the gods might be kind to me, but human nature being what it is I was not prepared to give up.

The rate of rotation was quite high, and the only controls with any aerodynamic load that I could perceive were the ailerons. If I applied full right rudder, full right aileron and forward stick I may be able to tip the aircraft into a steeper spin from which I could recover. At about 24 turns the control input started to take effect, and through automatic actions I recovered into level flight.

After 26 turns you would not believe the level of disorientation. Unable to read the instruments, struggling to maintain straight and level flight, heading away from friendly soil I recovered enough to consider a forced

Top: thanks chaps - Neil Spooner with the Essex firemen who came to his aid
Above: here's one we made earlier; Neil with fully functional Tipsy Nipper

landing and the wind direction. With no altitude to air-start the engine the landing area was quickly diminishing. Turning into wind I could see an area that looked survivable, but as I pitched up for the soft field landing the main gear caught the top wires of a barbed wire fence that I was unable to see. The wires flicked the plane onto its nose and thence inverted in a small marshy hollow.

There was no fire, and although the port wing tip was under water I appeared to be in no danger of drowning. The canopy opened outward, with the grass against it. Escape would be by trying to break the Perspex and getting out through the water and mud. This didn't seem necessary, as I was in no immediate danger. The inverted fuel system was not leaking, and the tide wasn't coming in! A call on 121.5 went unanswered, so tried Essex Radar as I knew commercial traffic above me would be on that frequency. A Ryanair (thank you) eventually relayed my Mayday, only 20mins later the police support air unit arrived and two of the crew lifted the tail to enable my escape (thank you very, very much). A full turnout of fire and paramedic personnel arrived shortly after, and once it was established that I was completely unhurt we carried the Nipper to the grass track that I might have made had the fence not intervened!

What have I learnt from the experience? Never assume the manoeuvre you are about to perform will end the same way – and I've learned a lot about flat spinning. On this occasion I added 500ft to my entry altitude, as I always do if I am trying something slightly different. I judged that I recovered at a height of 5-700ft from an entry at 3500ft; I will leave the maths to you. Remember: Altitude or airspeed, preferably both.

My research on flat spinning has led me to read Alan Cassidy's book 'Better Aerobatics', which I think is probably one of the best modern books on the subject. His recovery technique for an aircraft in a flat spin is: 1. Full opposite rudder. 2 . Full in-turn ailerons. 3. Forward stick. Full throttle may help to accelerate the recovery. There must be three distinct control movements, and they should be made without rushing so that all three actions have time to work.

What do I think made the Nipper spin go flat? C of G plays a big part in the dynamics of a flat spin; the C of G was close to the aft limit. I introduced out-spin aileron and probably held it too long on entry, and the application of rudder was rapid. This combination created a strong yaw moment, which coupled with the C of G issue allowed the aircraft to establish a stable flat spin very quickly. I think the key to my recovery was the application of in-turn aileron. This provides a yawing force in the opposite direction to the spin. But have a look at Alan's book because he explains it much better than I do. Should you find yourself in a flat spin also consider moving the C of G by leaning forward.

I implore anyone who does aerobatics to seek training in this scenario, and equally anyone who has never spun an aircraft to do so under training with a qualified instructor. A layman's normal spin recovery is just to let go of everything, apparently this works on most aircraft.

Since my experience I have moved the C of G further forward, and have spun the Nipper again, but do it over somewhere more hospitable to land! I am also working on an engine mod' that will allow easier air-starting.

The flat spin has claimed better men than I; if you wait till the end of the credits of "Top Gun" you will find the film dedicated to Art Scholl. He was commissioned to provide footage for the flat spin; his Pitts entered an inverted flat spin from which he was unable to recover in time. He was a highly acclaimed and experienced aerobatic pilot.

I wish to thank the emergency services for such a prompt and great turnout. I also wish to thank my wife, colleagues and friends for being so understanding and supportive. I learnt much from the experience, which is why I would like to pass my findings on in the hope that others may benefit. I still have to swallow hard when I watch the video, believe me; I thought I was going to die.

This article is based on my own experience; it does not and should not replace proper training in a suitable aircraft.

Google references: youtube: G-ONCS flat spin; AAIB bulletin: AAIB G-ONCS ■

Tipsy Nipper is no heavyweight – here dwarfed by an Avro RJ

Neil Spooner:

Neil Spooner is an experienced professional pilot who obtained his PPL 20 years ago and now has more than 3,000 hours on commercial jets. He did an aerobatics short course in the USA in 2003 and had amassed some 25 hours of aerobatics at the time of this incident. A former prestige car mechanic, he restored the Nipper himself under the watchful eye of LAA inspector Richard Kimberley and has since qualified as an LAA inspector himself.

With regard to 'getting back on the horse after falling off', Neil says: "The first spin and aerobatics after the repairs I can only liken to diving off of the top board for the first time... you just know its going to hurt if you get it wrong, and the trepidation of leaning over the edge to dive was palpable. I was more focused then than at any time of my life, I think! Now I have been aerobatting the Nipper for some time after the repairs the trust has built up again and I am thoroughly enjoying it. I have not flat spun it yet, but after some professional tuition in a Pitts S2 or Extra to explore that manoeuvre I may do so in the future."

Below: cockpit video shows prop stopping while Essex marshes continue to rotate while looming larger in the windscreen; this selection covers 16 seconds