

The Invincible Part I & II

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Author's Note: Names in the following narrative have been changed for obvious reasons. This story can now be told. For reasons that you will understand later, it could not be told before now.

Do you remember a few years ago, the big winner on the contest circuit was Willie Watson? Willie won every contest he entered. He was simply amazing. He could find lift when no one and I mean no one - else could find the slightest bit of up. He maxed consistently and never got less than 99 on a landing. The strange thing about Willie was that up until that winning year, he was a mediocre flyer, at best. He generally could do no better than the middle of the pack, though he had been flying for years. When he started to win, he was jocularly known as Willie Who? By the end of the season, his name was the best-known name in the soaring community.

The top flyers naturally wondered how Willie suddenly got so proficient. Willie's explanation was that he had come up with this great original design sailplane that was far superior to all currently flying sailplanes. Beyond that, he was totally secretive. He would give no information whatsoever

about his sailplane, which he had named Invincible, which it apparently was. Further, Willie brought the plane to the field assembled and took it home the same way in a special box that fit diagonally in his van. There was always a family member by the plane to protect it from prying eyes. They professed complete ignorance and referred all questions to Willie, who, as mentioned above, simply smiled and bantered, but would answer no technical questions.

The plane itself gave no real clues. It was a fairly conventional straight wing design with a V tail, looking very much like a typical modern high performance sailplane. The only differences about it were its bulbous nose, that made it look nose heavy and somewhat awkward in flight, and its trailing edge, which had four moveable surfaces on each wing, rather than the two - ailerons and flaps on other sailplanes. And it had an unusual polka dot color scheme. But fly well it did. Speculation about the sailplane was rampant. Some thought that the fat nose provided some turbulence along the center of the wing that started boundary layer separation earlier, like a trip, thus making the center of the wing more efficient. Others suggested that the rounded nose provided additional lifting surface. Still others thought that the four moving surfaces on each wing had something to do with its outstanding thermalling ability. Whatever, there was just no other sailplane around that could compete with the Invincible.

Toward the end of the season when Willie was top gun on the contest circuit by a large margin, curiosity got out of hand. Competitors Sam, Joe and Bill got together and conspired to get closer look at the Invincible. They needed to separate Willie and his family from the sailplane for a little while. They decided to keep a 100% watch on the Invincible, rotating the duty among them, hoping that it would be left unguarded for a few minutes. As luck would have it, Willie went off

to the woods to commune with nature at the same time that his teenage daughter, who was guarding the plane disappeared into the van to get a coke or something. Sam quickly picked up the Invincible and briskly spirited it to a prearranged spot behind his canopy, deliberately surrounded by cars, where Joe and Bill were waiting. They knew they had only a few minutes to check it out before Willie came back to discover his plane gone. So, they had to move fast.

At first, they could not figure out how to look inside the fuselage. Though there was a seam on either side of the nose, the plane had no canopy or nose cone as such. Then Joe noticed that the top of the nose was continuous under the wing. They removed a forward wing bolt and found that the top third of the nose was a hatch that could be slid forward. They removed the hatch and knocked heads in their eagerness to look inside the fuselage. To say that they were astounded would be too mild a description. They couldn't really believe what they were seeing. They were speechless. Someone who was not speechless said, "Well, I see you finally found out my secret." They all looked up at Willie.

Our narrative thus far: Willie Watson, a middle-of-the-pack competitor suddenly started winning every contest he entered. His sailplane the Invincible with a bulbous nose, four trailing edge control surfaces and a strange polka dot color scheme, was always guarded by a family member and was an object of much curiosity among contest competitors. Sam, Joe and Bill hatched a scheme to get a closer look at the Invincible. They watched until Willie retired to the woods to commune with nature and his daughter who was guarding the sailplane went into the van. Sam picked up the sailplane and took it to a prearranged spot where Joe and Bill were waiting. With some difficulty they removed the hatch and looked inside the fuselage

There was a bird in the nose! A semi-naked bird. The feathers had been removed on parts of its wings and it had no tail feathers at all. It had electronic sensors attached to its wings, rump and legs. The wires from these sensors ran to a small black box which was attached to the receiver servo receptacles. The servo wires were plugged into the black box. Other wires from the black box ran to small sensors on the outside of the

back to the tail. The sensors were round spots that accounted for the strange polka dot appearance of the sailplane. The hatch was a one-way mirror so that the bird could see out but nobody could see in. Sam, Joe and Bill looked at the bird and at one another incredulously. The bird looked back at them and chirped. It seemed happy and not at all frightened. Later, Willie, allowing that he knew his secret would come out sooner or later, confessed all.

Willie's Uncle Albert was Professor Albert Watson, a renowned ornithologist at the local university. He had gotten his PhD for an extensive study of soaring bird flight and how raptors and other soaring birds sensed lift to maximize the soaring element of their flight envelope to minimize energy expenditure. For years he had continued experiments, attaching sensors and tiny transmitters to birds to study bird flight. He published his results and became the recognized expert in his field.

Willie became interested in RC soaring and often discussed his efforts to find lift with his uncle to try to get some input that might give him an advantage over his fellow contestants. This didn't do much good for Willie until his uncle came up with the idea of wiring up a bird so that it

received sensory inputs as if it were in flight, and other sensors would monitor the birds responses.

Professor Watson had rare South American species that was intelligent and docile. Uncle Albert had raised several of these birds from chicks in his laboratory, ensuring that they would be friendly and cooperative in what he regarded as an important experiment that would further his knowledge and his reputation.

So Willie built a sailplane based on current design standards so he knew it would fly well and be competitive in its own right. He modified it to accommodate the bird, and, to take advantage of the bird's total wing configuration flexibility, he split the trailing edge into four segments that looked like four ailerons/flaps to observers. He simulated the bird's tail by a V tail having the ruddervators split as well (Sam, Joe and Bill hadn't noticed this). Control surfaces were operated by twelve miniature servos connected to a special circuit (the black box) which routed the bird's sensory responses to the right servo to emulate the movement of the feathers. When the bird sensed lift it just did what was natural to it and circled in the thermal. Of course, the Invincible could not flap its wings, so Willie was able to override the birds input with his computer transmitter to bring the sailplane back to the field and land. The bird turned out to be smarter than they thought and after a few landings got the idea and guided the plane to the spot, which was a bonus and really helped Willie win all his contests. Willie asked Sam, Joe and Bill to keep his secret to protect his Uncle and they agreed if Willie agreed to compete henceforth on an equal footing with everyone else, namely, to forego the bird. The word of Professor Watson's experiments with live birds did get out somehow not through the Soaring community, though and somebody wrote a nasty letter to the New York Times about this being another example of cruelty to animals, even though the bird had bonded with Uncle Albert and seemed quite happy with its life in the laboratory and in Invincible. However, Professor Watson, ever mindful of his reputation, discontinued his experimentation with live birds and Willie went back to placing in the middle of the pack.

Recently the good Professor met with an unfortunate accident. He was studying birds in the Congo, slipped into a river and was eaten by a crocodile. So, being the Bill of the trio who made the Invincible discovery, I now feel free to tell the story, and you are the first to know the truth.