Newest aerobatic manoeuvre in 20 years

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It was a superb, cloudless autumn day--the opening of the 1951 Society of British Aircraft Constructors Air Display at Farnborough, England.

Word had filtered out to the hushed crowd that they were about to see something astonishing--an entirely new aerobatic manoeuvre dreamed up by Gloster's Chief Test Pilot Jan Zurakowski.

Tense and silent, they watched as he swept past in a gleaming red Gloster Meteor jet fighter, and climbed vertically into the sky. As speed fell off, the fighter seemed suspended in space. Then it slowly started a hammerhead until the nose pointed vertically earthward.

But it didn't stop there. The aircraft continued its rotation in the vertical plane with the nose edging slowly until it was again pointing straight upward, completing a 360-degree flat vertical rotation at near zero speed.

The rotation continued. The nose came down, then a slight pendulum oscillation set in, and the aircraft flicked into a spin. As control was regained, and the spin checked, the aircraft pulled out into a high-speed run past the awe-struck spectators.

The idea for the Zurabatic cartwheel had been in Jan's mind for several years before he finally was able to try it. The configuration of the airplane was of paramount importance.

In order to establish the cartwheel and continue it through 540 degrees, the aiplane had to have a great deal of lateral inertia, or more simply, a great deal of weight farther out on the wing than usual, combined with asymmetric thrust provided by engines mounted well out along the span.

As a twin-engine fighter with the engines buried in the wings well outboard of the fuselage, the Gloster Meteor met this requirement. Gloster at the time was developing a private venture ground attack variant of the type, stressed for higher wing loads and designed to carry 16 2.75-inch rockets in external racks under each wing, as well as 180-gallon long-range tanks on the wingtips.

Jan and his slide rule came to the decision that the combination of all this additional weight on the wings, aided by full power on one engine, would provide the lateral inertia he needed.

One day at the end of a routine development test flight, he stood the prototype on its tail at 10,000 feet and commeced a vertical climb under full power. Speed decreased steadily from the entry speed of 350 knots, and finally with the airspeed needle at the 70-knot mark, Jan cut one engine, leaving the other at full power.

As he expected, the airplane started a wingover in the direction of the dead engine, making a clean entry into the cartwheel. Passing through the vertical nose-down position, Jan cut the other engine, and now came the test: was there enough inertia to carry the airplane past the full nose-up position again?

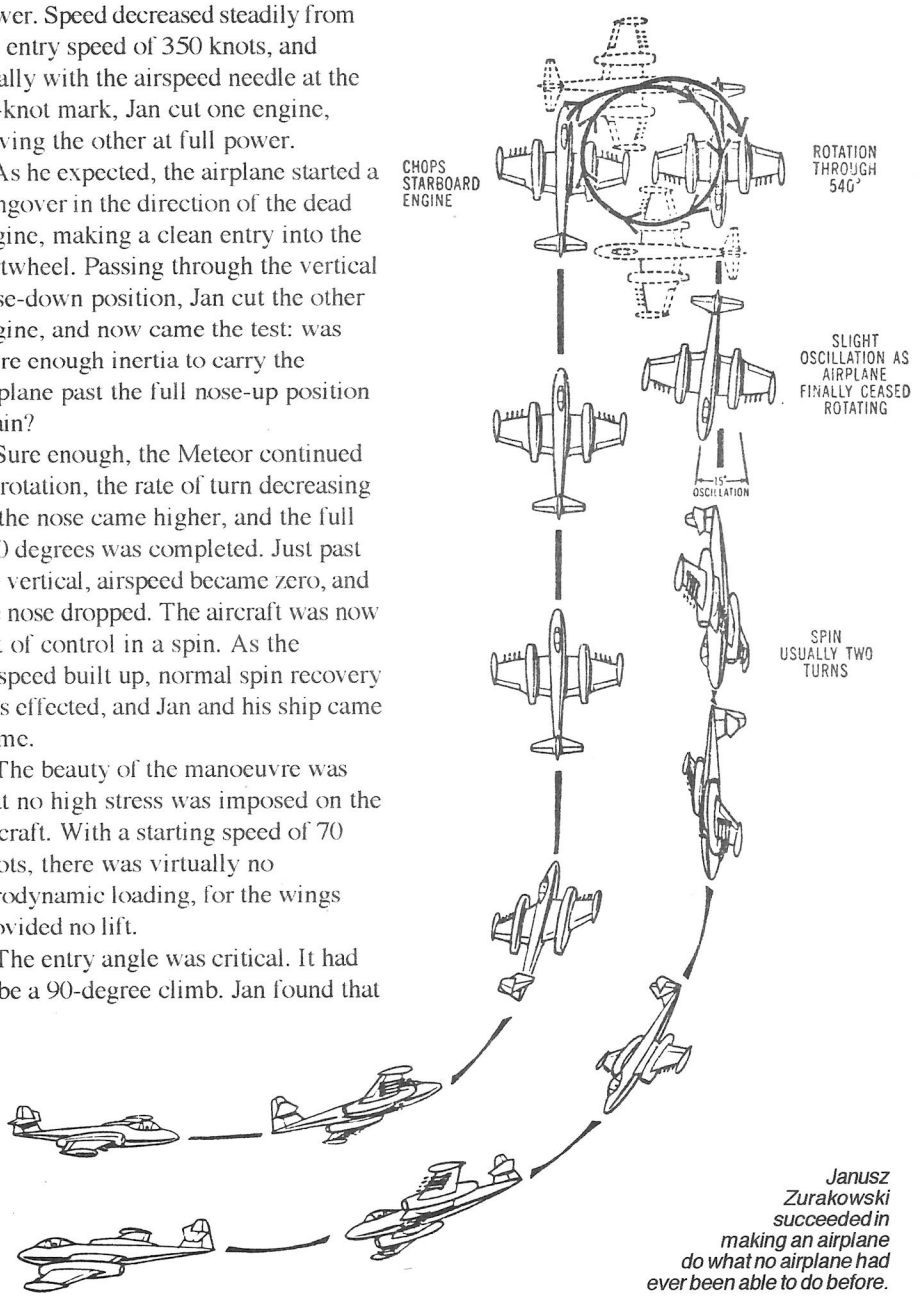
Sure enough, the Meteor continued its rotation, the rate of turn decreasing as the nose came higher, and the full 360 degrees was completed. Just past the vertical, airspeed became zero, and the nose dropped. The aircraft was now out of control in a spin. As the airspeed built up, normal spin recovery was effected, and Jan and his ship came home.

The beauty of the manoeuvre was that no high stress was imposed on the aircraft. With a starting speed of 70 knots, there was virtually no aerodynamic loading, for the wings provided no lift.

The entry angle was critical. It had to be a 90-degree climb. Jan found that if short of the vertical, the nose dropped forward at the start of the rotation, and a normal spin resulted. If past the vertical, the aircraft would flip on its back, followed by an inverted spin.

Having proved his point to himself, Jan demonstrated his new manoeuvre over his home aerodrome one day without any prior warning, starting with a low-level fly-past at 500 knots and pulling up to 6,000 feet before starting the rotation.

This left a comfortable margin for spin recovery, provided your name was Zurakowski.



Janusz Zurakowski succeeded in making an airplane do what no airplane had ever been able to do before.