AUTOGIRO AS HANG GLIDER ?

Rotating wings have interesting qualities which can be made utilizable perhaps also for weight controlled machines. With the development of an autogiro without engine Stephan Nitsch 1982 tried to bypass the legal prohibition of hang gliders in East Germany 1982.

East German order over flight equipment of 25. August 1980 (extract)

§ 1 Flight equipment according to this order are hang gliders, equipment for operating the water ski flying as well as equipment with a same or similar function.

§ 2 The possession, the production, the sale and the use of flight equipment in accordance with §1 are not allowed in the German Democratic Republic.

Autogiro - test model 1982 - a remedy against frustration about grounding order

Would a autogiro have been a flight equipment according to this law?
Don't reveal. The development of a weight controlled autogiro started therefore in autumn 1981.

Rotor instead of wing

Such airplanes were called autogiro by the inventor Cierva. The rotor driven by the air stream replaces the otherwise usual wing. In the normal case an aircraft engine with propeller takes care for the propulsion.

A rotating wing has many advantages. E.g. she cannot be stalled. If the angle of attack of the blade area gets too big, then the forward speed reduces herself. The rotor shifts faster by extended sink again.

A autogiro nearly can land on a point. They were used for reconnaissance on German submarines in the second war.

A freely flying autogiro could be controlled by weight like a hang glider.

Design

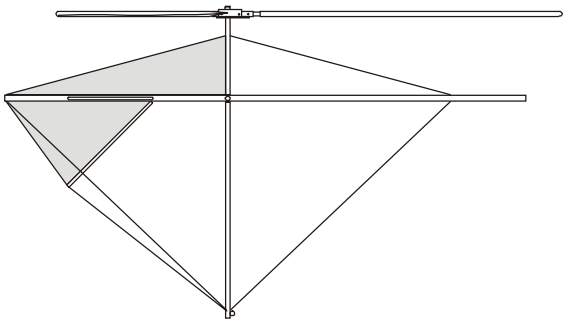
With some knowledge in rotor theory the blade angles where calculated. The concept for a three blade autogiro with 4,5 m rotor diameter and hang glider steering were developed soon.
The rotor head was complicated. Flapping joints must make possible an upward movement of the blades.
The to the front moved blade has more lift off than the backwards one. Therefore the rotor area always is a little sloping.
Plates were cut out from styrofoam for the blade profiles, strung to each other on an aluminum pipe and covered with plastic foil.

The "Bachstelze" - an autogiro in the 40th years

The angle of attack of profiles must be adapted to the speed in circumference direction.

For the fixing at the rotor head a same angle of attack had to be realized for all three blades. Otherwise the rotor ran unevenly. After several tests the optimal attitude was found.

The little stabilization surfaces behind the pilot had only the task of lining the rack up into the wind and to decrease movements around the traverse axis.



Flight tests

The following prerequisites were required for the tests at a hill near Quedlinburg at the Harz mountains:

- weekend
- moonless night
- wind from south, at least 8 m/s

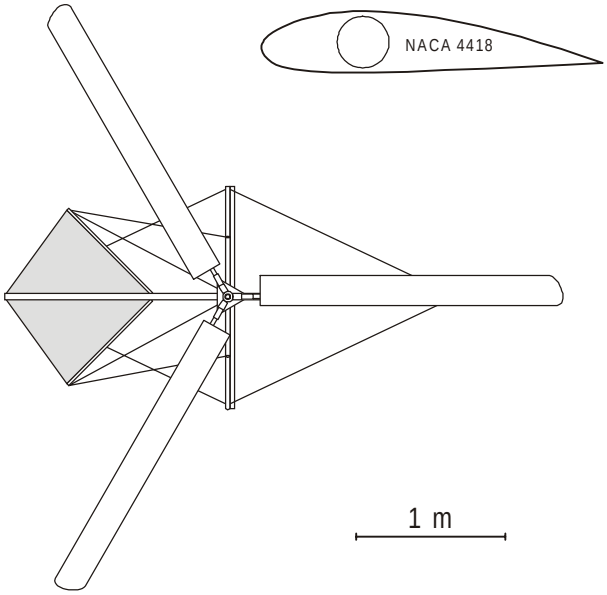
After some less successful attempts once all conditions were correct in October 1982. A late walker nevertheless still found me in the far remote terrain. I explained to him it is a rotor for a wind generator and I test it so late because during the day was no time - probably he didn't believe it The rotor turned very fast in the strong wind, a little uneven at the beginning - but with higher revolutions quietly with a clear lift off. With an increased angle of attack the revolutions increased too with a backward movement.

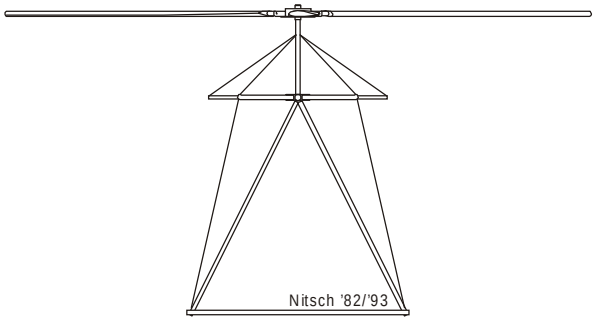
Some run tests (in the darkness) didn't lead to take off. Later a blade had ground touch. Altogether respect instiling sooner than successful. The equipment therefore was put aside.

Further tests followed 7 years later, after the German re-union. Because of the ground touch the rotor was asymmetrical and didn't run evenly. A take off wasn't possible although the rotor turned fast at strong wind. The effective surface wasn't sufficiently obvious.

Today the autogiro is in the Otto Lilienthal Museum Anklam together with other testimonials of the east German hang glider history.

Stephan Nitsch





Diameter of rotor	**4,5 m**
Weight	**10 kg**
Velocity of wind	**7-15 m/s**
Revolutions of rotor	**ca. 250 U/min**