

A Standing Take-off

Birdlike, completely without the use of any kind of runway, the test-aircraft KÄNGURUH takes off with the help of an on-board pneumatic catapult only. Therefore, it is able to take off even when only little space is available - without the disadvantages of a helicopter.



Birds do not have wheels and only few of them have to reach a certain speed on the ground or in the water, in order to take off. Usually, a fairly strong impulse from the oftentimes long legs is enough to enable them to fly. Apparently, nature fulfills two different tasks - taking off and flying - using two different optimized devices - wings and legs - in order to increase the general effectiveness and with it the animal's chance of survival. In the case of a helicopter, for example, the rotor is responsible for taking off as well as flying - an integration of functions with substantial disadvantages.

The KÄNGURUH could be said to take a bionic approach: The pneumatic two-phase telescope cylinder with integrated air-compressor accelerates it to the starting speed. After 4 - 5 seconds, the work is done, and the wings as well as the engine take on their functions. This way, instead of being designed for the high energy requirements of the take off itself (as it is usually the case), the driving power can be fully optimized for the effective lift off and flight. Furthermore, fixed wings are, in a structural as well as in an aerodynamic respect, much more advantageous than horizontal rotors.

The test-aircraft KÄNGURUH was realized as a sub-project of the technological program STINGRAY and was aimed to prove the usability of the division of the functions mentioned above in both theory and practice. Fully equipped with sensors, the KÄNGURUH has led to fundamental knowledge regarding independent take off (that is: without special ground devices and runway) in many manned flights. By the way, it is no coincidence, that the aircraft is named KÄNGURUH (German for "kangaroo"), for the animal stores the energy for its economical hopping in its elastic tendons.

By the way: In the "real" STINGRAY, the acceleration is reduced by a factor of 3, because the stroke of the cylinder is - at constant speed - increased by the factor of 3, too.

Wingspan	13 m
Length	7 m
Max. take off weight	400 kg
Ground speed	43 km/h
Acceleration distance	5 m
Average acceleration	1.5 g

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