

Norbert Schuerz has always dealt with the things that seems impossible. A statement from his father "... you're not able to do that!" in 1984 was the kick-off for him to plan and build his first model helicopter. A phrase like "this cannot be made!" is never a reason to give up. At the very least it was the drive for something to invent, build and implement. Education as a turner was the base for working with metals. Additional he advanced to a mechanical engineer. Further education gave him the necessary tools to develop, design, build and fly remote controlled rotor-driven airplanes and more.

Actually he's employed as a sales-manager for ERP-systems for INFOR

This project runs parallel to the job in his leisure-time

The original V-22 Osprey is a tilt-rotor airplane with VTOL characteristics. Maiden flight was 1989. It's deployed in the US-Navy and US-Marine-Corps since 2005.

## Original V-22

2 Rolls-Royce AE1107C .....	4.586 kW
Length .....	17,48m / 57,3feet
Width incl. rotors.....	25,78m / 84,5feet
Rotor-diameter .....	11,60m / 38feet
Max. height (nacelles vertical) .....	6,73m / 22feet
Max. starting weight.....	23.859 kg / 52.600pound
Max. travel speed .....	500km/h / 300 kts
Range .....	790 km / 428mn
Max. hovering time (Loiter time) .....	20 min
Payload .....	24 men or weight up to 20.000 pound
Maiden flight ..	March 19.1989, deployed 8.12.2005

## Model data:

Length.....	2,05m 6,72 feet 80,7inch
Width incl. rotors .....	9,84 feet / 118,1 inch
Rotor diameter .....	14,52 feet / 54,3 inch
Weight inc. batteries .....	about 48,5 pound
Motor .....	Kontronik Pyro 1000-40
ESC .....	Kontronik KOSMIK 200 HV
Batteries .....	12s 4x5100mAh (2p) LIPO
External tiltelectronic.....	Benedini
Flight controller .....	Flip32 Board
Remote control .....	Jeti DC-16
Scale .....	1:8,5

## Version 0 with tooth-belt

Self made rotor-hub without flapping hinge. Whole rotor-hub could tilt with damping-elements. The swash-plates were controlled via two servos (actuators) on each nacelle. Each servo has to control pitch, aileron, yaw, elevator.

Powered by a Webra 20cm<sup>3</sup> engine the propulsion was carried out through toothed belts to the nacelles. Advantage of a central located engine ist o have a synchronous rpm on each rotor. For tilting the nacelles on each an actuator was attached.

At that time no standard RC-helicopter-parts could be used because of to much weight if using them. At the end the toothed belt was removed because of several problems.

## Version 1 with „tube“ propulsion (2000)

New were the especially made carbon tubes, used as beam (see left and right) In each of this tubes were further turnable attached carbon - tubes.

With these tilting-tubes tilting was realized. From a central attached tilting-motor I could tilt both nacelles the same time and the same angle. nken aufgenommen.

Powered by a Webra 20cm<sup>3</sup> engine the propulsion was carried out with steel-tubes inside off he carbon-tubes.

Rotor-hub was an „Orthofer“ 3-bladet Bendix-rotor-hub. This version was the first model able to fly!

A wing never was attached on this version



## Version 2 with Pahl jet-engine (2006)

Because of new engine and the need of necessary gyros the model was designed and built totally new. The jet-engine was located central in the body and the jet-exhaust was on the upper side of the fuselage behind the wing. The functionality of the swash-plates realized by two mechanical mixers and two electronic mixers. First mechanical mixer enables the mixing of collective pitch and aileron (rolling) with one servo (actuator) on each nacelle. By means of an airplane-gyro with 2 outputs (one for each side) this was the first time to realize a gyro-functionality in the plane.

The gyro was located in one nacelles, because it had to be tilted too for properly operation in each flight-situation.

A second mechanical mixer allowed the control of elevator and yaw with one servo (actuator) in each nacelle. This gyro was also attached in one nacelle.



Meanwhile the scale-body has been realized.

## Version 3a electrified with Pyro-800-48 (2015)

Advantages of electrified propulsion:

- less weight - about 3kg / 6,6pound less compared to jet-engine
- no tank with fluctuating fuel
- perfect constant rotor-rpm
- no remaining exhaust thrust like in jet-engine.

Swash-control is now realized by two servos in each nacelle. Pitch, aileron, yaw, elevator are now mixed by an electronic-mixing-controller from Tom Mast. First flight was at the end of 2015

## Maiden flight Version 3a

Because the high current consumption of 109 Ampere further changes were necessary.

With friendly support of KONTRONIK the motor was changed to a Pyro 850-400. Additionally the gear ratio was changed.



Is it the real V-22 or remote controlled model?

## Maiden flight Version 3b end of December 2015

With this changes the power consumption was about 90A during hovering, this was much better.

With friendly support from Mr. Stefan Klee (owner of SLS-Liposhop) 12s batteries 4 pieces with 5.800mAh each are used. Total capacity 11.600mAh.

## Version 3c 2016

Change of motor to Pyro 1000-400 because of motor issues caused in a crash.

New flight-controller installed with own developed firmware for better flight performance



**2017 live at MCAS Mirama Airshow San Diego CA**