Air-Pressure – Bowl-Engine – new Aero-Technology

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Helicopters and airplanes are most noisy and polluting the environment. It´s absolutely essential to replace the usual technology by new possibilities for lift- and thrust-forces. Like at the wings, the normal atmospheric pressure should be used, with much less fuel consumption. That´s documented at the website www.evert.de. The following article describes the main points of view in brief.

General Principle

The basic principle is sketched at figure 1. If a profile A is flying through the air, a thrust force is demanded to overcome the air resistance. A profile B with smaller face needs less thrust. Based on the asymmetry now however come up additional forces, the well known lift. At the utmost flow-conform shape of a glider, the air resistance is less than a tenth of the generated lift-force, even at a speed of 180 km/h.

The air flows faster along the upper face, so a strong dynamic flow pressure exists and corresponding reduced static pressure. The air flow along the below face is slower, the flow pressure is weaker and the pressure aside is corresponding stronger. So, the difference of flow speeds results the lift-force, a well known fact.

One can produce an ´artificial wind´ also within a stationary, closed, round and hollow cylinder, e.g. with rotor-blades (RB) moving the air all around the center, steady keeping up the rotation with few demand for drive (M).

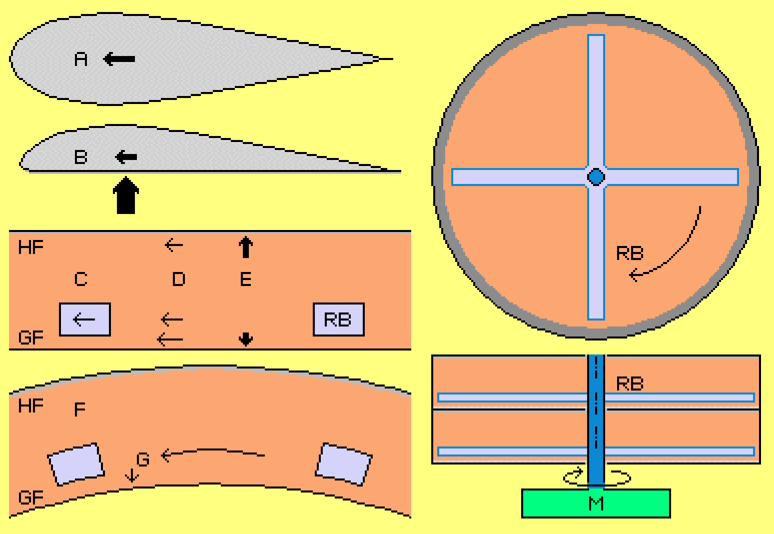

Fig. 1 Basic Principle

The rotor blades should move some distance above a most smooth ´glide-face´ (GF). The distance towards a most rough ´stick-face´ (HF) is some longer. Thus the speeds of flows near to both faces is different, faster along the glide-face and slower along the stick-face.

The motion process is comparable with a tracked vehicle. A chain link is laid down at the ground in front of the vehicle and keeps that position. When the vehicle did roll over, the link is accelerated upward and is flying forward, by double speed, all over the vehicle. Opposite here, the stick-face functions like rough asphalt and the air is flying along the glide-face with accelerated speed (see arrows at D).

Resulting is a difference of static pressures (see arrows E) and thus the wanted lift force. Several of such plane hollow-cylinders can be installed one above the other. It´s especially advantageous, if the rotor blades draw the air along curved faces (see G). Up to the sound speed, the air particles follow the suction of the blades by themselves and they fall into the curvature without any resistance (analogue to the upper face of wings).

Cone-Engine

This effect is achieved, if the engine is build cone-shaped (see left side at figure 2). The faces of that box are curved like the mantle of a cone, building a most stable constructional element. The rotor-blades are affected by centrifugal forces, so they must be connected by a ring, outside running all around. Possibly also a ring could be installed at the middle and additional rotor-blades could be mounted. Supporting glide-bearings could be used at the stick- and glide-faces. Thus also that ´rotor-cage´ is a light and stabile construction.

The rotor-´blades´ could be a hollow square profile with rounded edges, about 2 or 4 cm width. The distance towards the glide-face is 1 to 2 cm, the longer distance towards the stick-face about 6 to 12 cm. The box shows a height of only 10 to 20 cm (at that cone maximum 25 cm), at all length of the radius. Several of such boxes can be piled up at one shaft.

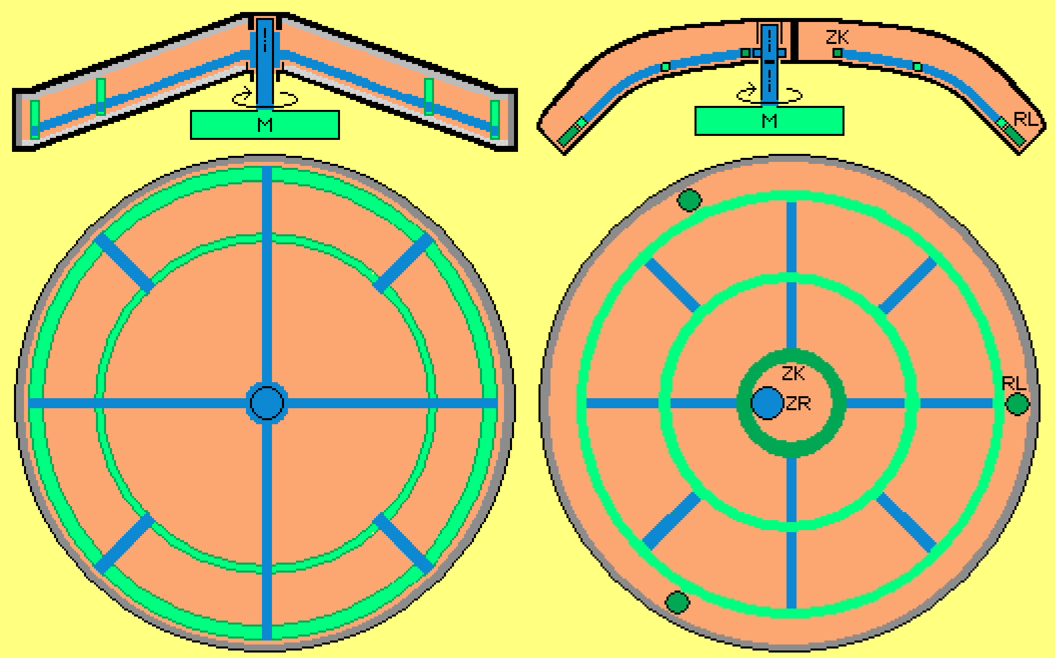

Fig. 2 Cone - Engine and Bowl - Engine

Bowl-Engine

The face increases with the radius, the force increases with the square of speeds. So the outside areas of these circle-faces are especially effective. Towards the center, the boxes could be flat, the outside regions however should be inclined. This is achieved with ´bowl-shaped´ boxes. At long radius, these double curved faces are most stabile.

Right side at figure 2, an additional variation is sketched. The rotor-cage now shows a gear rim (ZK) at the middle, the drive is done via a gear wheel (ZR) and a shaft, eccentric mounted. Inside and outside the rotor-cage is guided by each three ball bearings (RL). These stationary boxes are build all over the top and thus most stabile.

Multiple Bowl-Engine

Also these boxes could be piled one above the other. However most interesting is the possibility of one bowl including the other.

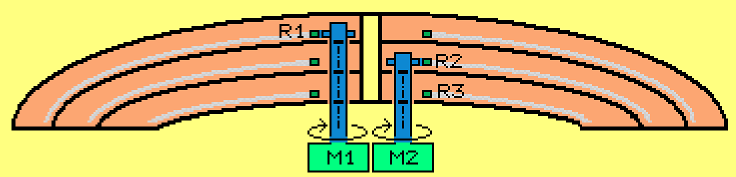

Fig. 3 Bowl - Engine with three Rotor-Levels

At figure 3 as an example, three bowl-shaped boxes are arranged one within the other. Each rotor is driven by an own shaft with a separated drive-motor, even contrary turning (here sketched only R1-M1 and R2-M2, R3-M3 is shifted).

The wide rotor could be dimensioned for the basic load of the helicopter. The mid-size rotor could be used for the present payload. The small rotor could manage the lifting. For reasons of security, sufficient capacity should be available for the failure of a part-system.

New Helicopter Conception

Previous air-pressure engines in shape of flat discs, cones or bowls can be combined in great variety. The design of aircrafts will show other characteristics. Fig.4 shows an example of a new conception for a mid-range helicopter, upside left by view top-down, at right side a front view and a side view.

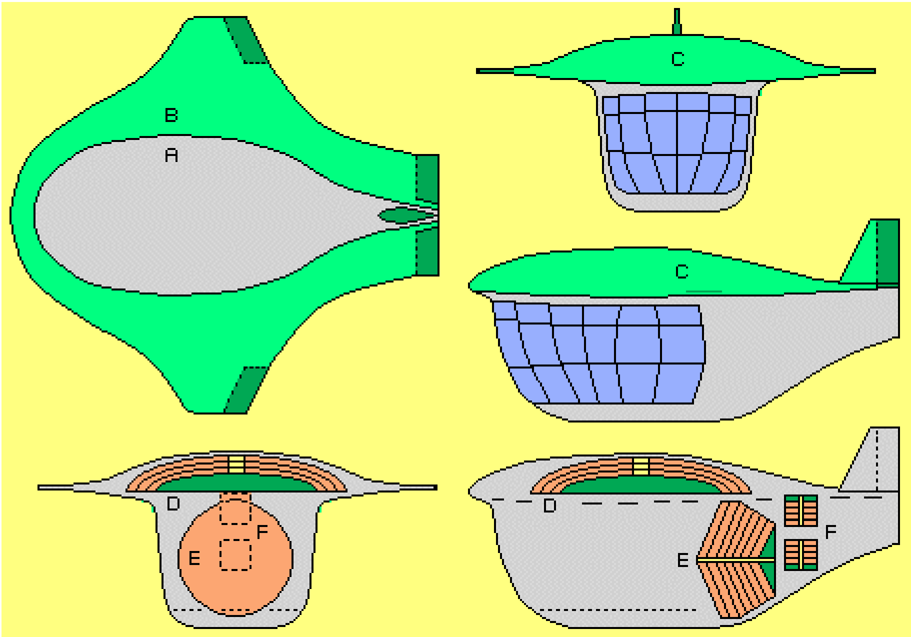

Fig. 4 New Helicopter Conception

The contours of the cabin (A, grey) has a round bow and it´s reduced to the rear end. The contours (B, green) of the helicopter reaches out over the cabin at the front side above the bow, aside flat merging into short wings, also flattened out to a wide fin at the rear end. So the top of the helicopter builds a wide and rounded dome C.

At the front, this dome is similar to the nose of a wing. Aside, the dome works like wings, where flaps (dark green) are installed outside-rear. At the very end, it has a rudder and horizontal tails (dark green). That flat dome with its wing-like profile will contribute lift force at horizontal flight. So this design has characteristics like a (truncated) airplane and can be controlled like a normal plane by its flaps and rudder.

Below of that ´dome-wing´ hangs the relative high cabin. The front view shows its maximum width. However the cabin has a rounded bow and ends narrow. So that wide usable room has a rather flow-conform shape.

The below row of that figure shows the positions of the engines. The lift-engine (D, red) is installed within the dome, here e.g. with three bowls, one within the other. The area of its drive-motor is marked green. Instead of the complex adjustable rotors of common helicopters, here the thrust is done by a separate engine with horizontal shaft, here in shape of a cone-engine (E, red). For optimum usage of space, the radius of the rotors is different long. Instead of the conventional external control-rotor, here also the demanded components are included within the fulcrum, here marked by two units (F, red) in shape of simple plane rotors. All devices are driven by electric-motors. A usual commercial emergency-generator will do.

This helicopter shows only closed surfaces towards outside. It does not cause any air movement outside. In comparison with common helicopters, that aircraft will fly totally silent. It can even float into its hangar by itself.

The helicopter discussed here, approximately could show these dimensions: total length and width 8 m and height 4 m. The free usable space within the cabin 3 m long, wide and high (at the double floor are installed tanks, electric generator and starter batteries). The lift-rotor (D) has a diameter of 4 m, the thrust-rotor (E) nearby 3 m, each control-rotor (F) about 1 m.

Control Units

The internal control-units (F) are only necessary for landing and keeping a certain position at floating flight. Here are use two simple units with plane boxes. The rotor blades are only 0.4 m long for fast acceleration. When starting that system, both units are directed at opposite position, so their thrust force compensate each other. These units are suspended to turn and swivel around two axis. If both are turned back, forward thrust comes up. If both are directed towards the front, the helicopter will fly backward. If both units are turned aside, the helicopter will turn around its vertical axis.

Already at moderate revolutions of 1800 U/min, a thrust force of at least 500 N is available (increasing by square with faster speed). This is sufficient for a helicopter of that size (comprehensive details an calculations see the website).

Thrust Unit

Previous conception uses a cone-shaped thrust-unit (E). Seven rotor-layers are installed with partly differing radius (from 0.9 m to 1.4 m) at one shaft. They produce thrust forces of about 4000 up to 9000 N when rotating with 600 up to 900 rpm. The air-resistance of that helicopter is also about 9000 N at a speed of 200 km/h (glides show a Cw=0.15, here is assumed Cw=0.4, at a cross-face of 12 m^2). So the thrust-unit allows that helicopter to travel sufficiently fast.

At double speed, the air resistance rises by square. That´s why airliners fly high up at thin air (density about 0.4 kg/m^3), where the air resistance is reduced to one third. However up there, also the performance of conventional thrust-engines is reduced correspondingly.

Opposite here, as the air pressure is constant within these hermetic closed boxes and thus also the performance is independent from external conditions. These units could even drive higher density, e.g. rho = 2 kg/m^3. The thrust would rise by one half, so here up to 13500 N.

Previous calculations are rather cautious, e.g. based on only 5 % difference of speeds flowing along the glide- and stick-faces. At these cone-engines, the air is pulled around curved faces, the convex glide-face is relieved, while the air ´scratches´ along the concave stick-face. The difference quite realistic will be 10 % and more. The thrust is double and triple, here rising up to 18000 N or even 27000 N. So that air-pressure-cone-engine will deliver sufficient thrust for that helicopter.

Lift-Unit

A bowl-engine (D) was used at previous conception for lift of the helicopter. Three rotor-layers are included one within the other, with radius of 1.4 m, 1.7 m and 2.0 m. They are not mounted at a common central shaft, but each rotor ends with a gear rim at the middle. The drive is done by each separated gear-wheel , shaft and motor. So the rotors can drive different revolutions independent from each other.

The maximum flow speed here is limited to some 125 m/s. The revolutions were calculated with 450 up to 840 rpm. Resulting are lift-forces of about 5000 N up to 9000 N. That´s more than sufficient for a helicopter of e.g. 3.500 kg cross weight. Previous mentioned possibilities could rise up the forces to 40 kN. These are heavy forces, nevertheless only a small part of the basic energy background (see the energy-background at the appendix below).

High Performance Thrust Engine

Indeed, these engines can also deliver thrust forces for airliners. Figure 5 shows a cone-engine A and a bowl-engine B. The central area contributes few thrust, so here it´s open. The boxes now are ring-shaped and also the rotor-cages. As an example, five layers can build one unit, driven by gear rims and gear wheel at one shaft and one motor.

The units could show diameter of e.g. 4 m or preferred about 2 m. Four of the smaller units could be arranged aside and above each other (and more units behind each other), e.g. within the fuselage of an A320. For maintenance they can be exchanged like garbage-containers (as autonomous ´plug-in´ units). Figure 5 right side shows possible storage of these units.

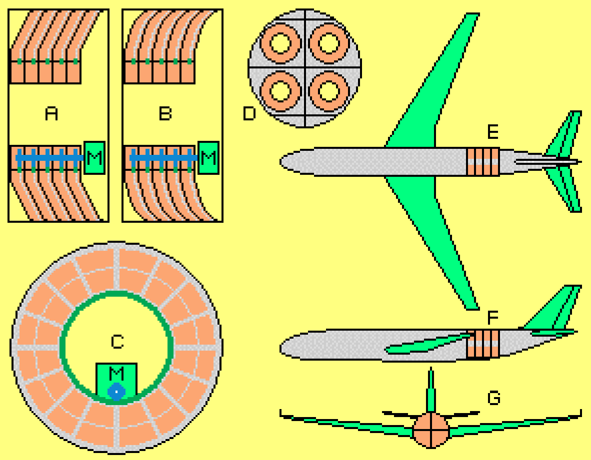

Fig. 5 Airpressure - Thrust - Engine

Figure 6 shows the thrust forces. At the following is discussed the right column. The inside and outside radius are 1 and 2 m, the ring-face is 9.4 m^2. At 450 rpm, the speed at the utmost rim is 94 m/s. The weighted average is assumed at 2/3 of the radius, so here the speed of 79 m/s. The difference of speeds is assumed with 10 %, so the kinetic flow pressures are calculated with 79 to 71 m/s. The system is running with increased density rho=2.0 kg/m^3. Based on known formula F=0.5* rho*v^2 the flow-pressure along the glide-face is 6167 N/m^2 and along the stick-face 4991 N/m^2. The difference of roundabout 1000 N/m^2 same time is the difference of static pressures at both faces. The total thrust results by multiplication with the effective face, the number of layers of each unit and the number of units. Here, the total thrust is 220 kN – just like commonly installed at an A320.

Radius inside	m	0,5	1,0
outside	m	1,0	2,0
Ring-Face	m^2	2,4	9,4
RPM		1.200	450
V max inside	m/s	63	47
V max outside	m/s	126	94
V fast at 2/3	m/s	105	79
V Difference	%	5	10
V slow at 2/3	m/s	99	71
F fast rho=2.0	N/m^2	10.955	6.162
F slow	N/m^2	9.887	4.991
F Difference	N/m^2	1.068	1.171
P at Ring-Face	N	2.515	11.029
P at 5 Rotordisks	N	12.577	55.146
P of 4 Units	N	50.309	220.584

Fig. 6 High Performance Engine Diameter 2 and 4 m

Consequences

These air-pressure-bowl-engines demand drive at a range of common service-functions of such airplanes. Small fuel tanks will do. Complex external jet-engines no longer must be build and maintained. These new machines are much lighter and easier constructions. They behave like (very large) gliders with according few noise pollution and air disturbances. Everybody might reason about the consequences, e.g. for airports and about other points of view.

Analogue to previous conception of a helicopter, all kind of helicopters will come up, designed for most different usage. Some cars already are driving autonomous based on assistant systems. Analogue the heli-flying might become everyday reality – with diverse consequences, positive and possibly negative. Traffic exists also at the land-, rail- and water-roads and even within airless space – and autonomous thrust would be welcome.

That´s no science-fiction. It´s only a smart usage of side-effects of known behaviour of the molecular movements of air particles. I make no patent application for this invention. Everybody may use these open-source ideas. For more details see www.evert.de.

Appendix: Energy Background and Side-Effect Usage

Naturally now it seems mysterious, from which energy source these forces might come. The technique of conventional helicopters is quite natural: the chemical energy of the fuel is transferred into mechanical motion and via rotor-blades the air is pushed down, so the weight of the aircraft is lifted. If the rotor of a helicopter is 6 m long, it covers a circle-face of 113 m^2. Its weight of 3500 kg corresponds to an air volume of 2800 m^3, an air-pile of 25 m height above the rotor-face. Permanently these air masses must be accelerated downward with hurricane speed. However, the air escapes any pressure, so the efficiency is once more minor than at common energy transformations.

The air-volume of all radial-, cone- and bowl-boxes of previous new helicopter conception are only 12 m^3 in total. Each particle of that air-mass of 10 kg is steady flying around with its molecular movement speed of some 500 m/s. Based on known formula E=0.5*m*v^2 this corresponds to the huge energy of 1.250.000 J. The particles hit on a wall, however not right angle all times but in average by 45 degree, so only with 0.7 of the perpendicular force. The static pressure at a wall is (with rho=1.25 kg/m^3 and v=500 m/s), based on known formula P=0.5*rho*v^2 thus 156250 N/m^2. Factor 0.7 results the ´normal´ atmospheric pressure of roundabout 100000 N/m^2. Only one hundredth part of, these 1000 N/m^2, are necessary for suitable lift- and thrust-forces – like achieved at all engine-variations discussed upside.

The air rotates within the disk-shaped boxes. The particles scratch along the walls by flat angle. The perpendicular pressure is reduced. Valid is the strong law of energy-constant: if a particles affects stronger pressure towards front side, it can affect only less pressure aside. Here, the force of kinetic flow pressure is not used, it´s idle running just around circled tracks. Indeed, here is used only the ´side´-effect: fast flows affect less static pressure aside than slower flows. Only that secondary appearance is used here – and that usage does not lessen the primary appearance of the idle running flow.

The enclosed air masses are put in rotation at the start of the system. However, at the slow starting, no ´heat´ is added, the molecular speed of particles is not accelerated as the particles follow the suction of rotor-blades by themselves. The energy of the air mass is still constant. Only the original chaotic motion of the particles becomes ordered a little bit. However even within a flow of 100 m/s, the particles crash around still by 500 m/s, only some more into a certain direction, preferably circling along curved faces on and on.

Some energy-input is demanded for starting the system (or following accelerations). At the running mode however, only the friction losses must be balanced. The energy-input is only the trigger (and not the energy-source). Only the (reduced!) static pressure-forces coming up aside of the glide- and stick-faces, only that secondary side-effect is used. These effecting forces correlate not with the energy-input. At running mode, the rotor and the air nearby are moving same speed. Even the machine delivers full performance, the energy-input is a minimum – at least in comparison with common techniques of aircrafts.

These effects come up at the upside and below faces of every wing. These motion processes are rebuild here within a closed system. This principle can be realized by know techniques in multiple variations. It´s a clear example for using given energies without consuming and exhausting the energy-source.

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www.evert.de/ap0516e.htm is the original website chapter,
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Author

Prof. (em.) Alfred Evert is a hobby physicist and know e.g. by his ´Aether-Physics- and Philosophy´ with exact description of that ´Something Moving´ as the material background of all being. The ´Dancing Satellites´ approve the existence of that basic substance and the ´aether-winds´ around the globe. He also contributed essential statements at the fluid-sciences, e.g. the twist-flows within special pipes or the trout-engine and much more, finally that revolutionary invention of airpressure-bowlengines. See www.evert.de