Thrust for Aeronautics

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Airplanes and helicopters produce unbearable noises and pollute the atmosphere. Nevertheless, these problems were left aside at last climate conference at Paris. Obviously one can´t see any chance for essential improvements. However this might change rapid by a revolutionary upheaval: the new helicopters and airplanes fly without external rotors and engines and won´t whirl up the air (figure 1).

These aircrafts consume much less fuel and they fly silent like gliders. That development is based on a new understanding of the uplift-effect. At first however, one must study the affecting forces of present aircraft technology, e.g. by data of an A320 (figure 2).

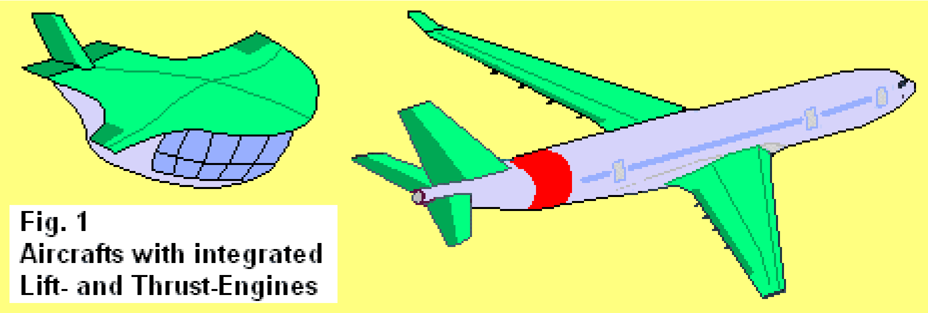


Fig. 1
Aircrafts with integrated Lift- and Thrust-Engines

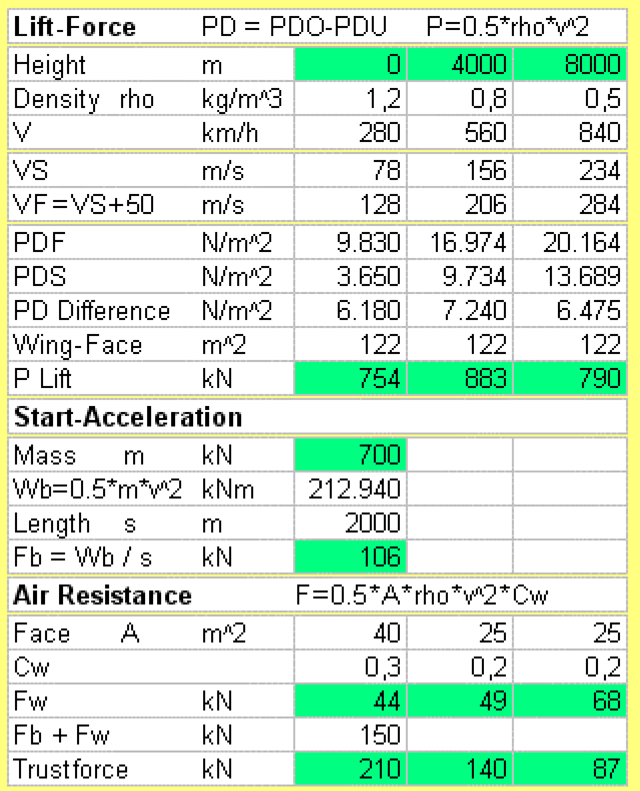
Data of the A320
Three columns show the phases of starting, rising-up and travel-flight, at heights of 0, 4000 and 8000 m, where the density is 1.2 and 0.8 and 0.5 kg/m^3. The speeds are 280, 560 and 840 km/h, respectively 78, 156 and 234 m/s (VS).

It´s assumed, the flow along the upper face (VF) is faster by 50 m/s than along the face below (explained next figure). The dynamic flow-pressures are calculated for the upper-fast and lower-slow speeds (PDF and PDS). The PD-difference is multiplied by the wing-face of 122 m^2, resulting the lift-force (P-Lift).

Already at the start-speed of 280 km/h sufficient uplift-force (resp. buoyancy) exists for rising-up the A320 with its start-mass of 70 t (700 kN).

For the following climbing up, the mass is rising up exclusive by the surplus of buoyancy forces (e.g. at 560 km/h with 883 kN). Also at travel-speed within ´thin´ air, the lifting-force of 790 kN is stronger than demanded.

The mass m = 70000 kg is accelerated with a = 1.5 m/s^2 at a runway of s = 2000 and after the time t = 52 s the speed v = 78 m/s is achieved, demanding a thrust Fb = 106 kN.



Lift-Force	PD = PDO-PDU		P=0.5*rho*v^2	
Height	m	0	4000	8000
Density rho	kg/m^3	1,2	0,8	0,5
V	km/h	280	560	840
VS	m/s	78	156	234
VF=VS+50	m/s	128	206	284
PDF	N/m^2	9.830	16.974	20.164
PDS	N/m^2	3.650	9.734	13.689
PD Difference	N/m^2	6.180	7.240	6.475
Wing-Face	m^2	122	122	122
P Lift	kN	754	883	790
Start-Acceleration				
Mass m	kN	700		
Wb=0.5*m*v^2	kNm	212.940		
Length s	m	2000		
Fb = Wb / s	kN	106		
Air Resistance		F=0.5*A*rho*v^2*Cw		
Face A	m^2	40	25	25
Cw		0,3	0,2	0,2
Fw	kN	44	49	68
Fb + Fw	kN	150		
Trustforce	kN	210	140	87

Fig. 2 Buoyancy- and Thrust-Forces of an A320

Same time, the air-resistance must be overcome. With extended rear-flaps, the cross-section face might be A = 40 m^2 with Cw = 0.3, demanding up to 44 kN thrust. So at the end of the runway, 150 kN thrust force is necessary, available by the installed power of about 210 kN.

If the rear flaps are retracted, the face is reduced to A = 25 m^2 and Cw = 0.2. At higher level, the density is lower. Nevertheless, the faster speeds result stronger air-resistance, demanding stronger thrust (e.g. of 49 and 68 kN). The performance of the installed engines decreases with the density (e.g. at 140 and 87 kN). Finally these facts determine the optimum flight-level and travel-speed.

Forces and Counter-Forces

The prevailing hypotheses suggests, the energy-input is lifting the aircraft because air masses are pushed down correspondingly. Indeed, that´s practise at helicopters – with miserable efficiency. However, the result of previous calculations is absolutely clear: the available energy finally is consumed by the air resistance at maximum speed (quite similar to any car). The common hypotheses of ´pushing-up-aircraft by pushing-down-air´ is untenable. The performance of the engines is sufficient for the acceleration up to the travel-speed. Afterward the reduced performance is only sufficient to overcome the air resistance.

This work is done by the reaction-principle according to the law of force and counter force. The air resistance (and necessary thrust) here is about 44, 49 and 68 kN (row Fw). The lift-forces here are about 754, 883 and 790 kN (row P-Lift), thus 11 to 18 times stronger (and 3 to 4 times stronger than the maximum engine thrust). So no direct mechanic relation can exist between uplift and energy. The energy base and laws for generating buoyancy forces must be quite other kind.

A wing does not float within air-less space. The wing is ´clamped´ by the atmospheric pressure, from upside and below with 10 t/m^2 respectively 10000 kg/m^2 respectively 100000 N/m^2. Caused by the relative flow direct at the border faces, a difference comes up at a size of about 6000 N/m^2 (row PD-Difference). So the pressure differs only by 6/100 between the upper and lower face – resulting lift-forces sufficient for lifting heavy aircrafts.

The buoyancy is generated according to the hydro-static law, only based on the pressure difference at the upper and lower faces. Here within the air, the static pressures are differing because the air is moving along the faces by different speeds. The dynamic and static forces behave according to the laws of fluid-dynamics. Thus also here, forces and counter-forces are acting. Their bases however are the omnipresent gravity, here in shape of the atmospheric pressure, and the enormous energy of the molecular movements of air particles.

Air-Movement and –Pressure

Figure 3 upside shows the profile of a wing. Within the profile (grey), the air is resting, so ´normal´ atmospheric pressure exists. This pressure affects from inside at the upper and lower face, thus it´s force neutral (see arrows A). The air at the below face (red) is resting, however the wing is moving relative to the stationary air. This is equal to an air-flow (see arrow B) along the below face with the airplane´s speed. The air particles hit not perpendicular onto the face, but by a flat angle. That´s why the static pressure onto the below face is some reduced (see arrow C).

Along the upper face (green), a real air-flow exists, because the air particles fall into the relative void upside-rear. That suction is spreading also toward the front, especially along the upper surface. That´s why that ´artificial flow´ starts far in front and some below of the wing´s nose. The suction affect spreads by sound speed, i.e. that wind relative to the wing exists only below sound speed. The economical best speed is 15 % below of the sound-border, corresponding to a difference of about 50 m/s (at an example-wing, I deduced theoretic the weighted difference of 45 m/s, see chapter ´Lift at Wings´ of my website).

That real air motion of about 50 m/s adds to the airplane´s speed. So in comparison with the face below, the relative flow at the upper face is faster (see arrow D). That flow has stronger dynamic pressure and thus it can effect only reduced pressure onto the upper face (see arrow E).

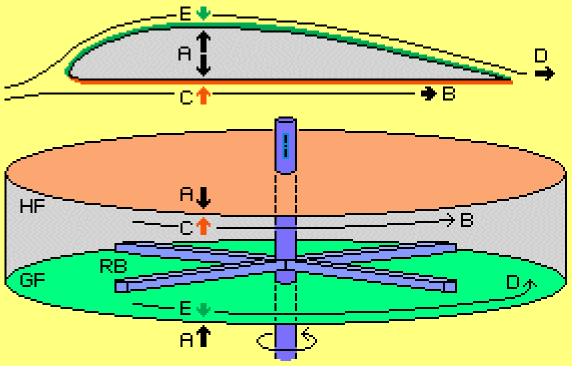


Fig. 3 Air-Movements and Pressure-Forces at a Wing and within a closed round Hollow-Cylinder

The difference A-C presses down the below face. The difference A-E presses up the upper face. More simplistic: the total construction is pressed upward by the difference C-E. That resulting uplift-force corresponds to the difference of dynamic pressures of these two air movements different fast.

Reconstruct at closed System

These processes are rebuild within the closed system of the ´Air-Pressure Bowl-Engine´. Its general shape is a round hollow cylinder, like sketched at figure 3 below. The normal atmospheric pressure weights at all outside faces, force neutral in total (see arrows A). A rotor (blue) produces and maintains the ´artificial wind´. Its rotor-´blades´ (RB) are a right-angle profile, working not like normal props. They only keep the air steady rotating. The rotor-blades are moving above the below inner face by a short distance. This surface is most smooth, here called ´glide-face´ (GF, green). The distance to the inner face above is some larger. This surface is most rough, here called ´stick-face´ (HF, red).

Based on different distances and qualities of the surfaces, the flows along both faces show different speeds (see arrows B and D, upside slow, below faster). The flows show different dynamic pressures and correspondingly, they affect different static pressures onto the inner faces (see arrow C and E, stronger towards up, weaker towards down). Analogue to the forces at previous wing, here the lift-force comes up by the differences A-C and A-E respective direct by the difference C-E.

The lift force affects on the inner faces GF and HF, in total directed upward. The cylinder is fix mounted at the fuselage of the aircraft, so the lift force affects onto the whole body. All parts are stationary constructional elements, only the rotor is a turning part. The rotor blades are moving at horizontal level and they produce air movement only at the horizontal plane.

New Helicopter Conception

These modules can be used by multiple variations. These bowl-engines allow quite new conceptions, e.g. for a new helicopter like shown at figure 4. Several modules can be mounted at one shaft driven by an electric motor. The diameter can be 1 or up to 4 m. However one layer is only 10 to 25 cm high.

For controlling functions (C), here as an example, are installed two units of each fife layers at the rear end of the fuselage. They are directed vice versa, so their thrust forces mutually compensated. If both units are tilt aside, the helicopter will turn around its vertical axis. If both units are tilt to the front / rear end, the helicopter will move forward / backward. So sensitive control is possible even with steady revolutions.

A drive engine (D) with horizontal shaft is installed, composed by seven layers with partly different radius (for optimum usage of available space). Here, the boxes are cone-shaped: the rotor-blades pull the air around convex faces without resistance, thus the glide-faces are released. Opposite, the air ´scratches´ along the concave stick-faces, affecting high static pressure. That cone-shape (and bowl-shape) is much more effective than the flat cylinders.

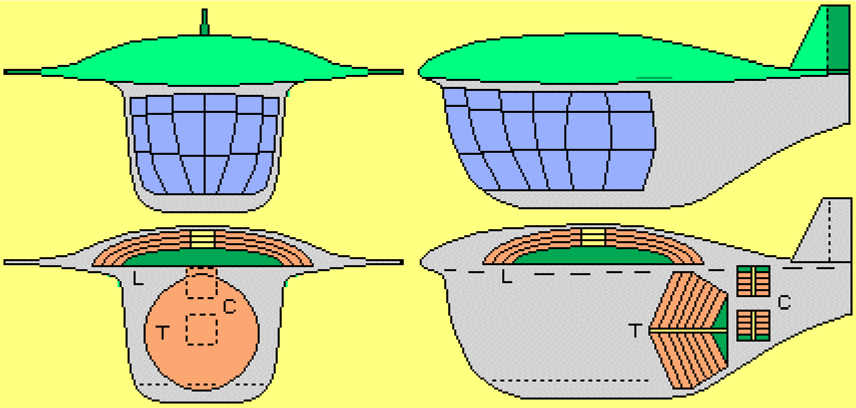


Fig. 4 New Helicopter-Conception with integrated Engines for Lift, Thrust and Control-Functions

The lift-engine (L) is installed within the dome, where three bowl-shaped boxes are including one the other. This bowl-shape allows units of wide radius, as a light and stable construction. The middle is free space (for support of the dome). The rotors have a central rim gear. A separate shaft and motor drives each rotor, even contrary direction, with revolutions as momentary demanded. At horizontal flight, the dome and short wings contribute buoyancy forces and the aircraft can be controlled with common rudder and flaps.

The most complex mechanics of conventional rotor-blades thus is replaces by these simple constructional elements. All units are integrated within the fulcrum, causing no external air movements. This helicopter can even float into the hangar by its own. The performance of these engines can be dimensioned as one likes it.

High-Performance Bowl-Engine

Such engines are even strong enough for delivering sufficient thrust for airliners. The installation and data example of an A320 are shown at figure 5.

The fuselage has a diameter of four meter. At the rear area of the fuselage are installed the engines with a total length of about four meter. Each four units are installed at two levels. Each unit has fife round hollow cylinders at one shaft with one drive-motor. The boxes here are build cone-shaped, i.e. that simple and most effective construction.

The radius of the rotor-blades is 0.65 m, covering a face of 1.33 m^2. Weighted averages are given at a radius of 0.45 m, respective at the circumference of 2.83 m. The performance can be controlled by the density, e.g. the system is driven with rho = 3 kg/m^3. The performance naturally is also controlled by the revolutions, here e.g. with 2400 RPM. The difference of the flow speeds along the glide- and stick-faces (GF and HF) is only to measure empirical. The differences at wings are 60 % to 25 %, only 10 % are assumed here.

Radius	m	0,65
Face	m^2	1,33
Circum. R0,45	m	2,83
Density 10	kg/m^3	3,00
RPM		2.400
V-Diff.GF/HF	%	10
V-GF	m/s	113
V-HF - 10 %	m/s	102
PD-GF	N/m^2	19.167
PD-HF	N/m^2	15.525
PD-Diff	N/m^2	3.642
P 1 Disk	N	4.831
P 5 Disks	N	24.157
P 2*4 Units	N	193.253

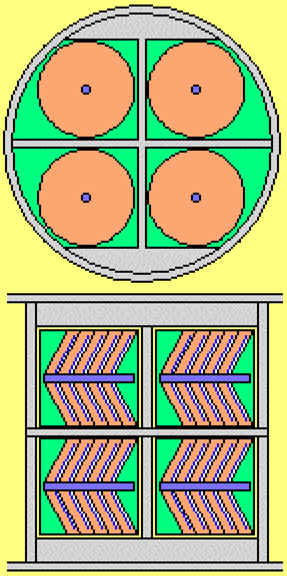


Fig. 5 Thrust-Bowl-Engine A 320

The weighted speeds are 113 m/s and 102 m/s, the difference of dynamic flow pressures is 3642 N/m^2. Same time that´s the difference of static pressures (about half of the buoyancy forces at a wing). Multiplied by the effective faces, one unit will deliver a thrust force of about 24 kN and in total the eight engines about 193 kN (a size comparable to the present installed jet-engines).

Advantages of Aerostatic Thrust

When the thrust is done by reaction-principle, many tons of hot gases must be accelerated up to 300 m/s, on and on, demanding steady energy input. The weight of necessary fuel is one quart (at least) of the cross-weight at the start phase.

At this bowl-engine, the thrust is done by the hydro- respective aero-static principle, which is much more effective. For example, all cylinders of previous engine in total contain only 10 kg of air, which is once accelerated up to about 100 m/s. Afterward the rotors must only keep the air rotating, all times running around, along cone-shaped faces, synchronous with the rotor-blades, demanding few energy input. Much less fuel is necessary (probably less than one tenth). The start weight is reduced, so the acceleration demands less thrust.

The internal installed bowl-engines replace the external jet-engines, so the air-resistance will be reduced. The performance of the bowl-engines is constant at all heights. The new engine is much lighter and easier to build with corresponding advantages of costs and maintenance. Last but not least, these airplanes are silent like gliders.

That´s no science-fiction. That´s only the clever usage of the known behaviour of molecular movements of air-particles. Strong storm are running within the cylinders, representing enormous dynamic pressures – which unused is running idle all around all times long. As a side-effect however, the static pressures are reduced and different weak at the glide- and stick-faces. Only that side-effect is used – without consuming or disturbing the original storm.

The air-pressure-bowl-engine is tremendous effective because working by the rules of hydro- and aero-static buoyancy. Its background is the enormous energy of the atmospheric pressure, which by itself is an appearance of the omnipresent gravity. So please do not mix up the benefits of clever using Free Energy with a ´perpetuum mobile´ of closed systems.

No patent application is done for this invention. Everybody may use these open-source ideas as one likes.

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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 air-pressure-bowl-engines. See www.evert.de