UV-Stimulated Lifter Enhancements

By Tim Ventura, Oct 18, 2002

Overview

Traditionally, Biefeld-Brown and Ion-Wind based propulsion systems utilize a high-voltage corona-effect to create aerial propulsion. The high-voltage current works by ionizing air-molecules, which are then transported from an emitter to a collector through the surrounding atmosphere. In a manner similar to a propeller or helicopter rotor, the Biefeld-Brown Effect (or BB Effect) is able to move a mass of air, which in turn causes propulsion that can be described by the basic Newtonian F=MA formula.

Testing on Biefeld-Brown systems has been underway since the 1930's, and has involved a number of organizations ranging from private startup companies to the United States Navy and Air Force. All of these organizations have encountered some measure of success, in that they were able to create motion in lightweight devices utilizing this effect, however, all of these organizations encountered failure due to the comparative inefficiency of Biefeld-Brown systems as compared to more conventional technologies, such as aircraft and helicopter methods of propulsion.

Major Alexander Deseversky of the US Air Force was able to demonstrate in the 1950's that ion-wind propulsion was capable of lifting a custom-built non-aerodynamic device, which he described as a "flying bedspring". Deseversky's device was similar in many respects to the devices in testing during the 1960's by Thomas Townsend Brown, in that a high-voltage applied from a top-mounted set of "corona-" or "emitter-wires" would travel to a bottom-mounted set of "collectors", thereby producing sustainable lift.

Deseversky's device demonstrated an efficiency of 0.96 hp/lb, which can be compared to the devices of his day – the Piper Cub airplane (0.065 hp/lb) and the helicopter (0.1 hp/lb). It can be easily seen from these figures that the major shortcoming of the ionocraft was the efficiency of this device, which in fact is a shortcoming that was never surmounted – Deseversky never created a device that was efficient enough even to carry an onboard power-supply.

Primary Shortcomings

The primary shortcomings of Deseversky's device stems from the use of the requisite high-voltages required by both Biefeld-Brown and Ion-Wind propulsion systems. Because these systems utilize electricity flowing through the atmosphere across an air-gap, a high-voltage is required to create enough ionization in the atmosphere to carry electric charge.

Typically speaking, the atmosphere is non-conductive in nature, although a very high potential voltage can create ionization of air-molecules, which then become a conductive bridge in the atmosphere. Therefore, with an ion-wind or BB-Effect device, a high-voltage is required to create the necessary current flow through the atmosphere to create lift. However, since atmospheric ionization is a transient phenomenon, power must be continually applied in the form of high-voltage to maintain a stable conduction channel between the emitter and collector.

Atmospheric Plasma: A candle-flame burning against gravity due to a high-voltage plasma interaction.

The primary shortcoming of maintaining a high-voltage is the amount of power required to create the voltage in the first place. The electrical-engineering formula (voltage x current = power) provides some insight into the nature of this problem. To create a conduction channel at 20,000 volts and 1mA of current, the amount of power required is 20 watts. If it is determined that a voltage on the order of 40,000 volts creates a more powerful conduction-channel than the initial 20,000 volt charge does, then the power requirements double to 40 watts.

Biefeld-Brown "traditionalists" maintain that the solution to the problem of increasing power-levels due to voltage is simply to cut the current in half. After all, because of the multiplication factor involved, if you double the 20,000-volt charge to 40,000, but simultaneously reduce the current from 1mA to 0.5mA, you still have a power-requirement of 20 watts.

While initial Biefeld-Brown effect research would seem to support this claim, more recent research by NASA indicates that the majority of thrust in a Biefeld-Brown or Ion-Wind effect system results from the conduction current – or volume of atmospheric charges – rather than the voltage of the charges. While voltage definitely plays a supporting role in determining the speed at which the conduction-ions travel, the sheer volume of conduction ions present in the atmosphere plays the more important role.

This presents us with a catch-22 – a dilemma that has plagued Ion-Wind experimenters now for over 70 years. Quite simply, how do you increase the amount of conduction current in a Biefeld-Brown effect propulsion system without increasing the power-consumption, when the level of high-voltage required must be high-enough to create the conduction current in the first place?

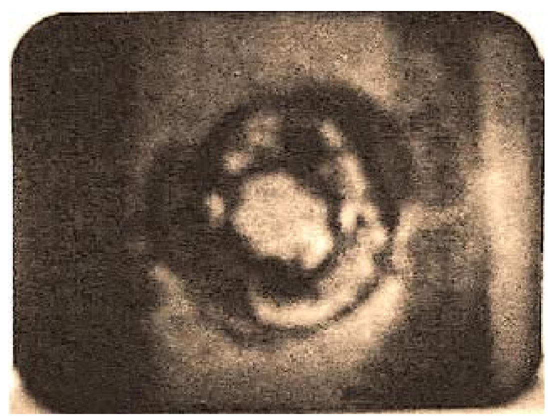
In other words, if the minimum useable voltage is 20,000 volts, then for the addition of each additional milliamp of current put into the propulsion system the power-consumption of the propulsion system alone increases by 20 watts. Even neglecting the power consumption requirements of the electronic communications and navigation technology in modern-day vehicles, it is obvious to even the layman that power-consumption requirements rapidly exceed even the most powerful propulsion systems.

Based on Ion-Wind and Biefeld-Brown experimentation by the author, a rough estimate of the amount of current required to lift a lightweight vehicle and associated passengers and baggage might be a considerably higher amount of current.

For instance, the author's most-efficient Lifter to-date uses 5 mA of current at 50kV to lift 1 pound of weight. If this power-weight ratio remains constant for larger-sized devices, a Lifter capable of lifting 1 ton of weight will require 10 amperes of current. (500,000 watts/670 horsepower)

Potential X-Ray Hazards

Research by Saviour demonstrates that unshielded Lifters during operation produce a significant amount of X-Radiation. In the photo below, exposed to a Lifter using 50 watts/30kV for an 8-minute period of time, you can see a definite indication of X-ray exposure from these devices that have even penetrated a series of 2mm-thick stainless steel washers. While exposure of this sort can be shielded with advanced materials and by engineering the passenger compartment to be distanced from the source of X-Ray emissions, any ion-wind technology utilizing high-levels of both voltage and current will rapidly produce unreasonably high amounts of X-radiation.



X-Ray Exposure: This is a photographic plate after 8-minutes of close proximity.

Ion-Leakage and Ozone Production

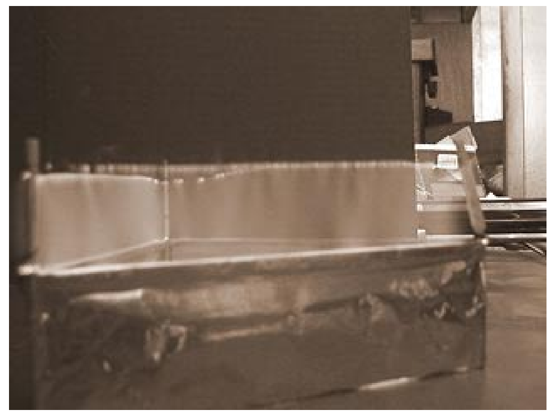
One major consideration for a high-current device utilizing high-voltage electricity to create propulsion is the inherently "messy" nature of high-voltage ion-effect electricity. Ion-wind is seldom as clean as it looks, in that quite often static electricity builds up on nearby surfaces, causing damage to instrumentation and in some cases even a dangerous shock potential.

While there are a few effective methods for reducing this, such as setting the collector-voltage below the ground-voltage level of the environment, for the most part ion-leakage is unpredictable and dangerous to nearby electronics. Additionally, high-voltages also encourage the production of ozone gas, which is a chemically powerful oxidizer and can pose a significant health-risk in large quantities.

Ozone production is even more difficult to reduce than unwanted high-voltage leakage and static buildup. The production of Ozone is a by-product of the kinetic interaction of high-voltage electricity with air-molecules, and the increased production of it is aggravated by increases in voltage and inefficiencies in the transfer of conduction-current from the emitter-wire to the atmosphere.

Electromagnetic Interference

The possibility exists for electromagnetic interference from the Lifter to cause disruptions to nearby electrical-equipment. Even the author's 250-watt power-supply causes lights to flicker and power to fluctuate in equipment during operation. The 250-watt power-supply is built to withstand high-voltages, but tends to be affected adversely by high-voltage static buildup. After taking into consideration the expectation to increase wattage from 250-watts to 500,000 in order to lift a vehicle, then it can be seen that 2000x increase in EM-field intensity will cause considerable interference in nearby equipment of any sort, and should especially effect broadcast and reception equipment nearby.



EM Interference: This light-enhanced corona illustrates potential EM-Interference.

Solution Overview

The problems of excessive power-requirements by the propulsion system, in addition to high-levels of X-ray, ozone, EM-interference, and other negative effects on the environment can be greatly reduced by a variety of compensatory measures, some of which have been alluded to in this proposal document. However, while a variety of different measures may be employed that each reduces on negative aspect of the Biefeld-Brown effect propulsion technology, there is another measure that can be taken that will reduce all of the negative effects of the high-voltage in a system-global manner.

Information from equations regarding Ion-Wind and Biefeld-Brown derived from conventional physics by Saviour and others indicate that within the realm of these technologies, the increase in thrust from increase the voltage (and hence, input power) is not made up for in increased thrust. In other words, increasing the voltage from 30 to 40 kilovolts increases the power-consumption by a factor of 133%, but the output thrust is not in turn increased by 133% as a result, assuming that current levels are held constant for both voltages in testing.

Traditional Biefeld-Brown experimenters have indicated that experimentally, 40 kilovolts appears to provide a great deal of thrust compared to 30kv, however, this is not mathematically supported, and is believed to result from increased conductivity of the atmospheric medium. In other words, since the air essentially functions as a semi-permeable dielectric, the increased voltage has a greatly pronounced effect on conduction-current transfer through the air, which bears the resemblance of being more powerful when in reality it is simply more efficient than the lower voltage.

Extrapolation into low-voltage behavior from Saviour's equations, which were designed for high-voltage research, shows that lowering the voltage to levels considerably below those thought to be possible allows a much greater increase in efficiency than previously thought.

Using Saviour's equations, a baseline voltage of 30kv from the emitter to the collector should produce an overall Lifter performance of 1 g/ Watt, and an ion-transport speed of 1.72 cm^2/Vsec. These values match established norms (calculated assuming a negative-output terminal to maximize ion-mass).

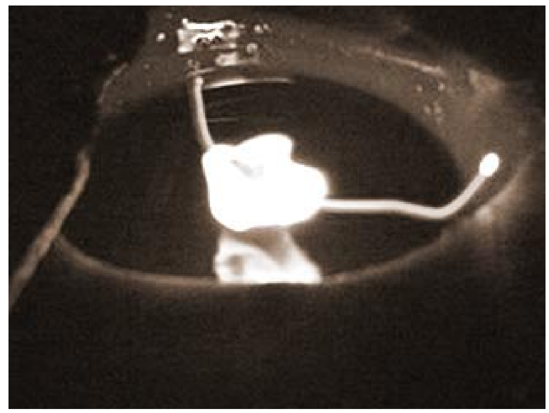
Having established a baseline to compare against, consider what happens when the value of 115 volts (rectified to DC) is used instead of 30,000. The overall performance changes to 324.6 g/ Watt, which is equivalent to nearly 1 pound per watt, or about 746 pounds per horsepower).

Ultraviolet Radiation Ion-Production

Using Saviour's equations to demonstrate the increase in efficiency with a greatly reduced voltage helps to support the notion that lowering the voltage below the ionization threshold would provide attainable requirements for input power-levels, as well as reduce the voltage below the point where negative X-ray and ionic effects occur. However, Saviour's equations tend to also breakdown with lower values, because the traditional community considers it common sense that "Ion-Wind" cannot exists without ionizing potentials.

Research into Ultraviolet photo-ionization indicates that at the frequencies of 1024nm for O2 and 798nm for N2, both of these atmospheric molecules will photo-ionize, and will then become ready for manipulation by electrical fields in the same manner that similar molecules ionized by high-voltage would be.

Experimentally, a beam of lightning was directed down a pre-determined path to ground in Ontario, Canada through the use of an excimer-laser, which stimulates the air-molecules within the beam radius to become conductive.



UV Ionization: Exposure to Ultraviolet light increases conductivity in the surrounding air.

The conductivity of a lightning channel – or any atmospheric plasma – is in fact greater than the conductivity of an equal volume of copper wire. This means that by using the appropriate wavelengths of ultraviolet radiation, it is possible to manipulate and direct low-voltage currents of electricity through the atmosphere in the same manner that they are directed through a circuit board.

Hence, instead of requiring 30 kilovolts of electricity to stimulate ion-production and conduction-charge transfer; a much greater amount of electricity can be transferred at a much lower voltage without the side-effects associated with the traditional Biefeld-Brown and Ion-Wind technologies through the intermediary use of UV radiation to modify the conductivity properties of air.

Methods of Generating Ultraviolet Radiation

For experimental use in modifying atmospheric conductivity, a variety of light sources are available that provide ultraviolet ionizing-radiation to greater or lesser degrees, including:

1. Germicidal & Ozone Generation Bulbs & Fluorescent Tubes (253.7 nm)
2. Argon Mini-Arc Lamps (160-280 nm)
3. Mercury Arc Lamp (248 nm)
4. UV-Laser Diodes (370 nm)
5. UV Nitrogen Lasers (337 nm)
6. UV Excimer Lasers (190 - 248 nm)

Of the four general options, the least expensive and most easily obtainable source for the generation of ultraviolet ionizing radiation is from the germicidal and ozone-generating bulbs and fluorescent tubes. This category of product is generally used for the purification of water and air through ozone generation and the photodecomposition of bacteria after uv-exposure. This type of bulb is also used by the computer-industry in EEPROM-erasers reset computer-chip memory.

UV Bulbs: Germicidal bulbs produce ionizing UV and are used in water-treatment.

Typically, Germicidal and Ozone producing bulbs are the least expensive general method for generating ultraviolet ionizing radiation – they tend to radiate around 253.7 nm, but produce a considerably broader spectrum of visible light in addition to the ultraviolet component.

Argon Mini-Arc lamps are used in government calibration-studies, and require a water-cooling source for that application. They range in output from the very hard-UV range of 160nm to 280nm in frequency, but are expensive and difficult to maintain.

Mercury Arc lamps are a much better general option for generating high-output hard-uv. The L8288 series lamp manufactured by Hamamatsu Corp (JP) is an example of a mercury arc lamp with a high radiance at 248 nm. Mercury Arc lamps do require some warm up time, during which they must be correctly positioned in order for the mercury to ionize properly inside the lamp, however, other than that they are durable, semi-inexpensive, and easy to obtain. The Hamamatsu L8288 series lamp also has a high output – 500W total power.

UV Laser-Diodes are currently a newcomer to the realm of UV-generation. These devices are becoming more and more pertinent as manufacturers become able to create them with shorter and shorter wavelengths. The big advantage to the uv-diode is low power-consumption and high-efficiency, and they additionally benefit from low spectral dispersion (especially laser-diodes). Typically the light produced by these is invisible, whereas the light produced by arc lamps is highly visible, which may be relevant in some applications.

The Nitrogen laser has an output of 337 nm, which is within the Ultraviolet range, and is even has high as older excimer gas-laser mixtures. Most Excimer lasers are more efficient than the Nitrogen laser is -- excimer lasers use a 2 or 3 photon ionization-process, and the N2 laser uses a 3 or 4 photon process—however, the Nitrogen laser is more efficient at converting input energy into light than an excimer is, which may make up for some or all of the photo-ionization loss. The biggest advantage to the Nitrogen laser is the radiant energy, ability to create a coherent beam (as all lasers can), and the cost to manufacture. Nitrogen lasers can be bought or built from between a few hundred to a few thousand dollars.

Excimer lasers are the traditional method of generating ionizing-ultraviolet radiation. While Tesla and others in the past have used arc-lamps and other methods for the same task, since the advent of the excimer-laser it has been the primary means of ionizing columns of air. Organizations involved with particle-beam research, such as HSV technologies, Raytheon Inc, and the US Army & Air-Force have all experimented with excimer-lasers to successfully ionize columns of air using excimer lasers.

Examples of successful tests in doing this include directing lightning with excimer lasers during electrical storms (Ontario, 1990's), creating conductive air-channels for power-transmission (UCLA, 1990's), and several classified projects involved with similar strategies.