Presented at the STAIF 2003 Meeting, Albuquerque, NM
February 5, 2003 (Session E08)

Implications of Outside-the-Box Technologies on Future Space Exploration and Colonization

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Abstract. In general, planning for future manned space exploration either to the moon, Mars, or an asteroid has depended on a somewhat linear extrapolation of our present technologies. Two major prohibitive cost issues regarding such planning are payload lift and in-flight energy generation. The costs of these in both engineering and actual flight costs, coupled with the planning necessary to carry out such exploration have prevented us from actively moving forward. Although, it will be worthwhile to continue to plan for such exploration using "present" technologies, I recommend that planning be concerned mainly with mission strategies and goals utilizing both present technology and totally new energy breakthroughs. There are presently in research and development an entire suite of relevant outside-the-box technologies which will include both zero point energy generation and antigravity technologies that will replace our present solar/nuclear/fuel cell energy technologies and liquid/solid fuel rockets. This paper describes some of these technologies, the physics behind them and their potential use for manned space exploration. The companies and countries that first incorporate these technologies into their space programs will lead the way in exploring and colonizing space.

BACKGROUND: SPACE TECHNOLOGY NEEDS

Human exploration and, ultimately, colonization of low earth orbit, the moon, asteroids, and other planets will never "get off the ground" with the present costs of technology. At present the United States' only public human lift capability is the nearly two-decade-old shuttle fleet, which is expensive to maintain and limited in turn-around flight capability. Recent projected estimates by NASA for more than the next decade plan for about eight flights per year at a cost of approximately $300 million per flight with lower costs for two more flights (NASA, 2002). With only five flights per year considered to be a "safe" number and ten flights per year considered the maximum number, it is obvious that almost any kind of human exploration and colonization is nearly out the question in the foreseeable future. Even the less expensive Russian launch costs are still prohibitive for significant advances in space exploration and colonization.

In order to start to make space exploration and colonization a possible societal activity, the cost of low earth orbit flights must drop by at least three to four orders of magnitude. Even the most optimistic extrapolations of our present technologies will have trouble meeting that goal. Although, it will be worthwhile to continue to plan for such exploration using "present" technologies, I recommend that planning be concerned mainly with mission strategies and goals assuming both present technology and totally new energy breakthroughs. The three major areas of technology that must be developed include transportation needs, energy generation needs, and communication needs. Major technical and theoretical breakthroughs must occur in each of these areas. This paper deals with some potentially relevant outside-the-box technologies that if properly funded and researched will make human exploration and colonization of space a reality. The following sections are not meant to be exhaustive but give examples of where potential research may prove to be fruitful.

TRANSPORTATION NEEDS

Transportation needs incorporate two aspects that are obviously linked. The first is the need to lift a payload from Earth's surface to low earth orbit and attain orbital speeds. The second is to accelerate that payload to high enough speeds to escape Earth's gravity and travel to the moon and planets in a reasonable time frame. Obviously, the faster the transit times, the less payload is required for human support and accommodation needs during the journey and the greater the amount of material can be delivered to a destination. This section lists a number of technologies that all involve electrogravitic thrust or gravity modification technology that has potential for solving space transportation needs. That antigravity technologies are possible and already exist in covert military technology is discussed in recent papers by Greer and Loder (2001), Greer (2001) and Loder (2002).

One active area of antigravity research is the field of electrogravitics and the Biefield-Brown effect. This effect is based on the pioneering work of T. Townsend Brown, who discovered that gravitational mass and electric charge are coupled (Brown, 1929). He found that a capacitor, charged to a high voltage, tended to move in the direction of its positive pole. He later obtained several U.S. patents including a U.S. patent (Brown, 1960) for the design of disk shaped capacitors that flew around a stationary pole when charged and were demonstrated to the military in the early 1950s. More information on Brown's patents can be obtained from Valone (1994) and references listed therein and the T.T. Brown web site (Brown, 2002). In the last few years there has been a public and scientific resurgence of interest in electrogravitic phenomena and the Biefield-Brown effect. This has been both in the form of lifter technology to demonstrate the effect (Naudin, 2002; Applied Electrogravitcs, Devon, PA, USA; Transdimensional Technologies, Huntsville, AL, USA; Ventura, 2002) and more detailed investigations such as Bahder and Fazi (2002), who have just published a paper on the forces associated with an asymmetric capacitor. Although, there is a demonstrable ion wind associated with these lifter craft, Brown and more recently others have tested these devices in vacuum chambers and found that lift still occurs (reported by Naudin, 2002). Furthermore, thrust can occur in a horizontal orientation as shown by the Serrano device (Naudin, 2002) which received a worldwide patent in 2000 (Serrano, 2000). It is interesting to note that recently NASA received a patent for thrust using an asymmetrical capacitor without even mentioning the Biefield-Brown effect (NASA, 2001). Some of the theory about how the Biefield-Brown effect creates thrust is discussed by Bahder and Fazi (2002) and Barsoukov (2002). Other aspects of new propulsion technologies are reviewed by LaViolette (1999).

There are other reported mass-reducing or antigravity effects that may or may not be related to the above-described Biefield-Brown effect. Several of these include the use of radiation of a specific frequency, which can cause an object to lose weight or even levitate. For example, De Aquino (2000) has done significant experimental and theoretical work on antigravity including demonstrating the relationship between gravity and ELF radiation. Mallove (2001) reported observing up to a 70% weight loss in a gold foil suspended from a dielectric thread in experiments carried out by the Correas. Podkletnov and Nieminen (1992) and Podkletnov (1997) reported a slight loss in weight of an object suspended about a rapidly rotating superconducting disk, which was apparently able to partially shield the Earth's gravitational field. Later, Podkletnov and Modanese (2001) reported the use of a device where a very high voltage is discharged into a superconductor. This creates a focussed gravity impulse measurable at a distance from the device.

Several researchers have shown a link between the running of zero point energy devices and gravity effects. For example, Searl's electrogravity disk consists of a segmented rotating disk with segments supported by a set of cylindrical permanent magnets rolling within a circumferential track. This disk produces its own energy and can achieve lift off through production of its own gravity field (Searl, 2002). Recently Roschin and Godin (2000) built a one-meter simplified version of the Searl disk, which when spun at 600 rpm obtained a 35% weight loss while generating seven kW excess electrical power output. Sweet and Bearden (1991), in a paper describing a solid state over unity device (the Sweet self-powered vacuum triode), observed a 90% loss in weight of the 6 lb. device while it was operating at an output of 1000w.

The Alternative Energy Institute, Inc. (2001) has further general descriptions of antigravity research, while scalar electrogravitic theory and other experiments are briefly described in Greer and Loder (2001, pp.415-421). For a detailed, in depth discussion of antigravity theory the reader should see Sweet and Bearden (1991) and Bearden (2002). Haisch and various colleagues have also recently published a series of excellent papers attempting to link electron spin, zero point energy, mass and inertia which may provide us with an understanding of the Biefield-Brown effect (Haisch et al., 1994, 1997; Haisch and Rueda, 1998, 1999). Bahder and Fazi (2002) also discuss electrogravitic theory in their recent paper. I have only reported on experiments that have been reported in the open literature or have been documented by others. In summary, these are but a few of the researchers who have observed gravity loss during experiments, suggesting that there may be a number of ways of achieving gravity

shielding or total repulsion (antigravity) that could be used in a productive manner for both earth surface and space transport needs. However, it will take a more open minded scientific community than the present one to even consider the reality of what has been thus far reported.

ENERGY GENERATION NEEDS

At the present, spacecraft energy needs are met through a variety of means: notably solar panels and small nuclear devices for non-human flight, and solar panels and fuel cells for human flight and space station needs. These contribute to increased lift requirements and extra complexity. Furthermore, there will be areas of exploration where use of solar panels may be limited such as: at moon's south polar region, during long reconnaissance trips on the surface of Mars, and in the region of the outer planets. Obviously, energy generation is not as critical for exploration/colonization as the above described lift and propulsion, but there may become a time when large amounts of energy will be needed. These times might occur if electrogravitic-drive propulsion comes into general use, or humans wish to terraform Mars or take on large-scale mining and extraction technologies for off-planet manufacturing. There are a number of energy technologies (zero point energy devices) which may have the potential to fill these needs. All of these devices extract energy from the vacuum state using a variety of strategies. Although, the field of quantum mechanics finds that zero point energy terms are necessary to predict various phenomena, many physicists still believe that this energy is not real (King, 2001).

There are a number of books that describe many such devices for example: Manning (1996), King (1991, 2001) and Alternative Energy Institute, Inc. (2001). Greer and Loder (2001) have a chapter describing many devices with references. Bearden (2002) describes in detail, with numerous references, many devices and the theory behind them, while the Journal of New Energy and Infinite Energy Magazine both publish articles in this field. Puthoff also describes the physics of the zero point field (Puthoff, 1989a,b; 1990). Although there are dozens of such systems described in various books above, I will only mention a few here that would seem more suitable for space activity in that they are solid state, i.e. no moving parts. These types of systems would seem to be more rugged and reliable than devices with moving parts, but time will tell as this field begins to mature.

Sweet's vacuum triode device uses a magnet with a self-oscillating field to produce a continuous flow of energy with a very small continuous activation energy. This device produces an observed power gain of $5x10^4$ to $1.5x10^6$. Sweet and Bearden (1991) describe the theory behind this device in one very long sentence in their paper's abstract: "By treating the nucleus of the atom as a pumped phase conjugate mirror, several working model energy units have been produced which excite and organize the local vacuum, increase the local virtual photon flux between local vacuum and nucleus, establish coherent self-oscillations between the local excited vacuum and the affected nuclei, utilize the self-oscillating standing wave for self-pumping of the nuclei/mirrors, introduce a very tiny signal wave to the mirrors, and output into an external load circuit a powerful, amplified, time-reversed phase conjugate replica wave at 60 Hertz frequency and nominal 120 volt sine wave power."

The concept of using an oscillating ion plasma to extract energy from the vacuum state was first developed by T.H. Moray (Moray and Moray, 1978). His device was solid state, though of course the plasmas oscillated within their tubes. Correa and Correa (1995a) found a way to stabilize plasma ion pulsing in their patented tube described as a pulsed abnormal glow discharge (PAGD) tube. Their research has been described by King (2001) and in detail by Correa and Correa (1996a, b). In a second patent they describe the charging circuitry necessary to stabilize the discharge pulsing and extract excess energy from the pulse discharge (Correa and Correa, 1995b).

The Brown (1989) battery is another solid state device that uses a small LC oscillator coil and a weak radioactive ionizing source to create a corona around the coil. By tuning the circuit to the corona resonance, the ion-oscillations couple a zero point energy coherence directly to the circuit (King, 2001). Finally, the development of the motionless electromagnetic generator (MEG) by Bearden and co-workers (Bearden, 2001; Patrick et al., 2002; Anastasovski et al., 2001) has also demonstrated the principal of over unity energy production from the vacuum state, coupled with a strong theoretical foundation. Although the device has been replicated by several laboratories and shown over unity energy production, control of the energy flow is still being researched.

COMMUNICATION NEEDS

There is little problem with our present communication technologies in dealing with earth to human occupied space craft in the Earth-Moon region. The distances are short enough so that delays due to speed-of-light limitations are not too limiting. Communication with planetary explorers can not be carried out in real time because of time delays. However, there is present research that may lead to faster-than-light or super luminal communication (SLC) technologies. Although SLC is considered to be impossible by some researchers, there are many that are considering the possibilities very carefully. Several recent articles bear reviewing for those interested in this area. Cramer (1997) discusses the possibility of faster-than-light communication and Weisstein (2002) lists a number of references on this subject. Bearden (2002) describes the ordinary scalar potential as the basis for superluminal communication, and describes experiments already done at the University of Cologne, which demonstrate SLC. Recently, the New Scientist (Anonymous, 2002) reported that "physicists at Middle Tennessee State University have broken that speed limit over distances of nearly 120 metres, using off-the-shelf equipment costing just $500." Whether or not these initial investigations result in workable SLC technologies remain to be seen. Bearden (2002) notes that we already know it is possible, but need "a National Science Foundation and National Academy of Sciences that surge forward and formulate funded research programs to push the frontiers of science along such superluminal communications lines." This will probably not happen until there is a perceived need, must likely created by human space exploration.

CONCLUSIONS

In summary, these are three examples of technology areas that must be considered by aerospace engineers in designing future craft and mission capabilities. Although, it will be worthwhile to continue to plan for space exploration and colonization using "present" technologies, it would seem prudent that planning be concerned mainly with mission strategies and goals assuming both present technology and totally new energy and communication breakthroughs. There are presently in research and development an entire suite of relevant outside-the-box technologies which will include both zero point energy generation and antigravity technologies that will replace our present solar/nuclear/fuel-cell energy technologies and liquid/solid fuel rockets. This paper describes some of these technologies, the physics behind them and their potential use for manned space exploration. The companies and countries that first incorporate these technologies into their space programs will lead the way in exploring and colonizing space.

ACKNOWLEDGMENTS

I thank the following people for many discussions while preparing and writing this paper including: S. Greer, A. Craddock, T. Bearden, T. Valone, E. Mallove, E. Rice, H. Fox, M. King, T. Loder, C. Loder, S. Patel and the many courageous Disclosure Project witnesses.

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