

## **Our Mission and a Little History**

As the wind blew through Tucson, Arizona, it was the year 2000 and a new company was about to be born; they would call themselves Ionatron and they were working on something extraordinary. What was it they discovered? It was a remarkable new occurrence using plasma channels to carry electricity to its destination. The new scientific name for this discovery was Laser Induced Plasma Channel; they called it 'LIPC' for short. Over the next four years a group of Ionatron scientists (led by Ionatron cofounders Tom Dearmin, Steve McCahon and Joe Hayden) among others, and a number of high level government agencies began the highly confidential process of how LIPC could be used to create a new 21<sup>st</sup> century era laser-guided energy weapon and maybe much more. Interestingly, the CIA's quasi-investment arm 'In-Q-Tel' was so impressed with 'LIPC' technology that it became an early angel investor.

The project, and the successful laser guiding of 100's of kilowatts of electrical energy to a target, had all the markings of a novel revolutionary discovery and one that could be weaponized for lethal or less than lethal effects on humans. Just as remarkable were the effects on electronics, communications, explosives, infrastructure and vehicles. The demonstrations were so powerful that with the proof of concept completed, it was now more important than ever for Ionatron to create documentation protecting its intellectual property in earnest. Coinciding with this, because the project was so advanced and important, were new government rules concerning many aspects of the project, including critical personnel becoming classified, and areas of highest sensitivity quickly requiring '*top secret*' credentials.

As a result of this work, a revolutionary new technology was secure, and its new name would become Laser Guided Energy (LGE). This sophisticated laser created filaments which broke the bond between oxygen electrons in the atmosphere from the oxygen molecules creating a laser induced plasma channel. The direction in which Ionatron pointed the laser would then be where the laser created a conductive path which allowed controllable electrical pulses of up to a million volts down the LIPC channel to achieve the desired effect at the target. All of these novel discoveries made LGE way ahead of its time and created extremely valuable intellectual property which needed to be protected. Ultimately, with great diligence, this led to many new patents (25 current), with an additional (11) that are classified as Government Sensitive Patent Applications (GSPA's) and held under secrecy order of the government. These by definition are reviewed every year by the government agency that classified the application. This process also allows for greatly extended protection rights to the company and the classified patents have no expiration date until such time as they are no longer classified after which they will receive the normal 17-year patent protection.

The ultimate mission of the program was to use an Ultra-Short Pulse Laser with comparatively little power (key) to create what is called a Laser Induced Plasma Channel (LIPC). LIPC is a straight-line conductive channel that can carry controlled amounts of very high voltage electrical energy which is pre-determined to travel only a designated distance. The key is it can be both a non-lethal and a lethal controllable destructive force weapon because of its unique ability to be adjusted using variable settings. Importantly, this also allows decisions to be made in order to maximize, minimize or eliminate collateral damage depending on the mission objectives.

In short, we are talking about a controllable death ray. This was something no one had ever been able to do before. Not that they didn't try; the death ray had been the dream of Nicola Tesla, and he spent the better part of his life working on it. The Ionatron model, like Tesla's, involved concepts in nature. When lightning strikes it creates a channel through which the lightning actually travels. Likewise, the technology Ionatron developed would create a plasma channel to transmit high voltage electricity.

All current weapons that use lasers as a destructive force rely upon the power of the photons to heat and destroy the target. But LIPC only uses the laser to create a conductive channel for the insertion of high voltage energy, which can now be controlled to destroy a target. This was a breakthrough technology never before seen, which could be used in weapon systems for many decades to come. It would evolve towards advanced adaptive optics, and atmospheric and plasma energy interactions which allows cutting edge technologies, innovative laser accuracy and manageable lethality solutions for military missions with precision, safety and impact on a scale never before thought possible on the battlefield. When retired U.S. Navy Rear Admiral Thomas W. Steffens first saw a demonstration of this breakthrough technology, he commented, *"This will change the nature of warfare and the battlefield long into the future."*

Then in late March 2004, Ionatron became a publicly traded company via a reverse merger with ticker symbol IOTN. The following year, on August 17, 2005, Ionatron would ring the opening bell for NASDAQ in New York and by 2006 the company had grown to a NASDAQ market cap of over one billion dollars. Ultimately in *February of 2008, Ionatron would change its name to Applied Energetics (AE), ticker AERG*, to more accurately reflect its business activities, which by now included Banshee Counter-IED technology, also called JIN (Joint IED Neutralizer) for use in the middle east. In fact, US convoys using JIN technology ultimately traveled over 15,000 miles of roads in Afghanistan without a casualty or incident, a truly remarkable achievement. But by 2014, and after many years of government DoD budget cuts, CEO Joe Hayden made a critical decision to voluntarily put the company into hibernation via corporate shell status, with intent to preserve remaining company cash and patent assets.

We previously noted that R&D was a big part of AE's future. Over a 10-year period from 2004 to 2013, a total of over \$100 million was spent on R&D. Of that AE spent over \$40 million, and the Department of Defense spent over \$60 million. Because of this and with strong foresight by management confident about the long-term future of LIPC and LGE, Applied Energetics carefully protected its balance sheet and continually shunned debt, thus allowing it to protect assets for a better future. That opportunity would come as the calendar moved into 2016, with the DoD landscape for directed energy technologies beginning to reflect favorable change. Congress got the ball rolling in early 2016 with (S.2778 - Directed Energy Weapon Systems Acquisition Act of 2016). Ultimately, in April of 2017, Applied Energetics would emerge from shell status with the intent to restart its business.

As we moved into January of 2018, a challenge for control of the company and its valuable patent assets emerged through a proxy held to replace with cause the single executive Board of Director (BOD) that held control of the company. The existing single executive BOD was asked via a submitted request to provide a shareholders list and later the corporate books of the company but refused. These actions were legally submitted by an existing shareholder under articles covered by Delaware Corporate Law. However, in a seemingly unlikely turn of events, the shareholder proxy vote prevailed even without a shareholder list, and in the process went into the historical record books for Delaware Law which dates back to 1899. The proxy had all the makings of a soap opera with twists and hairpin turns and sheer cliff drop offs throughout a mudslinging contest. In the end, it was maybe the most unlikely proxy victory ever, and won by a landslide! The newly elected three-man BOD was led by *original cofounder, President and CEO* Thomas C. Dearmin, with Jonathon Barcklow and Brad Adamczyk as the other two directors. The new BOD immediately appointed Mr. Dearmin as CEO. Further good news included the return of Steven McCahon PhD as head scientist. Steve McCahon was an original AE cofounder, chief scientist and key architect of much of the company's intellectual property. Dr. McCahon pointed to a plethora of new and exciting growth opportunities going forward, including novel new LGE advanced processes at the atomic level.

Moving toward 2019 and beyond, management believes directed energy is in the early stages of a substantial new growth phase. The opportunities are led by a new U.S. president, new leadership in the U.S. Department of Defense (DoD), and changes in the mindset pushing out into other areas of government as foreign competition gets closer to home. Add to these the potential breakthroughs involving both *additive technologies* and advanced manufacturing 4.0, which we believe directed energy can play a big part in, and for which the government is now proactively positioning for with its massive '*Rebuilding of America*' infrastructure projects, and also broadly within the DoD, and one can see where this is all going. These are very diverse 4.0 projects led by large commercial industrial manufacturer's and are expected to have long build cycles. Just as important is AE's understanding of early stage enhancements to very specific areas of commercial 3-D additive processes. Included are very sophisticated novel advanced 3-D printer processes that *if successful* could be in high demand from major industrial entities around the world. Interestingly, these and other innovative novel processes useful within manufacturing 4.0 could well be the poster child for the next generation of new and exciting highly advanced innovation. AE's directed energy technology LGE could play an important role in many of these key areas. Not to be forgotten, industry and government are equally transitioning forward and at a rapid rate, substantiating the potential for explosive growth ahead. Furthermore, virtually everything discussed here will at some point likely be tied together via the *Internet of Things* (IOT) and utilize some form of advanced block chain technology.

In short, this new world of multi-use Directed Energy and commercial additive advanced manufacturing has the markings of something special and global in nature. It is being embraced by both government and commercial industry alike and is tracking toward a life of its own. Furthermore, all indications point to a long build cycle with rapid growth acceleration going forward. In summary, we view the current period as a sweet spot for directed energy, which include novel new advanced LGE technologies along with 2<sup>nd</sup> generation DoD Laser Guided Energy projects and next generation Banshee C-IED innovation among the many current opportunities.

Sincerely,

*Thomas C. Dearmin*

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CEO of Applied Energetics, Inc.

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