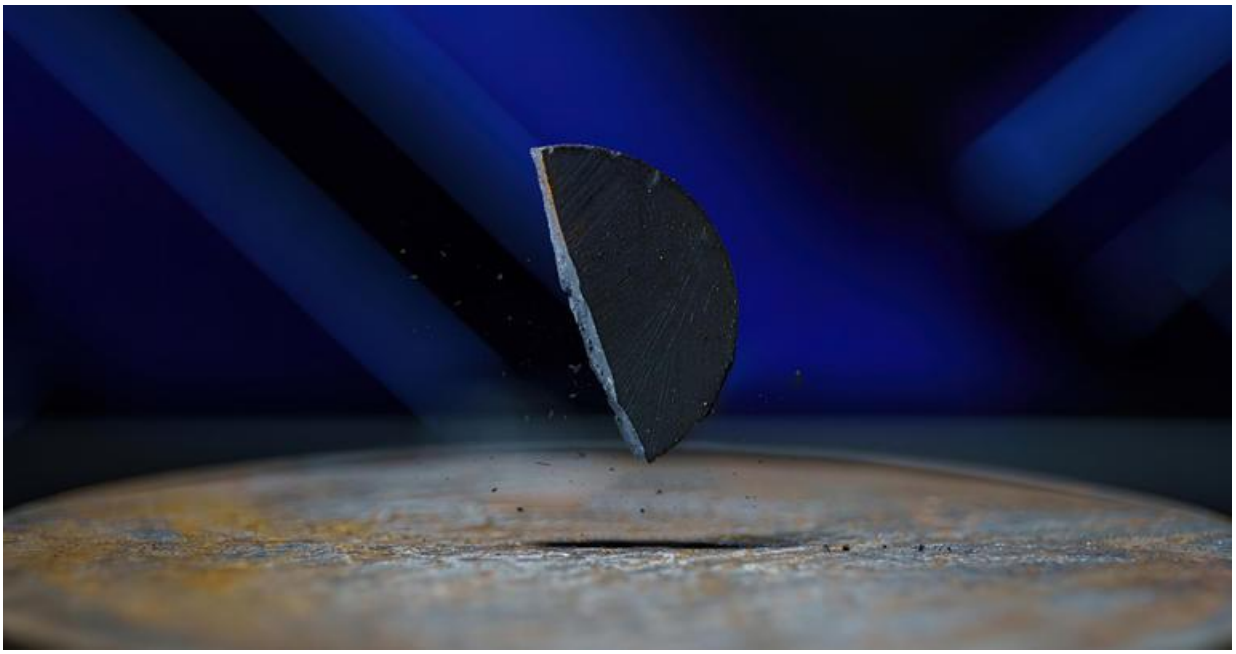
GRAVITY PROPULSION NEWS



Japan's Magnetic Levitation Cars Could Revolutionize The Automotive Industry© Sean Cate

American Antigravity was founded in 2002 to explore antigravity, warp-drives, and emerging science in Breakthrough Propulsion Physics. Over time it has grown into massive collection of research, interviews, and scientific knowledge relating to emerging space & energy science, and it serves as a community center for bleeding-edge research not covered by traditional media.

We serve the community by helping to connect scientists, innovators, and enthusiasts through a forum for them share their passion for emerging science, and we're proud to contribute to the continued innovation in mankind's quest for the stars. As we continue help innovators tell their story, we strive to engage public interest in supporting this valuable research that benefits us all.

THE ORIGINS OF APEC

The APEC Conference

An Open Forum For Emerging Innovation

APEC is an open, community-based conference bringing together scientists, engineers & innovators in a supportive, open forum to discuss research into emerging propulsion technologies.

We pride ourselves on being more than just a conference, though: we've created a community forum for innovators to meet & discuss their work, and our list of speakers includes nearly all of the top names in emerging propulsion research.

You might think of APEC as a "conference of conferences", because we provide an online monthly gathering place frequented by attendees, presenters, and even conference moderators from all of the past peer-review conferences.

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The American Antigravity website (no longer online) described the various types of Antigravity devices that use non-aerodynamic methods of propulsion to create thrust – typically a directional or upward thrust from systems based usually on Electromagnetism. There are dozens of proposed methods of creating gravity-nullifying effects, but they typically fall into the following categories of AG devices. The major categories for Antigravity Devices:

1. Mach's Principle: Off center-rotators, inertial-thrusters, or piezo-devices. These devices attempt to "pull themselves up by the bootstraps" to overcome gravity mechanically.

2. E L F-Gravitational Shielding: Low-Frequency E M-waves block gravitons from interacting with mass, creating a shield from gravity and inertia.

3. Mass-Fluctuation: Utilizing E M-waves to create mass fluctuations simulates "negative mass" which has been proposed to generate an Antigravity Effect.

4. Biefield-Brown: High voltages are used to create an asymmetrical capacitance, which Puthoff & Sakarov have proposed creates forward directional thrust by interacting with quantum-foam.

5. Superconductive Gravitational-Shielding: A rotating superconductor or gas plasma creates a shield around the test device that blocks inertia and mass, similar to the E L F shield above.

6. Superconductive H F GW: The Gertsenshtein Effect allows a high-frequency interaction between Electromagnetism and Gravitation that creates powerful Gravitational-Waves, capable of exerting tons of force.

7. Bismuth- Element 115: A poorly understood nuclear mechanism claimed to be the result of reverse-engineering U F O's that somehow translates high-voltage electricity into a propulsive gravity wave.

8. Gyroscopic-Precession: A variation on Mach's Principle in which a force applied horizontally creates an upward thrust in a rotating gyroscope. Includes N M R Antigravity, a nanoscale variation of Gyroscopic precession in which E M-radiation is used to generate Nuclear Magnetic Resonance and create a processional force against gravity for the entire test object.

9. Lenz-Law: A series of variations on the common electromagnetic inductive force in which an Antigravity craft is repelled from the Earth's surface using a macro-scale variant of Lenz's Law.

10. Geomagnetic Levitation: A high-energy, low-efficiency device that generates upward and directional thrust by applying a very high-strength magnetic field to repel against the Earth's natural magnetic field.

11. Rotating Magnetic Field Device: A broad category of Antigravity device in which a series of high-speed rotating electromagnetic fields are used to warp space and generate a pure, high efficiency, and sometimes over unity Antigravity Effect. May be related to Magnus-Effect propulsion or Rotating Superconductive Antigravity.

12. Hutchison-Effect: A poorly understood high-voltage/high-frequency Antigravity mechanism capable of lifting hundreds of pounds of weight but lacking the repeatability for close scientific scrutiny and easy replication. This is an aspect of scalar-technology and may be also called "scalar antigravity" or "Bearden Antigravity".

13. Poynting Vector Propulsion: A real, workable reactionless drive based on classical electrodynamics principles, tested to generate pounds of thrust. Scalability for this system is unknown – early prototypes are unstable.

Bismuth is so strongly repelled from magnets, it levitates. How?

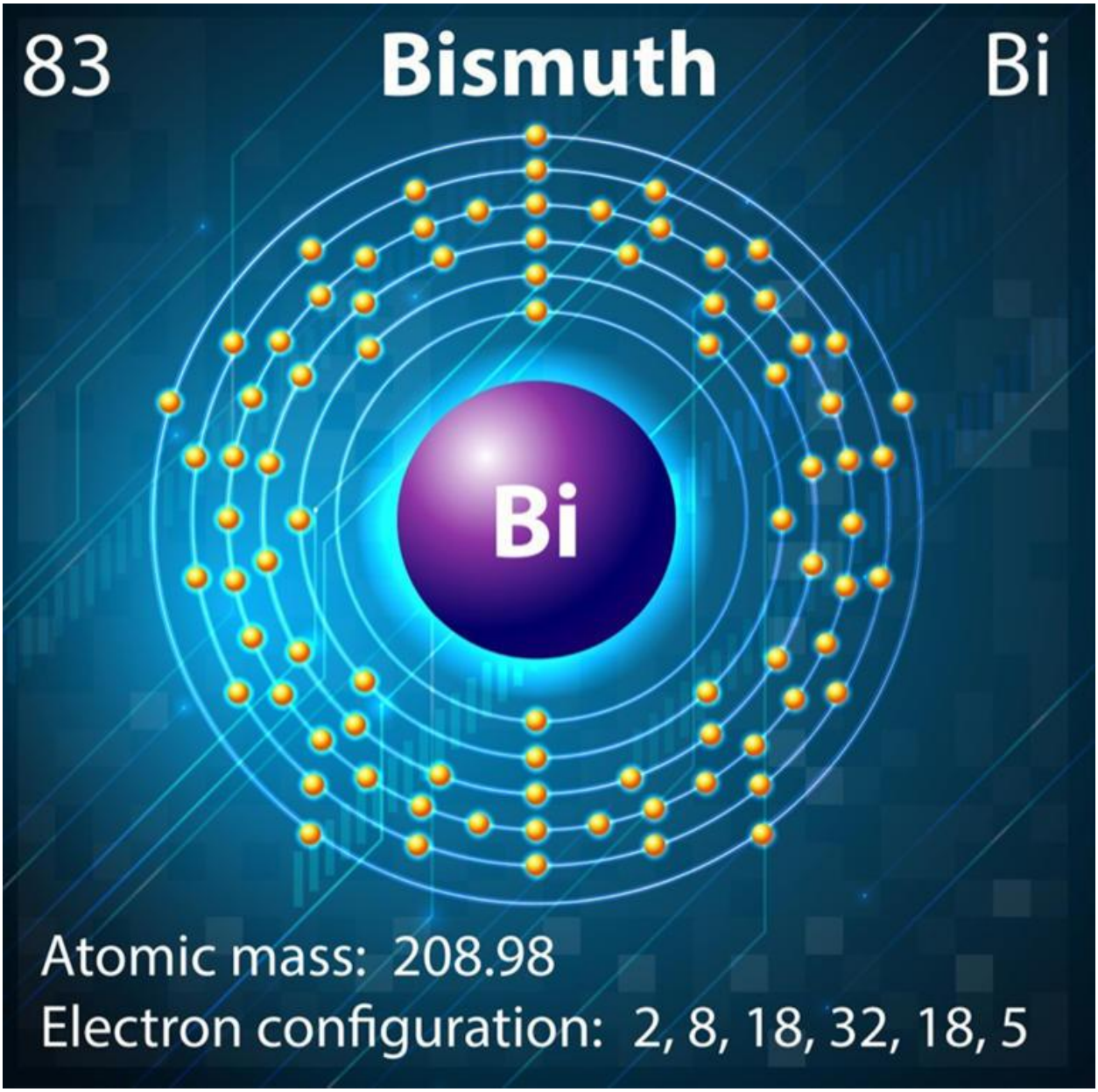
Bismuth is an unusual element that we don't encounter much in everyday life. But this pretty, iridescent metal, found near the bottom of the periodic table, exhibits some extraordinary properties. Magnetic levitation — bismuth's ability to seemingly float between two magnets — is perhaps one of the most interesting. The repulsion between bismuth and the magnets is so strong, it causes the metal to levitate.

But why is bismuth so strongly repelled from magnets?

According to Eric Riesel, a magnetic materials chemist at MIT, the answer comes down to the type of magnetism exhibited by bismuth. Every material has magnetic properties, determined by a quantum property of the element's electrons known as spin. But, this spin can only point in two directions — up or down — and the combination of all the spins in a material define exactly what type of magnetism the element will exhibit.

"Most people are familiar with ferromagnets (permanent magnets) like iron, where the spins are all aligned with each other, but there are also anti-ferromagnets where the spins are pointed in opposite directions to each other," Riesel told Live Science.

However, there's also another pair of magnetic categories: paramagnetism and diamagnetism. "In paramagnets, when you apply a magnetic field, spins in that material will align with the field in proportion to its strength," he said. "Diamagnets apply a force in the opposite direction to the field, repelling it."



The unfilled outer shell of bismuth means it should be weakly attracted to magnets but, relativistic heavy atom effects mean we can't predict bismuth's magnetic properties from just its electron configuration. (Image credit: White Space Illustrations via Shutterstock)© Provided by Live Science

Bismuth is an example of a diamagnetic material, yet this is not the behavior we would expect from the element's electron configuration. The type of magnetism exhibited by a material depends on the arrangement of electrons and their corresponding spins. Electrons circle the nucleus in defined layers called shells, which are further subdivided into levels called the s, d, p and f orbitals.

Typically, diamagnetic materials have a closed shell structure. This means a particular group of orbitals are completely full and the electrons have been

forced to pair, with one pointing up and the other down — essentially canceling out the spins. Conversely, paramagnetic materials usually have partially filled orbitals, meaning the electrons are unpaired and can align their spins in the same direction.

Bismuth is in Group 15 of the periodic table. The s, d and f orbitals are all full, but the p orbitals contain three out of a possible six electrons. So bismuth has partially filled orbitals and should behave as a paramagnet. However, its position in row six of the periodic table means bismuth also possesses some unusual heavy-atom properties.

"Chemical elements found after the f-block in the periodic table have their outermost electrons orbiting the nucleus at speeds that are significant fractions of the speed of light," said Ira Martyniak, also a magnetic materials chemist at MIT. "The direct relativistic effect makes the 6s and 6p orbitals contract and reside closer to the nucleus, which gives rise to anomalous physical and chemical characteristics."

These relativistic effects are responsible for many of bismuth's surprising properties, such as its unconventional superconductivity, its very low melting point (520.7 degrees Fahrenheit, or 271.5 degrees Celsius) and the unusual shape of its crystals. The unexpected diamagnetism is no exception.

"Even though bismuth has the unpaired electrons in its 6p orbital, because of relativistic contraction of the 6s and 6p levels, the paramagnetism stemming from the 6p electrons is suppressed and the behavior of bismuth is largely dominated by the closed shells and large size of the atom, leading to strong diamagnetism," Martyniak told Live Science.

Diamagnetic materials have lots of valuable applications, including electromagnetic induction in copper coils (used to generate electricity) and the aluminum tracks of high-speed maglev trains. Bismuth itself is too heavy to be a practical material for general use, but its potent diamagnetism means it is now a common component in superconductors and quantum computing.

U.S. Navy controls inventions that claim to change "fabric of reality"

Inventions with revolutionary potential made by a mysterious aerospace engineer for the U.S. Navy come to light.

Credit: Getty Images

U.S. Navy ships

- U.S. Navy holds patents for enigmatic inventions by aerospace engineer Dr. Salvatore Pais.
- Pais came up with technology that can "engineer" reality, devising an ultrafast craft, a fusion reactor, and more.
- While mostly theoretical at this point, the inventions could transform energy, space, and military sectors.

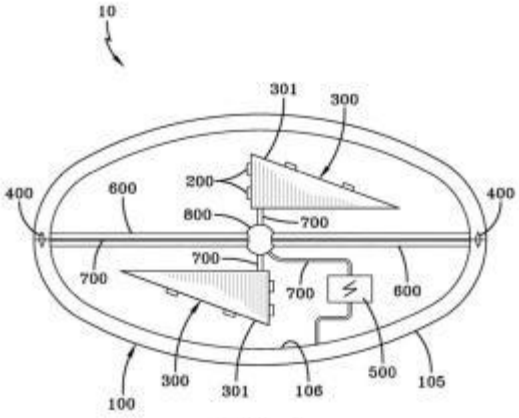
The U.S. Navy controls patents for some futuristic and outlandish technologies, some of which, dubbed "the UFO patents," came to light recently. Of particular note are inventions by the somewhat mysterious Dr. Salvatore Cezar Pais, whose tech claims to be able to "engineer reality." His slate of highly-ambitious, borderline sci-fi designs meant for use by the U.S. government range from gravitational wave generators and compact fusion reactors to next-gen hybrid aerospace-underwater crafts with revolutionary propulsion systems, and beyond.

Of course, the existence of patents does not mean these technologies have actually been created, but there is evidence that some demonstrations of operability have been successfully carried out. As investigated and reported by The War Zone, a possible reason why some of the patents may have been taken on by the Navy is that the Chinese military may also be developing similar advanced gadgets.

Among Dr. Pais's patents are designs, approved in 2018, for an aerospace-underwater craft of incredible speed and maneuverability. This cone-shaped vehicle can potentially fly just as well anywhere it may be, whether air, water or space, without leaving any heat signatures. It can achieve this by creating a **quantum vacuum** around itself with a very dense polarized energy field. This vacuum would allow it to repel any molecule the craft comes in contact with, no matter the medium. Manipulating "quantum field fluctuations in the local vacuum energy state," would help reduce the craft's inertia. The polarized vacuum would dramatically decrease any elemental resistance and lead to "extreme speeds," claims the paper.

Not only that, if the vacuum-creating technology can be engineered, we'd also be able to "engineer the fabric of our reality at the most fundamental level," states the patent. This would lead to major advancements in aerospace propulsion and generating power. Not to mention other reality-changing outcomes that come to mind.

Among Pais's other patents are inventions that stem from similar thinking, outlining pieces of technology necessary to make his creations come to fruition. His paper presented in 2019, titled "Room Temperature Superconducting System for Use on a Hybrid Aerospace Undersea Craft," proposes a system that can achieve superconductivity at room temperatures. This would become "a highly disruptive technology, capable of a total paradigm change in Science and Technology," conveys Pais.



FIG−1

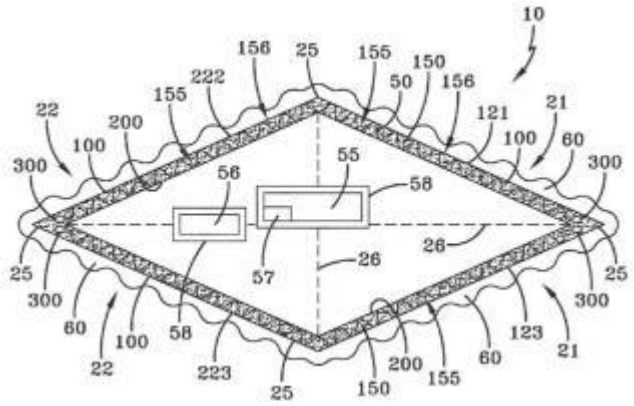
*High frequency gravitational wave generator.*Credit: Dr. Salvatore Pais

Another invention devised by Pais is an electromagnetic field generator that could generate "an impenetrable defensive shield to sea and land as well as space-based military and civilian assets." This shield could protect from threats like anti-ship ballistic missiles, cruise missiles that evade radar, coronal mass ejections, military satellites, and even asteroids. Dr. Pais's ideas center around the phenomenon he dubbed **"The Pais Effect".** He referred to it in his writings as the "controlled motion of electrically charged matter (from solid to plasma) via accelerated spin and/or accelerated vibration under rapid (yet smooth) acceleration-deceleration-acceleration transients." In less jargon-heavy terms, Pais claims to have figured out how to spin electromagnetic fields in order to contain a

fusion reaction – an accomplishment that would lead to a tremendous change in power consumption and an abundance of energy.

According to his bio in a recently published paper on a new Plasma Compression Fusion Device, which could transform energy production, Dr. Pais is a mechanical and aerospace engineer working at the Naval Air Warfare Center Aircraft Division (NAWCAD), which is headquartered in Patuxent River, Maryland. Holding a Ph.D. from Case Western Reserve University in Cleveland, Ohio, Pais was a NASA Research Fellow and worked with Northrop Grumman Aerospace Systems. His current Department of Defense work involves his "advanced knowledge of theory, analysis, and modern experimental and computational methods in aerodynamics, along with an understanding of air-vehicle and missile design, especially in the domain of hypersonic power plant and vehicle design." He also has expert knowledge of electrooptics, emerging quantum technologies (laser power generation in particular), high-energy electromagnetic field generation, and the "breakthrough field of room temperature superconductivity, as related to advanced field propulsion."

Suffice it to say, with such a list of research credentials that would make Nikola Tesla proud, Dr. Pais seems well-positioned to carry out groundbreaking work.



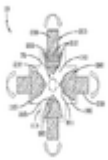
*A craft using an inertial mass reduction device.*Credit: Salvatore Pais

The patents won't necessarily lead to these technologies ever seeing the light of day. The research has its share of detractors and nonbelievers among other scientists, who think the amount of energy required for the fields described by Pais and his ideas on electromagnetic propulsions are well beyond the scope of current tech and are nearly impossible. Yet investigators at The War Zone found comments from Navy officials that indicate the inventions are being looked at seriously enough, and some tests are taking place.

Pais's patents:

Inventor: Salvatore Pais;

Plasma Compression Fusion Device

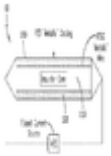


US US20190295733A1 **Salvatore Pais** United States Of America As Represented By The Secretary Of The Navy

Priority 2018-03-22 • Filed 2018-03-22 • Published 2019-09-26

A plasma compression fusion device which includes a hollow duct and at least one pair of opposing counter-spinning dynamic fusors. The hollow duct includes a vacuum chamber disposed within the hollow duct. Each dynamic fusor has a plurality of orifices and an outer surface which is electrically …

Piezoelectricity-induced Room Temperature Superconductor



US US20190058105A1 **Salvatore Cezar Pais** United States Of America As Represented By The Secretary Of The Navy

Priority 2017-08-16 • Filed 2017-08-16 • Published 2019-02-21

The present invention is a room temperature superconductor comprising of a wire, which comprises of an insulator core and a metal coating. The metal coating is disposed around the insulator core, and the metal is coating deposited on the core. When a pulsed current is passed through the wire, …

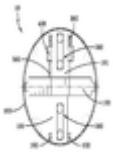
Craft Using an Inertial Mass Reduction Device

US US20170313446A1 **Salvatore Pais** United States Of America As Represented By The Secretary Of The Navy

Priority 2016-04-28 • Filed 2016-04-28 • Published 2017-11-02

A craft using an inertial mass reduction device comprises of an inner resonant cavity wall, an outer resonant cavity, and microwave emitters. The electrically charged outer resonant cavity wall and the electrically insulated inner resonant cavity wall form a resonant cavity. The microwave emitters …

Electromagnetic field generator and method to generate an electromagnetic field



US US10135366B2 **Salvatore Pais** The United States Of America As Represented By The Secretary Of The Navy

Priority 2015-07-24 • Filed 2015-07-24 • Granted 2018-11-20 • Published 2018-11-20

The electromagnetic field generator includes a shell, an electrostatic generator, a power plant, a thermoelectric generator, and an electric motor. The shell has embedded polycrystalline ferroelectric ceramic material which is polarized such that the ceramic material exhibits strong Piezoelectric …

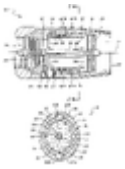
High frequency gravitational wave generator

US US10322827B2 **Salvatore Cezar Pais** The United States Of America As Represented By The Secretary Of The Navy

Priority 2017-02-14 • Filed 2017-02-14 • Granted 2019-06-18 • Published 2019-06-18

A high frequency gravitational wave generator including a gas filled shell with an outer shell surface, microwave emitters, sound generators, and acoustic vibration resonant gas-filled cavities. The outer shell surface is electrically charged and vibrated by the microwave emitters to generate a …

Laser augmented turbojet propulsion system



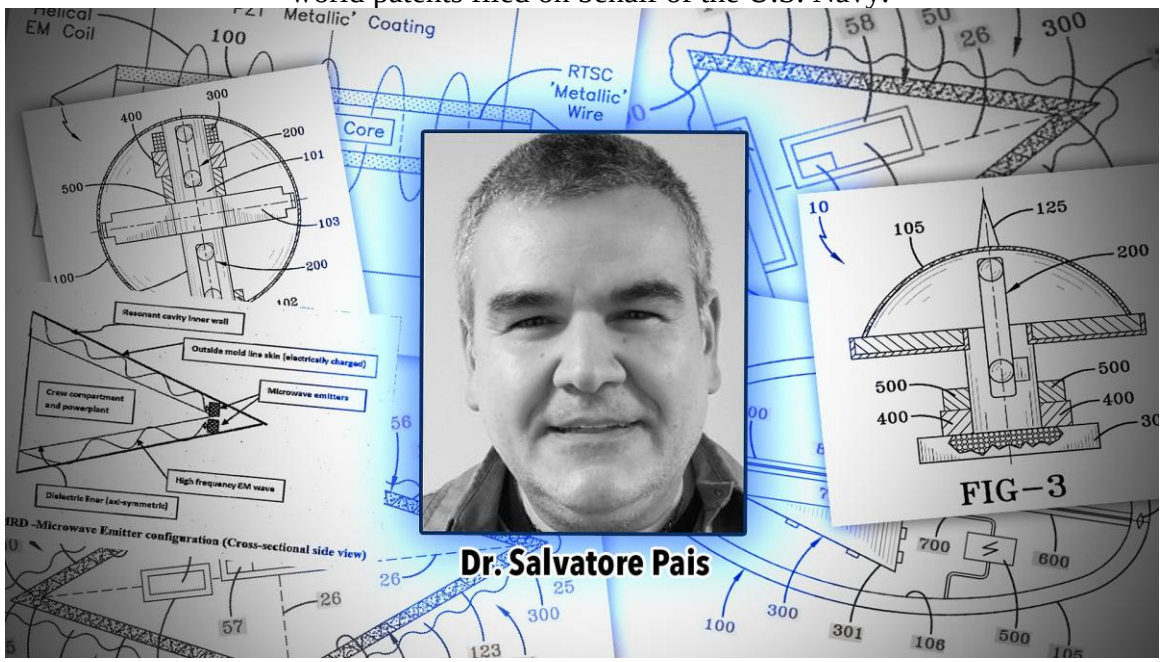
US US7080504B2 **Salvatore Pais** Northrop Grumman Corporation

Priority 2004-07-23 • Filed 2004-07-23 • Granted 2006-07-25 • Published 2006-07-25

The invention is a turbojet propulsion system which includes a compressor section, a turbine section coupled by a shaft to the compressor section, a combustion section mounted between the compressor section and the turbine section, and an exhaust duct coupled to the aft end of said turbine section …

The Secretive Inventor Of The Navy's Bizarre 'UFO Patents' Finally Talks

Dr. Salvatore Pais has finally spoken to The War Zone concerning his seemingly out of this world patents filed on behalf of the U.S. Navy.



Over the last six months, *The War Zone* has been deeply reporting on a set of bizarre patents assigned to the U.S. Navy. The patents, which are all the product of a single inventor, truly sound like the stuff of science fiction and include high-temperature superconductors, gravitational wave generators, compact fusion reactors, and high-energy electromagnetic field generators. Most radical of all is the "hybrid aerospace-underwater craft" claimed to be able to "engineer the fabric of our reality at the most fundamental level" by seemingly bending the laws of physics as we know them. Together, these patents seem to be the building blocks of a vehicle with truly out-of-this-world, UFO-like performance. As part of our reporting, we have been working to better understand the mind behind this mysterious intellectual property. Now, the elusive Dr. Salvatore Cezar Pais has spoken to *The War Zone*.

Despite the patents sounding extremely far-fetched, official documents show that the Chief Technology Officer of the U.S. Naval Aviation Enterprise personally attested to the reality of these inventions and their importance to national security and peer-state competition in appeals with the United States Patent and Trademark Office (USPTO). Meanwhile, the scientists and physicists we have talked to have made it clear that they find the claims largely absurd and not grounded in scientific fact. At the same time, there is, in fact, many decades of government research into similar technologies that are very much alike in concept to some of Pais's work. As such, while these are obscure ideas and remain on the edge of science, they are not exactly brand new.

All of this has led many to wonder what exactly is going on with these patents and a multitude of questions remain unanswered. Are the Salvatore Pais patents simply proactive, hoping to get ahead of the game for when or if these technologies actually become feasible? Are they part of a misinformation campaign designed to lead America's adversaries on a fruitless wild goose chase? Could they be an attempt by the Navy to try to emulate seemingly unexplained craft with incredible capabilities that its personnel have encountered? Could the Navy really be on the verge of changing human technological progress as we know it? Or maybe they even represent a breakthrough that has already occurred. Then again, could they be just the flimsy product of a persuasive and imaginative inventor and his gullible Navy bosses?

The one person who would actually know the answer to these questions and more is Dr. Pais himself.

New Details Emerge

Dr. Pais recently published a new academic paper in the *IEEE Transactions on Plasma Science* journal detailing his work on his Plasma Compression Fusion Device. That device, the patent for which *The War Zone* has previously reported on, is a compact fusion reactor claimed to be capable of creating a net energy gain, a breakthrough that would revolutionize energy production if truly feasible.

Like all of Dr. Pais's other patents and publications, the paper claims that this revolutionary new fusion reactor employs "controlled motion of electrically charged matter through accelerated vibration and/or accelerated spin subjected to smooth, yet rapid acceleration–deceleration–acceleration transients, to generate extremely high energy/high-intensity electromagnetic (EM) fields." In the case of this reactor, those EM fields are claimed to both heat the plasma within the core and also confine and compress it, enabling energy production levels currently out of reach.

In the author section of the paper, it is stated that Dr. Pais has "advanced knowledge of theory, analysis, and modern experimental and computational methods in aerodynamics, along with an understanding of air-vehicle and missile design, especially in the domain of hypersonic power plant and vehicle design" as well as "expertise in electrooptics and emerging quantum technologies, particularly the laser power generation arena, and high-energy electromagnetic field generation, besides condensed matter physics, such as the emerging breakthrough field of room temperature superconductivity, as related to advanced field propulsion."

The paper also contains a headshot of Dr. Pais, which confirms that a picture purporting to be Pais found on a Chinese news blog that we included in our previous reporting was indeed him after all. That image's provenance remains unknown.

Salvatore Cezar Pais received the Ph.D. degree in mechanical and aerospace engineering from Case Western Reserve University, Cleveland, OH, USA.

He was as a NASA Graduate Research Fellow with the NASA Glenn (Lewis) Research Center, Cleveland. He was with NAVAIR/NAWCAD, NAS PAX, Patuxent River, MD, USA. He was a General Engineer/Advanced Concepts Analyst with Northrop Grumman Aerospace Systems, where he was involved in defense-oriented work. He is currently with the Department of Defense, Department of the Navy, Strategic Systems Programs (SSP), Washington, DC, USA, where he is involved in a permanent civilian capacity. He has advanced knowledge of theory, analysis, and modern experimental and computational methods in aerodynamics, along with an understanding of air-vehicle and missile design, especially in the domain of hypersonic power plant and vehicle design. Furthermore, he has expertise in electrooptics and emerging quantum technologies, particularly the laser power generation arena, and high-energy electromagnetic field generation, besides condensed matter physics, such as the emerging breakthrough field of room temperature superconductivity, as related to advanced field propulsion. As a relevant aside, it is important to stress the fact that his work at SSP has absolutely no bearing on the subject of the paper at hand.

A biography of Pais listed in his most recent publication in *IEEE Transactions on Plasma Science*., *IEEE.ORG*

The IEEE publication states that Dr. Pais is no longer with NAVAIR/NAWCAD, but now works at the U.S. Navy Strategic Systems Programs (SSP). According to its website, SSP covers the "entire spectrum of activities from research, development, building of hardware, training of crews, and construction of facilities, through the continued operational support" of America's Trident submarine-launched ballistic missiles (SLBMs) and *Ohio* class and future *Columbia* class nuclear-powered ballistic missile submarines (SSBNs). In 2018, SSP announced it was developing a new "Prompt Global Strike Weapon," now known as the Intermediate-Range Conventional Prompt Strike, which consists of a hypersonic glide body on top of a rocket booster that submarines or surface ships that could launch and that could potentially reach any target on Earth within an hour, depending on the location of the launch platform.

It remains unclear whether any of Dr. Pais's prior work at NAWCAD has migrated to his new position at SSP. From the sound of our correspondence, and by what we know about SSP's scope, it seems like this is very much a separate field of study. His transfer to this other research arm of the Navy is also puzzling. If Dr. Pais's patents were relevant, feasible, and if some of them were in actual testing as the Naval Air System's Chief Technology Officer assured the USPTO, why would that effort be stymied by a transfer to another unit?

It's also worth noting the well-established trend of the U.S. military making use of the Invention Secrecy Act of 1951 to file patents unavailable for public viewing, under which the Navy has been the most prolific filer since 2017. It seems particularly notable that Pais's patents, which according to top Navy officials were of major national security interest, were filed publicly, though the reason why remains elusive.

Invention Secrecy Activity

(as reported by the Patent & Trademark Office)

	FY15	FY16	FY17	FY18	FY19
Total Secrecy Orders in Effect (at end of period)	5579	5680	5784	5792	5878
New Secrecy Orders Imposed	95	121	132	85	88
Secrecy Orders Rescinded	36	20	28	77	2
Sponsoring Agencies for New Secrecy Orders					
Foreign Origin	10	4	17	0	0
ARMY	5	32	19	14	21
NAVY	30	41	49	40	55
AF	45	29	33	31	10
DOE	0	3	7	0	1
NSA	4	1	2	0	0
DTSA	0	8	2	0	1
NASA, DARPA	1	3	3	0	0
New DoD Secrecy Order Types					
Type 1 (export control)	33	48	47	27	36
Type 2 (classified)	34	1	23	19	3
Type 2 (foreign PSA)	9	4	17	0	10
Type 3	19	62	38	39	38
New Non-DoD Secrecy Orders	0	6	7	0	1
"John Doe" Secrecy Orders (imposed on private inventors)	15	49	39	43	48

Data compiled by the Federation of American Scientists showing annual totals of inventions filed under the Invention Secrecy Act., *FAS.org*

"The Pais Effect"

The War Zone has reached out to the Naval Air Warfare Center Aircraft Division (NAWCAD) and the U.S. Navy Office of Information to request more information about Dr. Salvatore Pais's patents and a formal interview with Dr. Pais. So far we have been denied such opportunities. However, Dr. Pais did respond to a few questions directly by email recently and his replies only

add to the curiosity and mystery surrounding these alleged wondrous technological breakthroughs.

We asked Dr. Pais to clarify his background, as little information and much confusion surrounds the identity of the man himself. Dr. Pais would only state what is already public record, that he is "a graduate of Case Western Reserve University, received all my degrees at that school — BS '90; MS '93; Ph.D. '98 – all in Mechanical and Aerospace Engineering", then adding that "More than this I cannot comment, thank you for your consideration."

When *The War Zone* asked if Dr. Pais could comment on his patents or his research in general, he sent the following reply:

The fact that my work on the design of a Compact Fusion Reactor was accepted for publication in such a prestigious journal as IEEE TPS, should speak volumes as to its importance and credibility – and should eliminate (or at least alleviate) all misconceptions you (or any other person) may have in regard to the veracity (or possibility) of my advanced physics concepts.

Mr. Tingley, do realize that my work culminates in the enablement of the Pais Effect (original physical concept). The Pais Effect comprises the generation of extremely high electromagnetic energy fluxes (and hence high local energy densities) generated by controlled motion of electrically charged matter (from solid to plasma states) subjected to accelerated vibration and/or accelerated spin, via rapid acceleration transients.

Such high energy EM radiation can locally interact with the Vacuum Energy State (VES) – the VES being the Fifth State of Matter (Fifth Essence – Quintessence), in other words the fundamental structure (foundational framework), from which Everything else (Spacetime included) in our Quantum Reality, emerges.

The Engineering of the Pais Effect can give rise to the Enablement of Macroscopic Quantum Coherence, which if you have closely been following my work, you understand the importance of.

I must stress that all this work (patents, patent applications and technical papers) was conducted as a NAVAIR/ NAWCAD employee, and that my current position with Navy SSP has absolutely no bearing or in any way, shape or form has anything to do with this advanced physics work.

Thank you for your interest in my physics concepts, and try to keep an open mind in regard to my work.

Respectfully,
Sal
Salvatore Cezar Pais, Ph.D.
A.D. MMXIX

The email from Dr. Pais makes it clear that the inventor stands fully behind the science underlying these inventions, as radical as they sound. As we have explored in previous articles on Dr. Pais's work, all of the patents stem from what the inventor is now calling the "Pais Effect," the "controlled motion of electrically charged matter (from solid to plasma states) subjected to accelerated vibration and/or accelerated spin, via rapid acceleration transients."

Despite Dr. Pais's insistence that the Pais Effect is indeed a real phenomenon and the assurance that NAVAIR's Chief Technology Officer gave the USPTO, we have been unable to find a single scientist or engineer who can corroborate the claims made in Dr. Pais's patents. Nevertheless, in another correspondence, Dr. Pais assured *The War Zone* that "as far as the doubting SMEs [subject matter experts] are concerned, my work shall be proven correct one fine day…".

Subject Matter Experts Have Their Doubts

To help contextualize Dr. Pais's most recent patent and academic publication for the plasma compression fusion device, *The War Zone* spoke with Carl Willis, a nuclear engineer and reactor supervisor at the University of New Mexico who also serves as Senior Research Engineer for Verus Research, a company that is working on an advanced dense plasma focus fusion neutron source for the Army, a technology Willis says Verus does not view as "a competitive approach to a fusion power plant, or a competitor in any meaningful sense toward anything Dr. Pais is working on for that matter."

According to Willis, Dr. Pais's most recent work represents "a classic case of pathological science." Willis says the literature for the plasma compression fusion device contains invented jargon, nonsensical statements, weak or absent evidence of an informed theoretical basis, an "overabundance of nebulous adjectives and adverbs instead of meaningful quantities in technical writing," and "lots of statements made in passing that seem to contradict basic and accepted physics."

Willis says that Dr. Pais "references subjects that have consistently been plagued with pathological science and popular misunderstanding for decades, such as vacuum energy. It's hard not to suspect he's either drinking the kool-aid himself, or just chumming the waters for the kind of people who do."

Still, even Willis notes that "this case is mildly unusual in that the author has a Ph. D. and is employed by the government, his patents are assigned to the government, and the paper is slated to appear in a rather widely-read IEEE outlet. However, these facts in no way temper my view that this is all basically nonsense–it just raises additional questions about the *cui bono* of this particular case."

To help answer those questions, we spoke with Dr. Charles Collett, an assistant professor of Physics at Muhlenberg College who specializes in experimental low-temperature research on the quantum state of molecular magnets. Like most physicists we've spoken to about the Pais patents, Collett remains skeptical. While he admits that the theoretical basis for the so-called Pais Effect "is not outlandish, and indeed any charged matter that is undergoing a large amount of acceleration will produce this," Collett notes that there are likely "significant engineering challenges in creating a device" capable of producing such high electromagnetic forces.

Collett concluded by adding that "the claims of macroscopic quantum coherence seem dubious," and that he "cannot see how that interaction could lead to any of the claimed effects."

"Overall, my impression is that while there may (or may not) be an interesting engineering feat in the patents, the rest of the claims are extraordinary," Collett continued, "and extraordinary claims require extraordinary evidence."

Extraordinary Claims

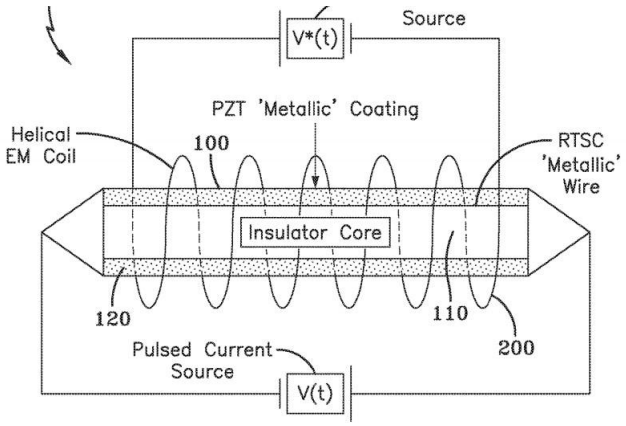
As we continue to report on the extraordinary claims of Dr. Salvatore Pais and the inventions he has patented on behalf of the Navy, we continue to find scientists who suggest that the intended audience of these patents may not, in fact, be the scientific or aerospace communities as these patents and their supporting publications contain what most would call pseudoscience and empty jargon. Still, as we noted earlier, there are decades of research into similar approaches at breakthrough propulsion technologies or so-called "space time metric engineering", much of it U.S. government-funded.

In fact, the Commission on the Future of the United States Aerospace Industry (CFUSAI) formed by President George W. Bush and the United States Congress in 2001 concluded that "in the longer-term, breakthrough energy sources that go beyond our current understanding of physical laws, such as nuclear fusion and anti-matter, must be credibly investigated in order for us to practically pursue human exploration of the solar system and beyond" and adds that "these energy sources should be the topic of a focused basic research effort."

Maybe the research and patents of Dr. Salvatore Pais are a beginning attempt at the realization of this very long term goal. Then again, as a number of subject matter experts have suggested, they may represent something misleading, misguided, or misappropriated.

Regardless, even with so many questions outstanding, we do know one thing for sure: Pais himself is clearly a true believer in his work.

If These US Navy Patents are Made Then We Are in a Star Trek Technology World



FIG–2

If These US Navy Patents are Made Then We Are in a Star Trek Technology World

February 22, 2019

Salvatore Cezar Pais is a US Navy researcher. Salvatore has three amazing patents that would be incredible breakthroughs in physics if they are true. The least extreme is a patent for Piezoelectricity-Induced Room Temperature Superconductor. The other two patents are gravity wave generator and inertial mass reduction.

If these could be realized as technologies then we are talking Star Trek level spaceships. The gravitational wave generator could be used for propellentless

propulsion to near the speed of light. Being able to reduce inertia would also mean capabilities which currently seem beyond known physics.

The more likely situation is that these will not lead anywhere and are incorrect.

1. Piezoelectricity-Induced Room Temperature Superconductor (2019)
Patent US 20190058105A1

2. High-Frequency Gravitational Wave Generator (2017)
Patent US20180229864A1

3. Craft using an inertial mass reduction device (2016)
Patent US10144532B2

Piezoelectricity-Induced Room Temperature Superconductor

Room temperature superconductivity is achieved from abrupt/accelerated vibration of a wire through use of a pulsed current through the wire.

High-Frequency Gravitational Wave Generator

A high-frequency gravitational wave generator including a gas-filled shell with an outer shell surface, microwave emitters, sound generators, and acoustic vibration resonant gas-filled cavities. The outer shell surface is electrically charged and vibrated by the microwave emitters to generate a first electromagnetic field. The acoustic vibration resonant gas-filled cavities each have a cavity surface that can be electrically charged and vibrated by acoustic energy from the sound generators such that a second electromagnetic field is generated. The two acoustic vibration resonant gas-filled cavities are able to counter spin relative to each other to provide stability, and propagating gravitational field fluctuations are generated when the second electromagnetic field propagates through the first electromagnetic field.

High Frequency Gravitational Waves – Induced Propulsion

It may be possible to generate high power / high-frequency gravitational waves (HFGWs) by high frequency accelerated axial rotation (spin) and/or accelerated high frequency vibration of an electrically charged, possibly asymmetric structure, within the context of non-equilibrium thermodynamics, namely far-from-equilibrium physics, highly non-linear in nature.

The structure which is the HFGW generator (HFGWG), has the ability to control the accelerated modes of vibration and spin of its electrically charged surfaces, in particular the rapid rates of change of accelerated-decelerated-accelerated vibration and/or accelerated-decelerated-accelerated gyration (axial spin) of these electrified surfaces, in this manner delaying the onset of relaxation to thermodynamic equilibrium, thus generating a physical mechanism which may induce anomalous effects. Under certain conditions, involving rapid acceleration transients, it is observed that there will be exponential growth in electromagnetic energy flux with accelerating vibration. In the present paper, high power HFGWs are generated by enabling the Gertsenshtein effect, that is gravitational wave production by propagating electromagnetic radiation through strong magnetic fields.

Controlled motion of charged matter under rapid acceleration transients may enable macroscopic quantum coherence, namely possible quantum mechanical behavior of macroscopic objects. Moreover, the accelerated vibration and/or spin of charged matter may generate high power /high-frequency gravitational waves which can be used in a variety of applications, such as advanced field propulsion, namely the design of a workable space drive.

Therefore, it may be feasible to propel a hybrid craft equipped with an HFGWG, by producing high-frequency gravitational waves which in turn generate their own gravitational fields upon which the craft would propagate in a 'wave-surfing' fashion.

The generation of high power high-frequency gravitational waves (HFGWs) is just one application of the fundamental innovative principle behind this work, namely the enablement of macroscopic quantum coherence induced by controlled motion of charged matter, subjected to rapid acceleration transients.

Artificially generated high energy electromagnetic (EM) fields can interact strongly with the local Vacuum energy state (an aggregate/collective state comprised of the superposition of all fluctuations in the collective quantum fields permeating a given spacetime locality). According to quantum field theory, this strong interaction between the fields is based on the mechanism of transfer of vibrational energy between the fields, further inducing local fluctuations in adjacent quantum fields which permeate that spacetime locality (these fields may or may not be electromagnetic in nature).

In a peer-reviewed paper by the inventor(Salvatore Cezar Pais), entitled "The high energy electromagnetic field generator," published in the International Journal of Space Science and Engineering, Vol. 3, No. 4, 2015 pp. 312-317. The inventor discusses the possibility of inertial (or gravitational) mass reduction using high energy electromagnetic (EM) fields, whereby, high frequency accelerated vibration and/or high frequency accelerated spin of electrically charged systems (minimally charged, if so desired) can lead to local vacuum state polarization (energy flux values in excess of 10^33 W/m2 are feasible, with corresponding energy densities in excess of 10^25 J/m3). In this manner, the local spacetime energy density is modified. These systems would be strategically placed on an intergalactic craft.

Craft using an inertial mass reduction device

A craft using an inertial mass reduction device comprises of an inner resonant cavity wall, an outer resonant cavity, and microwave emitters. The electrically charged outer resonant cavity wall and the electrically insulated inner resonant cavity wall form a resonant cavity. The microwave emitters create high-frequency electromagnetic waves throughout the resonant cavity causing the resonant cavity to vibrate in an accelerated mode and create a local polarized vacuum outside the outer resonant cavity wall.

There are four known fundamental forces which control matter and, therefore, control energy. The four known forces are strong nuclear forces, weak nuclear forces, electromagnetic force, and gravitational force. In this hierarchy of forces,

the electromagnetic force is perfectly positioned to be able to manipulate the other three. A stationary electric charge gives rise to an electric (electrostatic) field, while a moving charge generates both an electric and a magnetic field (hence the electromagnetic field). Additionally, an accelerating charge induces electromagnetic radiation in the form of transverse waves, namely light. Mathematically, as well as physically, electromagnetic field intensity can be represented as the product of electric field strength and magnetic field strength. Electromagnetic fields act as carriers for both energy and momentum, thus interacting with physical entities at the most fundamental level.

Artificially generated high energy electromagnetic fields, such as those generated with a high energy electromagnetic field generator (HEEMFG), interact strongly with the vacuum energy state. The vacuum energy state can be described as an aggregate/collective state, comprised of the superposition of all quantum fields' fluctuations permeating the entire fabric of spacetime. High energy interaction with the vacuum energy state can give rise to emergent physical phenomena, such as force and matter fields' unification. According to quantum field theory, this strong interaction between the fields is based on the mechanism of transfer of vibrational energy between the fields. The transfer of vibrational energy further induces local fluctuations in adjacent quantum fields which permeate spacetime (these fields may or may not be electromagnetic in nature). Matter, energy, and spacetime are all emergent constructs which arise out of the fundamental framework that is the vacuum energy state.

Everything that surrounds us, ourselves included, can be described as macroscopic collections of fluctuations, vibrations, and oscillations in quantum mechanical fields. Matter is confined energy, bound within fields, frozen in a quantum of time. Therefore, under certain conditions (such as the coupling of hyper-frequency axial spin with hyper-frequency vibrations of electrically charged systems) the rules and special effects of quantum field behavior also apply to macroscopic physical entities (macroscopic quantum phenomena).

Moreover, the coupling of hyper-frequency gyrational (axial rotation) and hyper-frequency vibrational electrodynamics is conducive to a possible physical breakthrough in the utilization of the macroscopic quantum fluctuations vacuum plasma field (quantum vacuum plasma) as an energy source (or sink), which is an induced physical phenomenon.

The quantum vacuum plasma (QVP) is the electric glue of our plasma universe. The Casimir Effect, the Lamb Shift, and Spontaneous Emission, are specific confirmations of the existence of QVP.

It is important to note that in region(s) where the electromagnetic fields are strongest, the more potent the interactions with the QVP, therefore, the higher the induced energy density of the QVP particles which spring into existence (the Dirac Sea of electrons and positrons). These QVP particles may augment the obtained energy levels of the HEEMFG system, in that energy flux amplification may be induced.

It is possible to reduce the inertial mass and hence the gravitational mass, of a system/object in motion, by an abrupt perturbation of the non-linear background of local spacetime (the local vacuum energy state), equivalent to an accelerated excursion far from thermodynamic equilibrium (analogous with symmetry-breaking induced by abrupt changes of state/phase transitions). The physical mechanism which drives this diminution in inertial mass is based on the negative pressure (hence repulsive gravity) exhibited by the polarized local vacuum energy state (local vacuum polarization being achieved by a coupling of accelerated high frequency vibration with accelerated high frequency axial rotation of an electrically charged system/object) in the close proximity of the system/object in question. In other words, inertial mass reduction can be achieved via manipulation of quantum field fluctuations in the local vacuum energy state, in the immediate proximity of the object/system. Therefore it is possible to reduce a craft's inertia, that is, its resistance to motion/acceleration by polarizing the vacuum in the close proximity of the moving craft.

Polarization of the local vacuum is analogous to manipulation/modification of the local space tie topological lattice energy density. As a result, extreme speeds can be achieved.

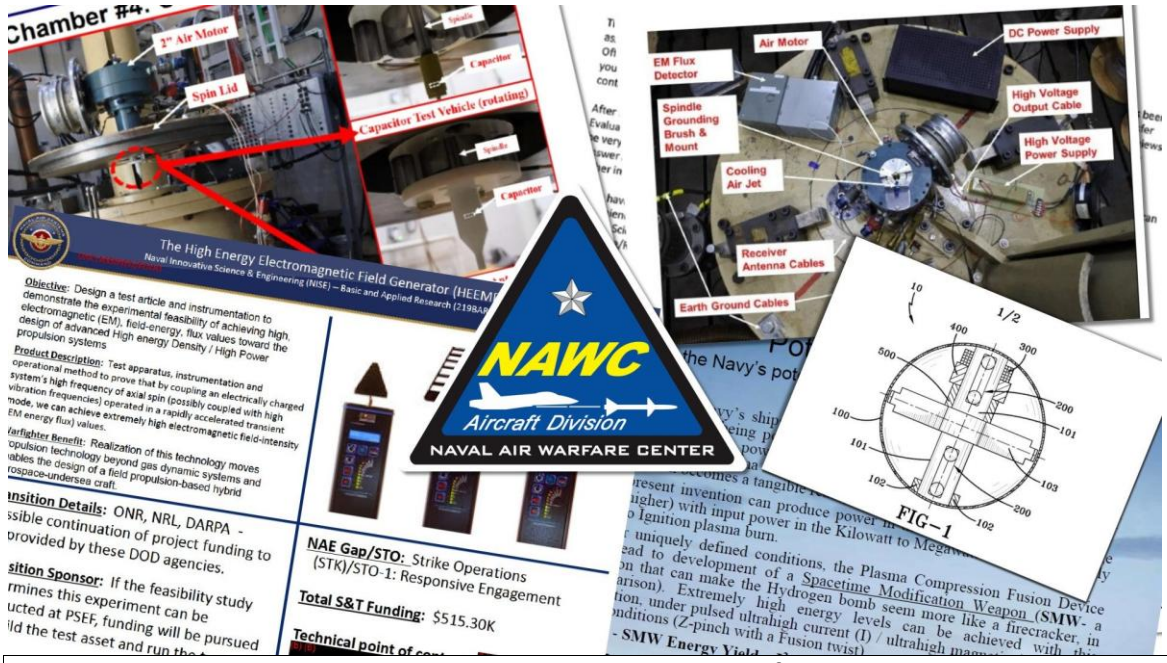
If we can engineer the structure of the local quantum vacuum state, we can engineer the fabric of our reality at the most fundamental level (thus affecting a physical system's inertial and gravitational properties). This realization would greatly advance the fields of aerospace propulsion and power generation.

SOURCES -US Patents

Navy “UFO Patent” Documents Talk Of “Spacetime Modification Weapon,” Detail Experimental Testing

The Navy spent three years and considerable sums of money testing the "Pais Effect" and may have transferred the program to another agency.

UPDATED ON JAN 27, 2021



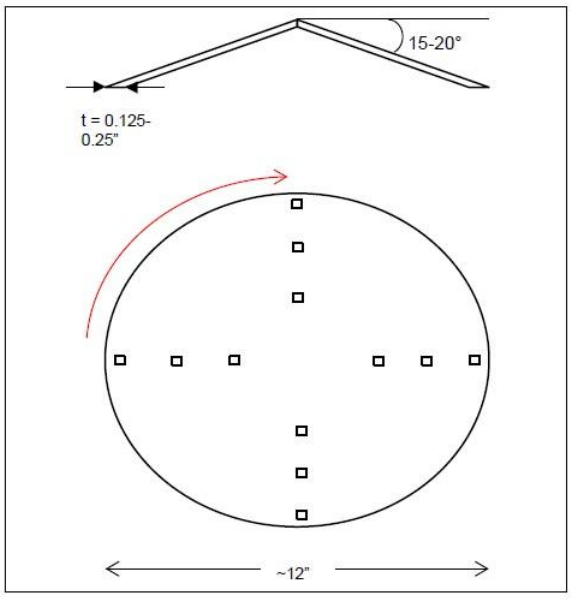
In our continuing investigation into the bizarre inventions of Dr. Salvatore Cezar Pais, an enigmatic aerospace engineer who works for the U.S. Navy, *The War Zone* has just obtained a wide range of documents detailing experiments that the Naval Air Warfare Center Aircraft Division (NAWCAD) conducted to test the core concepts and technologies underlying his seemingly out of this world “UFO patents.” These same patents were vouched for by the head of the Navy’s aerospace research enterprise who cited Chinese advances in similar technologies as one of the reasons why the Navy was filing them.

The War Zone‘s most recent report on the strange circumstances surrounding these patents underlined that there *were* indeed some type of physical experiments conducted related to them, even if very limited. Now, new Freedom of Information Act releases provide unprecedented insights not just into how seriously the Navy took Dr. Pais’s work, but also exactly how elements of it were actually tested at the cost of hundreds of thousands of dollars and where the program may have ended up. The materials even include mention of a “Spacetime Modification Weapon (SMW- a weapon that can make the Hydrogen bomb seem more like a firecracker, in comparison).”

The releases, which are all related to a Naval Innovative Science and Engineering – Basic & Applied Research Program under the project name "The High Energy Electromagnetic Field Generator (HEEMFG)," contain hundreds of pages containing detailed technical drawings, photographs, and data related to actual tests of the HEEMFG. The system was meant to evaluate the feasibility of Dr. Salvatore Pais's claimed "Pais Effect." If you haven't yet read about the ongoing saga of the enigmatic Dr. Pais and the science-fiction-like inventions he made on behalf of the Navy, be sure to get caught up on our previous reporting linked in order from the first to most recent here, here, here, here and here.

The High Energy Electromagnetic Field Generator

Naval Innovative Science & Engineering (NISE) – Basic & Applied Research (BAR)



Key Performers / Teams:

Location: PAX River

PI: (b) (6) [redacted] 4.4.5.1, (b) (6) [redacted]

Assoc PI: (b) (6) [redacted], 4.4.5.1,

(b) (6) [redacted]

Objective/ Introduction:

- Conduct experiments to demonstrate high electromagnetic field energy flux values
- Successful demonstration contributes to the design of advanced High Density / High Power systems. No government proprietary information

Approach/ Method:

- Rotating the aluminum cone apparatus at 30k-100k RPM while inducing vibration at 10^5 Hertz to 10^9 Hertz, with vibration amplitudes of 0.04 inch is expected to produce high electromagnetic field energy flux values
- Milestones/Achievements
  - Design of the test apparatus and experiment
  - Conduct Experiment
  - Publish Results

DoD/ Naval Impacts/ Benefits:

- This experimental work develops the AIR 4.4 core capability of designing novel/advanced High Density, High Power Systems
- Applications of the anticipated results include next generation propulsion systems for all branches of the military which ensure the Unites States wins the future and achieves battlefield supremacy

Accomplishments/ Outcomes/ Potential:

- Publication in technical journal
- Navy Case PAX 182 (Electromagnetic Field Generator and Method to create Electromagnetic Field), applied for patent; Navy Case PAX 205 (The Inertial Mass Reduction Device), recommended for patent application

Last Updated:

Distribution A

An overview of Dr. Salvatore Pais's claimed "High Energy Electromagnetic Field Generator" technology., *DON via FOIA*

Each one of Dr. Pais's inventions is stated to be enabled through what he himself described to *The War Zone* as "the Pais Effect," a theoretical physics concept that is claimed to be enabled through the "controlled motion of electrically charged matter (from solid to plasma) via accelerated spin and/or accelerated vibration under rapid (yet smooth) acceleration-deceleration-acceleration transients." This effect, the inventor claims, can lead to incredibly powerful

electromagnetic energy fields that can "engineer the fabric of our reality at the most fundamental level" leading to incredible revolutions in power and propulsion, quantum communications, energy production, and even weaponry.

These latest internal documents, which *The War Zone* obtained through the Freedom of Information Act (FOIA), show that NAWCAD felt this technology has "National Security importance in leading to the generation of thermonuclear Fusion Ignition Energy with commercial as well as military application potential, in ensuring National Energy Dominance."

In addition, the documents contain the Basic and Applied Research (BAR) proposal that was submitted to secure funding and resources for the test of Pais's High Energy Electromagnetic Field Generator concept. In all, it appears at least $466,810 was devoted to the project between Fiscal Years 2017 and 2019 — far more than what was previously thought.

Many of the documents also state that the HEEMFG project could be further continued by the Office of Naval Research (ONR), the Naval Research Laboratory (NRL), the Air Force Research Laboratory (AFRL), NASA, or even the Defense Advanced Research Projects Agency (DARPA). At this time, it is unknown if the HEEMFG transitioned to other DoD agencies, but *The War Zone* is pursuing FOIA requests related to any possible collaborative transition. Another slide (below) indicates ONR, NRL, and DARPA as likely candidates for transition or collaboration.

The High Energy Electromagnetic Field Generator (HEEMFG) (219BAR-17-009)

PI: Dr. Salvatore Cezar Pais, (b) (6) / **Assoc. PI:** (b) (6)

Naval Innovative Science & Engineering (NISE) – Basic and Applied Research (BAR) **Location: NAS PAX, PSEF, RSF**

Objective: Design a test article and instrumentation to demonstrate the experimental feasibility of achieving high, electromagnetic (EM), field-energy flux values toward the design of advanced high energy density / high power propulsion systems.

Technical Approach:

- By coupling an electrically charged system's high frequency of axial spin (with accelerated vibration), operated in a rapidly accelerated transient mode, this project could achieve extremely high electromagnetic field-intensity (EM energy flux) values.
- This experimental investigation has several tasks, namely to design the experiment, the test asset, the associated instrumentation, the power requirements, and then to perform Spin Test.

NAWCAD Benefit:

- Realization of this HEEMFG technology moves the propulsion and power arena beyond gas dynamic systems and enables the design of a field propulsion-based hybrid aerospace-undersea craft, capable of multi-domain missions. Controlled Motion of electrically charged matter (from solid to plasma) via Accelerated Spin and/or Accelerated Vibration under Rapid Acceleration Transients , can result in high intensity electromagnetic energy flux, thereby resulting in novel energy harvesting and generation techniques and devices. These devices can greatly enhance NAVAIR/NAWCAD's electronic warfare technologies arsenal. Moreover, this work can result in the enablement of Macroscopic Quantum Coherence, that is the engineering of macroscopic states to behave as if quantum mechanical in nature - this is revolutionary for the Emerging field of Quantum Technologies, with applications in Quantum Computing, Spintronics, Artificial Intelligence, Crypto., etc.
- Furthermore, this technology has National Security importance in leading to the generation of thermonuclear Fusion Ignition Energy with commercial as well as military application potential, in ensuring National Energy Dominance.

Accomplishments:

- Completed preliminary experiments / test asset charging / EM flux detector mfg.
- Will complete test asset design and perform Spin Test to detect HEEMFG effect.
- Published: Dr. S. Pais, (2017, October 02). High Frequency Gravitational Waves -Induced Propulsion. *SAE Technical Paper 2017-01-2040*, doi: 10.4271/2017-01-2040.
- Application filed: Dr. S. PAIS, (2018, March 22). Plasma Compression Fusion Device. Tracking number: Serial # 15928703 (Navy Case PAX 285).

External Collaborator(s):

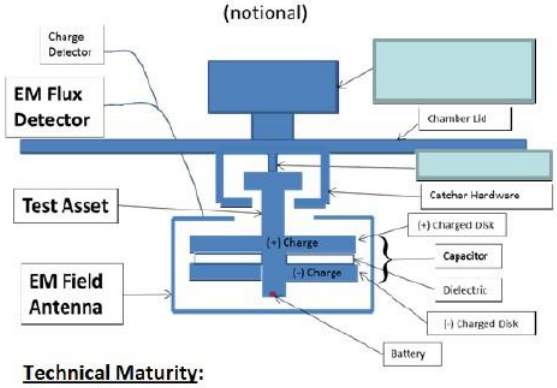
- None at this time.

Likely Customer(s):

- NAWCAD; possible engagement with DARPA, ONR, NRL, AFRL, NASA, etc.

HEEMFG Spin Rig

(notional)



Technical Maturity:
Research: Basic
Starting TRL: 2 **Est. Ending TRL: 3**

Technical Alignment:
Core Capability: High Energy Density / High Power Propulsion Systems

NAE Gap/STO: Power and Energy Technology / Advanced Naval Power Systems

Total Project Funding				
	FY17	FY18	FY19	Total
Labor	$144.4K	$127.6K	$117.3K	$389.3K
Travel	$5.00K	$5.00K	$0.00K	$10.00K
Material	$2.53K	$65.00K	$0.00K	$67.53K
Total	$151.9K	$197.6K	$117.3K	$466.8K

UNCLASSIFIED//FOUO **Last Updated: 2 May 2018** **T-Code: AIR 4.4T**

DON via FOIA

The documents also show that a team of at least 10 technicians and engineers were assigned to design and test an experimental demonstrator and that testing was being conducted as recently as September 2019.

15. The schedule is as follows:

Table 2 – Test Schedule

Task Description	Timeframe
EM flux Detection Instrumentation Develop/Design/Fabricate/Evaluate	April – June 2019
Tooling Design/Fabricate:	April - June 2019
Test Setup/Calibrations in Chamber #4	July/August 2019
Conduct Spin Test Experiment	**September 2019**
Report Results	September 2019

TEST TEAM

16. Core team members are given in Table 3 below.

Table 3 - HEEMFG Spin Test Team

Personnel	Code	Position	Phone Number
(b) (6)	4.3.5.1	NISE Principal Investigator/Program Engineer	(b) (6)
(b) (6)	4.4.5.1	NISE Program Engineer	(b) (6)
(b) (6)	4.4.4.	NISE Program Engineer	(b) (6)
(b) (6)	4.4.6.4	Test & Evaluation Engineer	(b) (6)
(b) (6)	4.4.6.4	Test & Evaluation Engineer	(b) (6)
(b) (6)	4.4.6.3	Engineering Test Technician	(b) (6)
(b) (6)	4.4.6.5	Instrumentation	
(b) (6)	4.4.6.5	Instrumentation	
(b) (6)	4.4.6.5	Instrumentation	(b) (6)
(b) (6)	4.4.6.5	Instrumentation	

DON via FOIA

Over 1,600 hours of work were conducted in 2018 and 2019 on the project between design, procurement, manufacture, testing, and assembling final reports and technical papers.

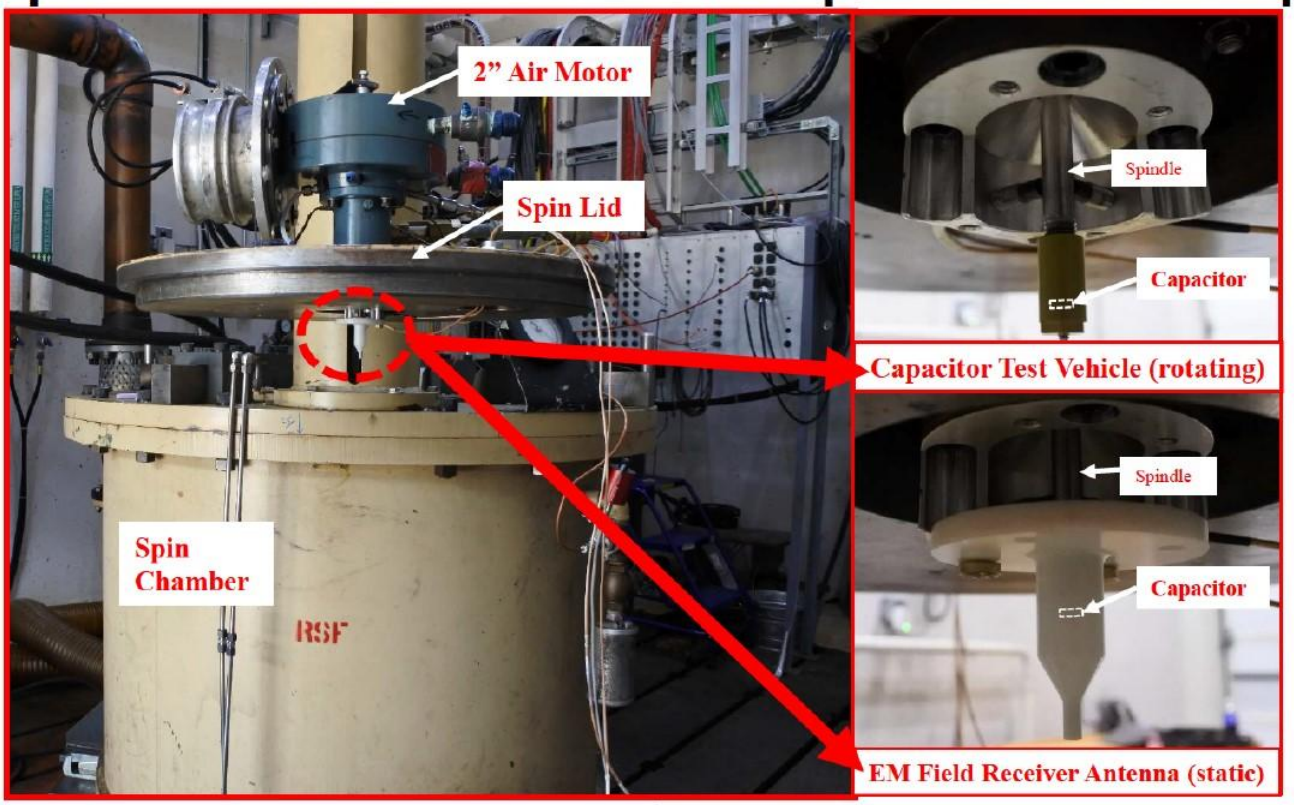
FY18
Task 1: Procure instrumentation and hardware ($70k)
PIs (0.1 MY, 174 hours) PI approves final design of experimental test article prior to manufacture. Anticipated low level of effort to approve design, answer questions from contracted source of hardware and instrumentation.
Task 2: Test cell setup and calibration
Lab Technicians (0.4 MY, 696 hours) Build up the test cell, instrumentation and data collection to conduct the test in PSEF rotor spin facility. Calibrate instrumentation prior to conducting the test.
Task 3: Test Readiness Review Preparation
Lab Technicians (0.05 MY, 87 hours) Conduct TRR with facility and technical management.
FY 19
Task 4: Test Execution
Lab Technicians (0.25 MY, 435 hours) Execute the test program in rotor spin facility.
Task 5: Test Reporting
Lab Technicians (0.15 MY, 261 hours) Write rotor spin facility test report including data analysis.
Task 6: Final Project Report and Technical Papers
PIs (0.5 MY, 870 hours), Lab Technicians (0.05 hours) Final report submission to NISE project and preparation of technical papers.

DON via FOIA

Many of the documents describe the tests of the High Energy Electromagnetic Field Generator (HEEMFG) and the data that resulted. Some of these documents describe specific "Identified Technical Obstacles" and proposed solutions for developing a working HEEMFG device. One test asset used in experiments appears to have been a "coin cell capacitor" with a 0.276-inch diameter, which was connected to a vertical drive spindle and spun up to 100,000 rotations-per-minute (RPM) with a 2-inch air motor. Other experiments describe spinning a 12-inch disk featuring piezoelectric elements arranged in a cruciform (cross- or x-shaped) arrangement. These larger discs were charged with much larger capacitors.

Approach

Spin Chamber #4: Coin Cell Capacitor Test Setup



DON via FOIA

The devices tested appear to have been benchtop versions of Pais's HEEMFG concept, or perhaps even multiple versions of the same idea. The devices used spinning capacitors to "demonstrate the experimental feasibility of achieving high electromagnetic field-energy flux values toward the design of advanced high energy density / high power propulsion systems."

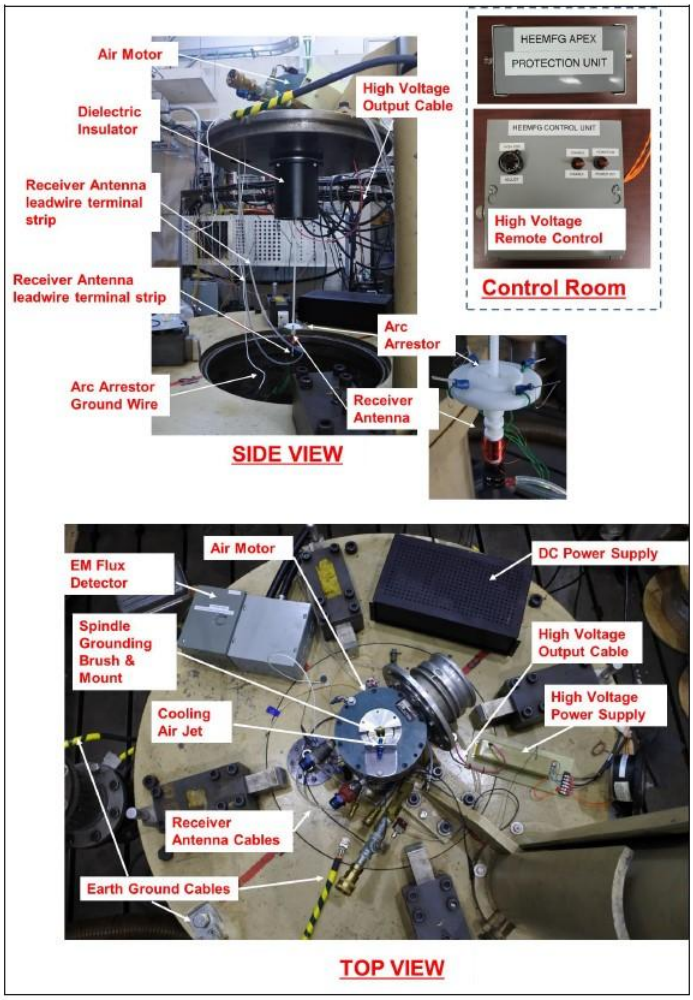


Figure 4. Spin Test Setup Photographs

DON via FOIA

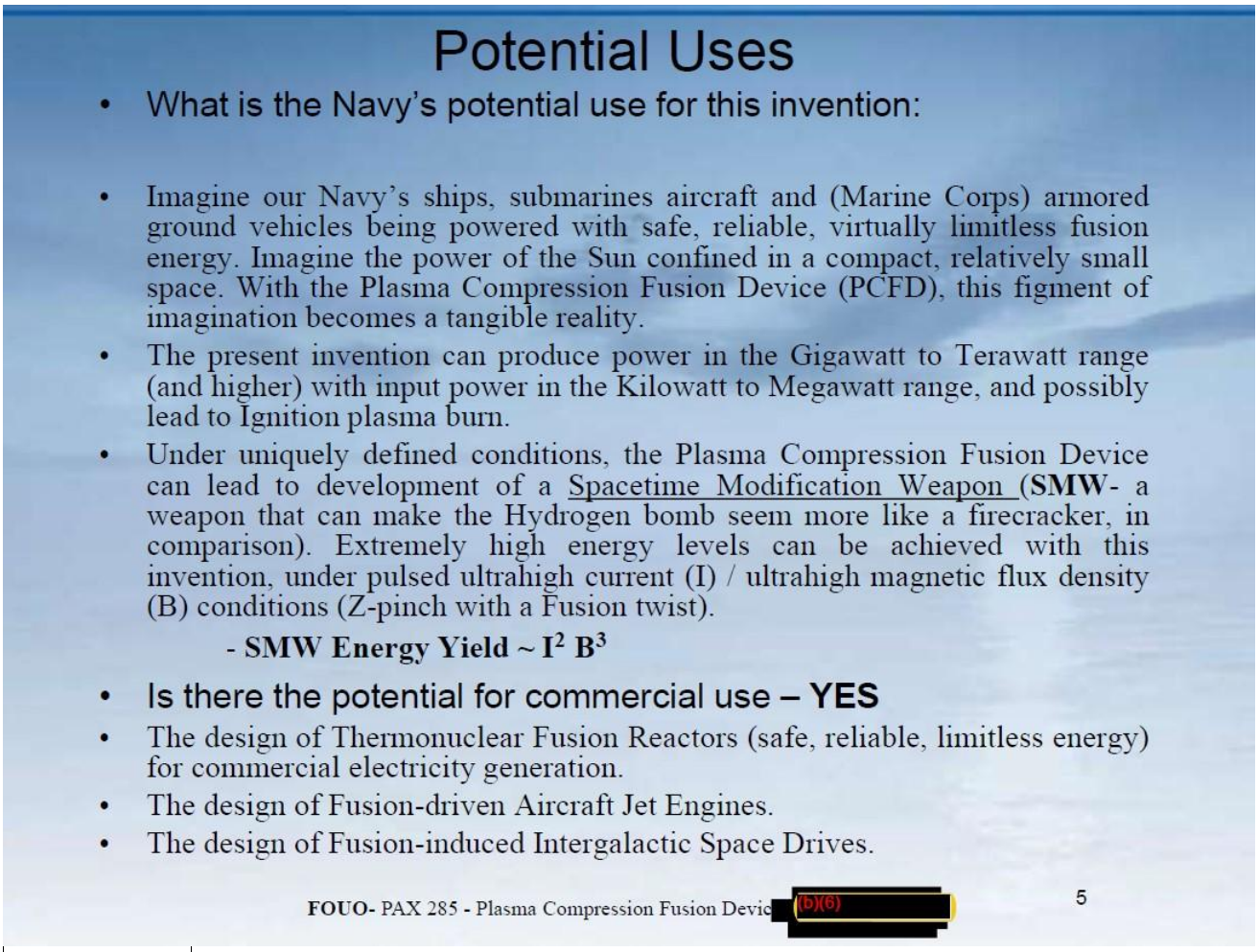
In one strange section describing test results, investigators reported that technicians felt a strange sensation on their skin as they approached the test article, although they note that there are plenty of prosaic explanations for such sensations.

107. On two of the test runs, 711 and 712, the Detector output shifted by +0.1 and -0.1 volts, respectively, while the charged spindle was spinning; however, the shift persisted beyond the end of test run when the spindle was stationary. On both of these runs, multiple people reported feeling a mild sensation on their skin as they approached the spin chamber immediately after the run; the sensation was noticed as far as 10 feet from spin chamber, increasing in intensity near the spin chamber. The skin sensation and the 0.1-volt shift in the Detector output dissipated less than 10 minutes later. A 0.1 volt shift is small, but well within the measuring range of the Detector. For both runs, because the 0.1 volt shift in Detector output persisted after spindle rotation was stopped, the HEEMFG effect was not indicated. There are natural and manmade phenomena that can provide reasonable explanations for both the Detector output shift and the anomalous skin sensation experiences.

DON via FOIA

One of the most bizarre documents in these releases, a slide deck marked For Official Use Only (FOUO), describes how Pais' Plasma Compression Fusion Device patent could be used to design a terrifying-sounding new form of weapon known as a "Spacetime Modification Weapon:"

Under uniquely defined conditions, the Plasma Compression Fusion Device can lead to development of a Spacetime Modification Weapon (SMW- a weapon that can make the Hydrogen bomb seem more like a firecracker, in comparison). Extremely high energy levels can be achieved with this invention, under pulsed ultrahigh current (I) / ultrahigh magnetic flux density (B) conditions (Z-pinch with a Fusion twist).



DON via FOIA

In one of the final test results sections, investigators note that the "Principle Investigator [sic] also desired vibratory excitation of the charged test disk" but noted that "the tested configuration does not have a method for providing spindle vibration." It is unknown whether further test articles were designed that were capable of the high levels of vibration cited as a requisite for enabling the radical emerging physics Pais claims his HEEMFG to be capable of producing.

It is curious that a test article was not designed that incorporated vibration since the inventor always cites the coupling of accelerated spin and accelerated vibration as key components of the "Pais Effect," but it may be simply that the restraints of existing test facilities and equipment were to blame. Often when new experimental systems are tested, subsequent experiments work toward mastering different aspects of a particular design before bringing everything together once the separate components are proven to be feasible. It's unclear whether or not the HEEMFG test article was designed to focus on maturing just one part of the complete system.

TEST RESULTS

97. A charged disk, in the form of a vertical drive spindle, was spun in a vacuum spin chamber to evaluate the presence of the HEEMFG effect. The spin test was conducted in the RSF spin chamber 4 over four test days: 18, 19, 23, and 25 September 2019.

98. The HEEMFG effect is presumed to emanate from the spindle as RF wave energy. The HEEMFG effect is enabled by spinning the charged spindle to high speeds with rapid acceleration transients, in a vacuum. The Principle Investigator also desired vibratory excitation of the charged test disk (spindle); however, the tested configuration does not have a method for providing spindle vibration.

DON via FOIA

Ultimately, these documents show that while the experimental test articles constructed by NAWCAD "performed well," they neither observed nor disproved the Pais Effect.

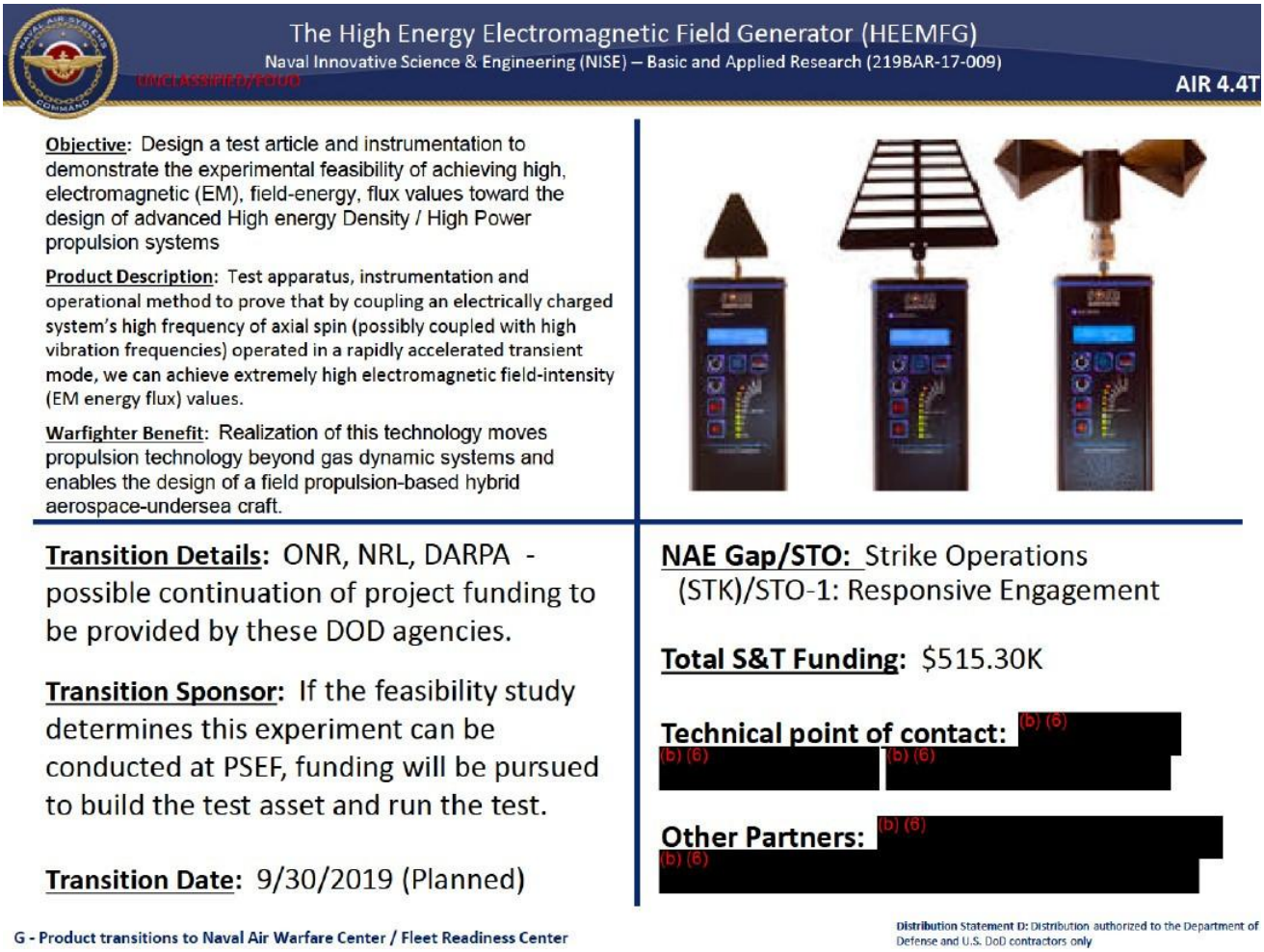
CONCLUSION

110. The spin test to evaluate the HEEMFG effect was successful in spinning a charged spindle with an estimated 2.9 x 10E-08 coulomb surface charge at one end of the spindle, at speeds up to 100 krpm/s with acceleration rates in the +/- 30 krpm/s range in a vacuum level of 0.4 torr. The experimental equipment for generating and maintaining the surface charge on the spindle and the instrumentation for detecting the HEEMFG effect performed well.

111. The HEEMFG effect was not observed or disproved in the tested configuration.

DON via FOIA

As usual, our investigation into the Dr. Salvatore Pais patents assigned to the Navy has generated more questions and lines of investigation. It is unknown if any of these concepts or technologies were, in fact, transferred to other entities, including elsewhere within the Department of Defense outside of the Navy, or whether further test articles were created and experimented on that might have included mechanisms to induce high-frequency vibrations. As with all of the documentation we have gathered related to these patents so far, it appears even NAWCAD's testing could not confirm experimental validation of the claimed "Pais Effect." Despite the lack of experimental confirmation, a Naval Aviation Enterprise (NAVAIR) quad chart published in September 2018 states that NAVAIR was aiming to transition the technology in 2019.



A 2018 quad chart regarding the High Energy Electromagnetic Field Generator (HEEMFG) project., *DON via FOIA*

An August 2019 NAVAIR Science & Technology Alignment and Investment Reporting System (STAIRS) report states that "the spin test to evaluate the HEEMFG effect took place in late September 2018" and that while the tests "did not measure any anomalous electromagnetic effects that would satisfy the theory," investigators believe "the reason for this is that the capacitor confined the electrons to its center, rather than the surface, which is necessary for generation of the effect." The report concludes its in its future outlook by noting that "planning has been in progress to compensate for the effect seen on the capacitor in the end of FY2018, with [a] new experimental setup to be completed by July 2019."

NAE S&T Alignment and Investment Reporting System

Project Overview

ADV TECH: The High Energy Electromagnetic Field Generator (HEEMFG)

219BAR-17-009, NAWC AD Section 219 NISE BAR

Project accomplishments:	FY	Accomplishment
	2017	(30 Sep 17): The team developed a parametric study based on the governing equations of the physical concept. This will predict maximum expected results for EM energy flux based on experimental conditions, and will also be used to bound the experiment based on instrumentation and/or facility limitations. The team also assembled a team of design engineers from the Rotor Spin Facility (RSF) located in the Propulsion Systems Evaluation Facility (PSEF) to design the test asset, arbor, and mount. This team will also assess the dynamic response of the test asset. The test plan was developed as a draft. There were several tests performed to see if test asset and capacitor can sustain an electrical charge.
	2018	(20 Sep 18): The team (including RSF engineers) initially planned to incorporate button cell batteries and an in-house designed capacitor to the test design. In June 2018, the team discovered COTS super capacitors with a 4+ Farad capacitance, allowing for a charge of 5.6 coulombs to be reached, rather than being limited to micro-coulombs. Currently, the test facility is prepared and calibrated and the test asset design is complete. EM flux measurement will be accomplished within-house designed/fabricated instrumentation for qualitative detection of EM Flux in the 1 Hz to 3.2GHz range. It consists of three components: an EM Field Receiver Antenna installed around the Test Asset to pick up the EM Flux from the test asset, an EM Flux Detector to sense the EM flux signal received by the antenna, and a High Speed Data Acquisition System to record and display EM Flux Detector output. The EM Flux Detector converts the EM Flux AC voltage signal from the antenna to a DC level voltage proportional to relative EM flux. The EM Flux Detector and EM Field Receiver Antenna are 100% complete with the bench top performance evaluation completed. The High Speed Data Acquisition System is existing facility equipment. The spin test to evaluate the HEEMFG effect took place in late September 2018. The EM Flux Detector did not measure any anomalous electromagnetic effects that would satisfy the theory. It's believed that the reason for this is that the capacitor confined the electrons to its center, rather than the surface, which is necessary for generation of the effect.
	2019	To date planning has been in progress to compensate for the effect seen on the capacitor in the end of FY2018, with new experimental setup to be completed by July 2019.

NAVAIR

Page 4

DON

via FOIA

The further our investigation continues, the more it seems like the patents of Dr. Salvatore Pais are exactly what they appear to be: hypothetical applications of theoretical physics the Navy thinks are viable enough to spend hundreds of thousands of dollars on, and possibly much more, to someday be able to master. Yet considering there have been all types of theories, ranging from a government disinformation campaign to alien emulation technology, behind these patents, we

still can't say conclusively what is going on here. Still, taken at face value, these new documents seem to prove even further that these inventions were not solely the product of an enigmatic maverick inventor, but instead received support from the highest levels of NAWCAD and led to DoD-funded research projects and experiments with an eye on producing exotic new forms of propulsion and weaponry. Whether these experiments were the start of a looming energy revolution or a dead-end is yet to be understood, but by the looks of the documentation we have studied, it seems like these experiments were more of a beginning than an end. This is all fascinating as no physicist we have discussed Pais's patents with sees how they are feasible, yet the Navy seems to have thought otherwise and spent considerable funds to explore the ideas in the form of physical experiments.

In light of these new documents, we have already reached out to NAWCAD in hopes of establishing a dialogue about the High Energy Electromagnetic Field Generator and the other Salvatore Pais patents. In the past, they have been unwilling to do so.

We at *The War Zone* have just begun combing through this huge batch of new documents and we will report more once we have concluded our review of them.

The Navy Finally Speaks Up About Its Bizarre "UFO Patent" Experiments

The Naval Air Warfare Center has finally given a statement to The War Zone about the patents and experiments of Dr. Salvatore Pais.

UPDATED ON FEB 2, 2021

After reporting on the bizarre saga of the Navy's "UFO" patents by Dr. Salvatore Pais for over a year and a half, *The War Zone* has finally gotten an on-the-record comment from the Naval Air Warfare Center Aircraft Division, or NAWCAD, about the scientist's seemingly out-of-this-world work and the service's equally strange outright support of it.

As we reported in our last piece, the science and technology branches of the Naval Aviation Enterprise and NAWCAD took the theories of Dr. Pais seriously enough not just to vouch for them at the highest levels to patent examiners, asserting Chinese advances in similar areas of research and that they were 'operable' in nature, but to also subsequently invest a significant amount of money and time into researching the so-called "Pais Effect." This is a theoretical concept for generating high-intensity electromagnetic fields that could supposedly lead to hypothetical breakthroughs in power generation and advanced propulsion. Specifically, the Navy has now responded to inquiries related to the new documentation we uncovered in our most

recent report that shows hundreds of thousands of dollars were spent on Pais's High Energy Electromagnetic Field Generator (HEEMFG) experiments, along with other details related to it.

The High Energy Electromagnetic Field Generator (HEEMFG) (219BAR-17-009)

PI: Dr. Salvatore Cezar Pais, (b) (6) / **Assoc. PI:** (b) (6)

Naval Innovative Science & Engineering (NISE) – Basic and Applied Research (BAR) **Location: NAS PAX, PSEF, RSF**

Objective: Design a test article and instrumentation to demonstrate the experimental feasibility of achieving high, electromagnetic (EM), field-energy flux values toward the design of advanced high energy density / high power propulsion systems.

Technical Approach:

- By coupling an electrically charged system's high frequency of axial spin (with accelerated vibration), operated in a rapidly accelerated transient mode, this project could achieve extremely high electromagnetic field-intensity (EM energy flux) values.
- This experimental investigation has several tasks, namely to design the experiment, the test asset, the associated instrumentation, the power requirements, and then to perform Spin Test.

NAWCAD Benefit:

- Realization of this HEEMFG technology moves the propulsion and power arena beyond gas dynamic systems and enables the design of a field propulsion-based hybrid aerospace-undersea craft, capable of multi-domain missions. Controlled Motion of electrically charged matter (from solid to plasma) via Accelerated Spin and/or Accelerated Vibration under Rapid Acceleration Transients , can result in high intensity electromagnetic energy flux, thereby resulting in novel energy harvesting and generation techniques and devices. These devices can greatly enhance NAVAIR/NAWCAD's electronic warfare technologies arsenal. Moreover, this work can result in the enablement of Macroscopic Quantum Coherence, that is the engineering of macroscopic states to behave as if quantum mechanical in nature - this is revolutionary for the Emerging field of Quantum Technologies, with applications in Quantum Computing, Spintronics, Artificial Intelligence, Crypto., etc.
- Furthermore, this technology has National Security importance in leading to the generation of thermonuclear Fusion Ignition Energy with commercial as well as military application potential, in ensuring National Energy Dominance.

Accomplishments:

- Completed preliminary experiments / test asset charging / EM flux detector mfg.
- Will complete test asset design and perform Spin Test to detect HEEMFG effect.
- Published: Dr. S. Pais, (2017, October 02). High Frequency Gravitational Waves -Induced Propulsion. *SAE Technical Paper 2017-01-2040*, doi: 10.4271/2017-01-2040.
- Application filed: Dr. S. PAIS, (2018, March 22). Plasma Compression Fusion Device. Tracking number: Serial # 15928703 (Navy Case PAX 285).

External Collaborator(s):

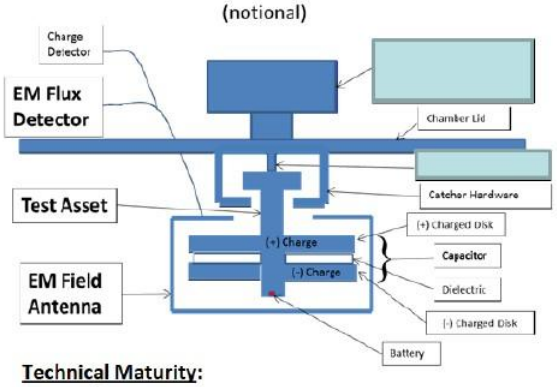
- None at this time.

Likely Customer(s):

- NAWCAD; possible engagement with DARPA, ONR, NRL, AFRL, NASA, etc.

HEEMFG Spin Rig

(notional)



Technical Maturity:
Research: Basic
Starting TRL: 2 **Est. Ending TRL: 3**

Technical Alignment:
Core Capability: High Energy Density / High Power Propulsion Systems

NAE Gap/STO: Power and Energy Technology / Advanced Naval Power Systems

Total Project Funding				
	FY17	FY18	FY19	Total
Labor	$144.4K	$127.6K	$117.3K	$389.3K
Travel	$5.00K	$5.00K	$0.00K	$10.00K
Material	$2.53K	$65.00K	$0.00K	$67.53K
Total	$151.9K	$197.6K	$117.3K	$466.8K

UNCLASSIFIED//FOUO **Last Updated: 2 May 2018** **T-Code: AIR 4.4T**

An overview of Pais's high-energy electromagnetic field generator concept., *DON via FOIA*

Timothy Boulay, Communications Director at NAWCAD, confirmed several points to *The War Zone* by email:

– The High Energy Electromagnetic Field Generator testing occurred from October 2016 through September 2019;
– The cost was $508,000 over the course of three years. Around ninety percent of the total – $462,000 – was for salaries, while the rest was used for equipment, test preparation, testing and assessment.
– When NAWCAD concluded testing in September 2019, the "Pais Effect" could not be proven.

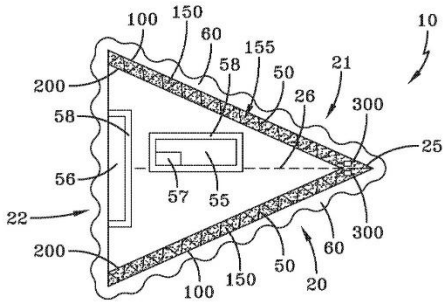
– No further research has been conducted, and the project has not transitioned to any other government or civilian organization.

While we greatly appreciate the response to our queries, it remains unclear why NAWCAD was unwilling to speak with us until now if they knew all along these experiments resulted in what appears to be a scientific dead-end that resulted in no verification of any of Pais's theories.

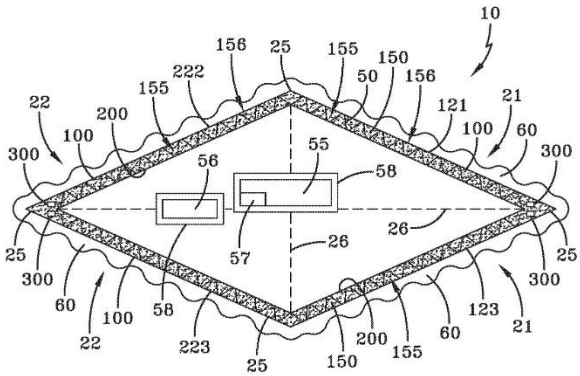
In addition to the statements above, Boulay added the following about the inventor of the Navy's "UFO patents":

The latest on Dr. Pais: you might remember that he left NAWCAD in June 2019 and moved to the Navy's Strategic Systems Programs organization. I found that he transferred to the U.S. Air Force this month.

We are still working with NAWCAD to determine where Pais was transferred within the research organizations of the USAF. Pais's first move from NAWCAD to Navy Strategic Systems Programs (SSP) office was somewhat interesting given that one of Pais's most eyebrow-raising patents was for a "hybrid aerospace-underwater craft." SSP oversees the development and sustainment of the Navy's nuclear-armed submarine-launched ballistic missiles.



FIG–1



FIG–2

Pais's hybrid-underwater-aerospace craft concept., *USPTO*

This statement from NAWCAD also raises a few questions about why these experiments were funded and supported so extensively by high-ranking scientists within the organization in the first place. Despite *every* physicist we have spoken to over the better part of two years asserting that the "Pais Effect" has no scientific basis in reality and the patents related to it were filled with pseudo-scientific jargon, NAWCAD confirmed they were interested enough in the patents to spend more than a half-million dollars over three years developing experiments and equipment to test Pais' theories.

Despite the fact that NAWCAD says the experiments ended in September 2019 without proving the "Pais Effect," the inventor asserted to *The War Zone* in a November 18, 2019 email that his work "culminates in the enablement of the Pais Effect" and that "as far as the doubting SMEs [Subject Matter Experts] are concerned, my work shall be proven correct one fine day…"

So, as it sits now, the Navy has finally chimed in that its latest little adventure into weird science has ended, at least as far as the seagoing service is concerned. Yet the bizarre secrecy surrounding this entire endeavor that has occurred after the Navy filed the patents publicly remains remarkably odd. Not until we actually got the images, data, and slides about the program of record that attempted to prove Pais' theories did they chime in to confirm its demise. We may never know why this was the case, although some will claim this was a misadventure in scientific research and fiscal misappropriation, to begin with.

This has been a wild ride, and we can't say for sure if it's come to an end just yet. But regardless, this is where it sits for the time being.

Below are the results of our Freedom of Information Act (FOIA) requests for documentation related to the Naval Innovative Science and Engineering – Basic & Applied Research Program under the project name "The High Energy Electromagnetic Field Generator (HEEMFG), broken into five parts here: Part 1, Part 2, Part 3, Part 4, and Part 5. We have removed only Pais's academic publications, to avoid copyright issues with their publishers, as well as Pais's patent documents which can already be found online.

Navy's Advanced Aerospace Tech Boss Claims Key 'UFO' Patent Is Operable

Navy officials claim their radical electromagnetic and superconductor technologies aren't theoretical, they're already operable in some form.

UPDATED ON OCT 17, 2019

Last month, *The War Zone* reported on a series of strange patent applications the U.S. Navy has filed over the last few years and questioned what their connections may be with the ongoing saga of Navy personnel reporting incidents involving unidentified objects in or near U.S. airspace.

We have several active Freedom of Information Act requests with the Department of Navy to pursue more information related to the research that led to these patents. As those are being processed, we've continued to dig through the U.S. Patent and Trademark Office's (USPTO) Public Patent Application Information Retrieval database to get as much context for these patents as possible.

In doing so, we came across documents that seem to suggest, at least by the Navy's own claims, that two highly peculiar Navy patents, the room temperature superconductor (RTSC) and the high-energy electromagnetic field generator (HEEMFG), may in fact already be in operation in some manner. The inventor of the Navy's most bizarre patent, the straight-out-of-science fiction-sounding hybrid aerospace/underwater craft, describes that craft as leveraging the same room temperature superconductor technology and high energy electromagnetic fields to enable its unbelievable speed and maneuverability. If those two technologies are already operable as the Navy claims, could this mean the hybrid craft may also already operable or close to operable? Or is this just more evidence that the whole exotic 'UFO' patent endeavor on the Navy's behalf is some sort of ruse or even gross mismanagement of resources?

Make sure to read our last feature on this bizarre topic to get up to speed on critical background information before continuing on.

The Navy's patents and their alleged operability

At the heart of these questions is the term "operable." In most patent applications, applicants must assert proof of a patent's or invention's "enablement," or the extent to which a patent is described in such a way that any person who is familiar with similar technologies or techniques would be able to understand it, and theoretically reproduce it.

However, in these patent documents, the inventor Salvatore Pais, Naval Air Warfare Center Aircraft Division's (NAWCAD) patent attorney Mark O. Glut, and the U.S. Naval Aviation Enterprise's Chief Technology Officer Dr. James Sheehy, all assert that these inventions are not

only enabled, but *operable*. To help me understand what that term may mean in these contexts, I reached out to Peter Mlynek, a patent attorney.

Mlynek informed me that the terms "operable" or "operability" are not common in patent applications, but that there is little doubt that the use of the term is meant to assert to the USPTO that these inventions actually work:

"Generally, patent applications are rejected on the basis of enablement more frequently than for operability. The Patent Office rejects patent applications based on enablement because the patent attorney did not describe the invention fully, because either the patent attorney did a sloppy job, or the patent attorney caved to the client's pressure to disclose as little about the invention as possible.
"Operability/operative, on the other hand, means that the invention actually works. From what I've seen, operability rejection comes up in cases where the patent attorney does not really understand the science or technology behind the invention. In many cases, the rejection based on inoperability is a kind of way of telling the patent attorney that the attorney has no idea what he/she is talking about."

All of these technologies – the room temperature superconductor, the high-energy electromagnetic field generator, and the hybrid aerospace/underwater craft (HUAC) – are inventions of the same NAWCAD aerospace engineer, the aforementioned Salvatore Cezar Pais. Our previous article on the Navy's patents explored the hybrid craft and whether or not it could be related to other developments such as Navy pilots reporting strange objects in U.S. airspace during training exercises and members of Congress now asking for answers on UFOs.

Salvatore Pais wants to save the world

In a conference paper that Pais presented earlier this year at the 2019 American Institute of Aeronautics and Astronautics (AIAA) SciTech Forum in San Diego, the inventor states that the research that led to all of these technologies was funded by a single Naval Innovative Science & Engineering (NISE) – Basic & Applied Research (BAR) program, titled "The High Energy Electromagnetic Field Generator (HEEMFG)."

In the Navy's patent application for the HUAC, it's claimed that the radical abilities of propulsion and maneuverability are made possible thanks to an incredibly powerful electromagnetic field that essentially creates a quantum vacuum around itself that allows it to ignore aerodynamic or hydrodynamic forces and remove its own inertial mass from the equation. Thus, the ability to generate such high-frequency electromagnetic waves is key to the alleged

abilities of this theoretical hybrid craft that can soar near effortlessly through air and water at incredible speeds with little to no resistance or inertia.

In the patent application documents for the HEEMFG, we came across a record of an interview requested by Pais and the Navy as part of the appeal process for the patent's initial rejection. During this telephone interview, which took place on July 10, 2018, Pais and the Navy's attorney presented evidence that the high energy electromagnetic field generator was, in fact, operable and was a "formative invention in its incipient stage(s)."

Applicant-Initiated Interview Summary	**Application No.** 14/807,943	**Applicant(s)** PAIS, SALVATORE	
	Examiner THOMAS DOUGHERTY	**Art Unit** 2837	

All participants (applicant, applicant's representative, PTO personnel):

(1) *THOMAS DOUGHERTY*. (3) *SALVATORE CEZAR PAIS, Applicant*.

(2) *MARK Glut, Atttorney for the Applicant*. (4)_____.

Date of Interview: *10 July 2018*.

Type: ☒ Telephonic ☐ Video Conference
☐ Personal [copy given to: ☐ applicant ☐ applicant's representative]

Exhibit shown or demonstration conducted: ☒ Yes ☐ No.
If Yes, brief description: *proposed addition to the specification and an article by Mr. Pais entitled "The high energy electromagnetic field generator:*.

Issues Discussed ☐101 ☒112 ☐102 ☐103 ☐Others
(For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: *1-12*.

Identification of prior art discussed: _____.

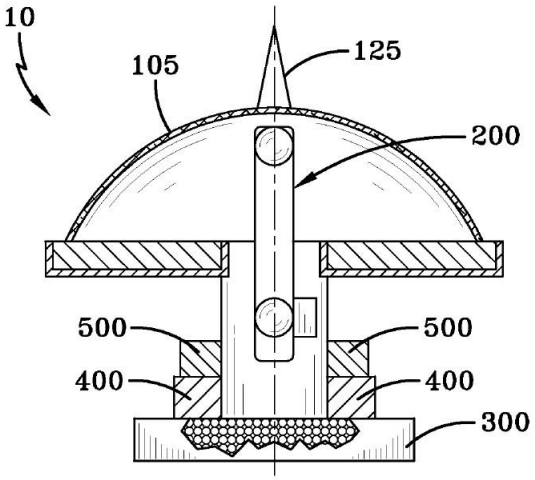
Substance of Interview
(For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

Mr. Glut and Mr. Pais presented information relating to the operability of the invention. The Examiner noted that there were no art rejections and indicated that a substitute specification including the information provided be included in that specification. Mr. Pais noted that the invention was a formative invention in its incipient stage(s)..

USPTO

In the patent for the HEEMFG, the technology is described as being able to create what is essentially a force field straight out of science fiction, one that could generate "an impenetrable defensive shield to sea and land as well as space-based military and civilian assets, protecting these assets from such threats as Anti-Ship Ballistic Missiles, Radar Evading Cruise Missiles, Top Attack for Main Battle Tanks (land and sea-based systems), as well as counteracting the

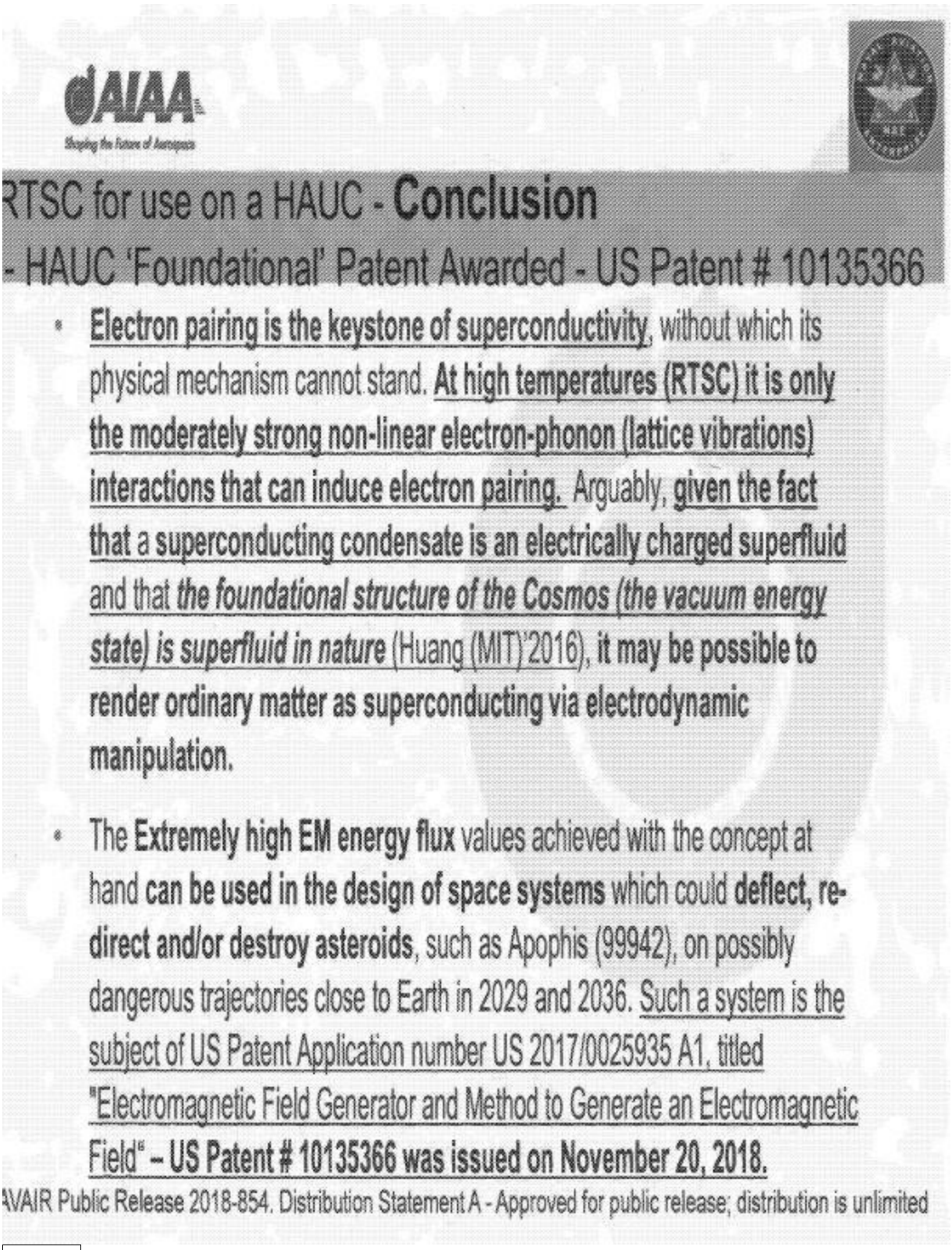
effects of solar-induced Coronal Mass Ejections or defending critical military satellites in an ASAT [anti-satellite] role (space based system).”



FIG−3

An image of the high energy electromagnetic field generator from the patent depicting its shell composed of “embedded polycrystalline ferroelectric ceramic material” capable of exhibiting “strong Piezoelectric Effects” (105), an electrostatic generator (200), a nuclear fission pebble bed reactor (300), a thermoelectric generator (400), and an electric motor (500). The protrusion at the top (125) is claimed to “generate a Cyclonic Plasma shield, which would greatly amplify the produced electromagnetic field intensity.”, *USPTO*

In his presentation at the 2019 AIAA SciTech Forum, Pais claims that this device could even serve as an optimal asteroid deflector to save the world from 99942 Apophis, a 370-meter diameter near-Earth asteroid which has been predicted to come dangerously close to our planet in 2029 and 2036.



USPTO

While saving the world from a massive asteroid is without a doubt a worthwhile application of this alleged high energy electromagnetic field generator, the military applications of this

supposed technology would give a paradigm-exploding advantage to any military wielding such an impenetrable electromagnetic force field. Is it only a hypothetical technology, though? The inventor and his attorney assured the patent office it is indeed operable, at least to some degree.

Many readers have also questioned whether or not Salvatore Cezar Pais is, in fact, a real person. In our search for information about the elusive inventor, we have found a few mentions in one of his alma mater's class notes updates, which states that Pais obtained his undergraduate degree in 1990 and a graduate degree in 1993 in mechanical engineering. The Mathematics Genealogy Project, meanwhile, states he obtained his Ph.D. from Case Western Reserve University in 1999.

We also came across this image purporting to depict Pais on a Chinese news blog which covered our original patent story, but we have so far been unable to ascertain its veracity. However, a smaller version of the same picture appears on a U.K.-based book review site under the author name Salvatore Cezar Pais.

A supposed image of Salvatore Pais standing among large Super Hornet and Growler models., *New.QQ.com/Chinese Internet*

Navy CTO claims Pais' room temperature superconductor is operable

While the HEEMFG sounds like pure science fiction, another one of Pais' patents may be *somewhat* closer to reality, depending on who you ask. For years, scientists have sought to create room-temperature superconductors, electrical circuits with zero resistance that generate powerful electromagnetic fields. Most superconductors require incredibly low temperatures, however, making them impractical for most uses outside of laboratories or other carefully controlled environments.

As noted by Pais in his 2019 AIAA presentation, "the achievement of room-temperature superconductivity (RTSC) represents a highly disruptive technology, capable of a total paradigm change in Science and Technology," and adds that its "military and commercial value is considerable."

Several recent experiments into room temperature or high-temperature superconductivity have had some preliminary success, which suggests this once-out-of-reach technology could possibly become obtainable with further research. A 2019 *Nature* article summarizing results with room temperature superconductivity under high pressure states that "it seems more likely than ever that the dream of room-temperature superconductivity might be realized in the near future" and that "experimental data now confirm superconductivity at higher temperatures than ever before."

Nevertheless, Pais' room temperature superconductor patent was rejected under 35 U.S.C. 101 because the examiner determined "the disclosed invention is inoperative and therefore lacks utility" and that "no assertions of room-temperature superconductivity have currently been recognized or verified by the scientific community." That code states that patents will be granted only for "any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof." According to the Manual of Patent Examining Procedure (MPEP) code 2164.07, patents are rejected on these grounds in cases "when the examiner concludes that an application claims an invention that is non-useful, inoperative, or contradicts known scientific principles."

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-8 are rejected under 35 U.S.C. 101 because the disclosed invention is inoperative and therefore lacks utility. The claims encompass room temperature superconductors, which are mere theoretical materials and currently under known principles of physics and chemistry cannot exist according to conventional scientific theory/No assertions of room temperature superconductivity have currently been recognized or verified by the scientific community. Given this combined with the issues discussed below and lack of enablement, the disclosed invention appears to be inoperable.

USPTO

Following that rejection, Naval Aviation Enterprise Chief Technology Officer Dr. James Sheehy once again stepped in to write a letter to the USPTO personally to vouch for the room temperature superconductor, going so far as to declare that the RTSC is “operable and enabled via the physics described in the patent application” and Pais’ publications. Again, the keyword here is “operable,” which has a different meaning than simply “enabled.”

DECLARATION UNDER 37 C.F.R. 1.132

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Pais	)	
Serial No.: 15/678,672	)	Group Art Unit: 1735
Filed: 08/16/2017	)	Examiner: Paul Wartalowicz
For: Piezoelectricity-induced	)	
Room Temperature Superconductor	)	Att. Docket No.: PAX 263
	)	

Commissioner of Patents and Trademarks
Washington, D.C. 20231

DECLARATION UNDER RULE 1.132

I, James Sheehy, declare and say as follows:

That I received a Doctor of Philosophy Degree (PhD) in physiological optics from the Pennsylvania State University, a Master's degree from the Rensselaer Polytechnic Institute in Human Factors Engineering (with research performed in energy efficient vehicles), and a Bachelor's degree from Kean University.

That I have served as a civilian employee of the United States Navy since 1985. During the course of my career at the Department of the Navy, I was a research and lab manager, and the Chief Scientist of the Naval Air Systems Command. I have directed basic to advanced technology research across the Naval Aviation Enterprise while continuing to pursue research interests in perception, physiological optics, visual vestibular interactions, analog then digital sensors and displays for night vision / low light level devices, nonlinear materials and novel coatings for filters and lenses. As a result, I am well versed in the generation of electromagnetic fields, high temperature super conductivity, and physics in general (the subject matter of the above application).

That from 2007 to 2018, I have been the Chief Technology Officer of the Naval Aviation Enterprise, and NAVAIR's Chief Scientist/CTO and technical authority, and spokesperson for all basic, applied, advanced research and transition. I am now currently the Chief Scientist for the Naval Air Systems Command Human Systems Division. I was promoted to the Senior Executive Service in November 2001 and was awarded the Presidential Rank Award for sustained superior accomplishments / scientific achievement in 2007.

That I am familiar with the above referenced patent application (and related amendment), as well as the development, usage and properties of the piezoelectricity-induced room temperature superconductor. That as a result of my education and career, I am regarded as a subject matter expert and can be considered "a person of ordinary skill in the art" in the subject matter of the above patent application.

That the invention described in the above referenced patent application is operable and enabled via the physics described in the patent application and the peered reviewed paper described in the Inventor Amendment.

That I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 USC 1001.

Date: 11/27/2018

James Sheehy

USPTO

Sheehy assures the examiner that he is "well versed in the generation of electromagnetic fields, high temperature

super conductivity, and physics in general." Note, too, the last line: Sheehy's declaration was made with the knowledge that false statements to the USPTO are punishable by fine or imprisonment.

Sheehy's letter was accompanied by a statement from Naval Aviation Enterprise attorney Mark Glut in which Glut states that "Sheehy states the invention is operable and enabled, thus overcoming both rejections."

room-temperature superconductivity at a metal - PZT interface," arXiv:1007.2736v1 [cond-mat.supr-con] 16 Jul 2010).

Additionally, attached please find a declaration by James Sheehy, dated 11/27/2018. Dr. Sheehy's Declaration indicated that the invention is enabled and operable. Dr. Sheehy was the technical authority, and spokesperson for all basic, applied, advanced research and transition for the Naval Air Systems Command of the Department of Navy for eleven years, and is now the Chief Scientist for Naval Air Warfare Center Aircraft Division Human Systems, and can be considered a subject matter expert and person of ordinary skill in the art. In his declaration, Dr. Sheehy states that the invention is operable and enabled, thus overcoming both rejections.

Applicant hereby requests further examination and reconsideration of the application, in view of the foregoing remarks.

In view of the above, it is submitted that claims 1-8 are in condition for allowance. Reconsideration and withdrawal of the rejections and objections are requested. Allowance of the claims at an early date is solicited.

Respectfully Submitted,

Date: 1/29/2019

Mark O. Glut
Registration #38,161
Department of the Navy
Office of Counsel, NAWCAD
47076 Liljencrantz Rd, Building 435
Patuxent River, MD 20670-1547
(301) 757-0582

USPTO

In a separate appeal document, Glut states that in the case of the RTSC patent, “there is no reason to doubt the truth of the statements contained in the specification” and that the patent office “must provide a factual basis for an enablement rejection, rather than conclusory statements regarding the state of conventional scientific theory.”

1971)). In this case there is no reason to doubt the truth of the statements contained in the specification. The examiner must also explain any doubts as to the accuracy of any statement with evidence or reasoning rooted in fact (*Marzocchi*, 439 F.2d at 224 (C.C.P.A 1971)), and the PTO must provide a factual basis for an enablement rejection, rather than conclusory statements regarding the state of conventional scientific theory or the PHOSITA's (person having ordinary skill in the art) level of skill (*In re Brebner*, 455 F.2d 1402, 1405 (C.C.P.A. 1972)). In this case, the Examiner did not utilize any references, provides no evidence as to accuracy or objective truthfulness of any statements, and makes a conclusion based on his personal knowledge.

USPTO

Glut goes even further with somewhat of a dig at USPTO examiner Paul A. Wartalowicz, writing that in the case of this rejection, “the examiner turned to *perceived* mainstream science to indicate the concept was not possible” but that “in this matter, the gatekeepers of science (the peer reviewers of Applicant’s papers) indicated the concept is possible and enabled.”

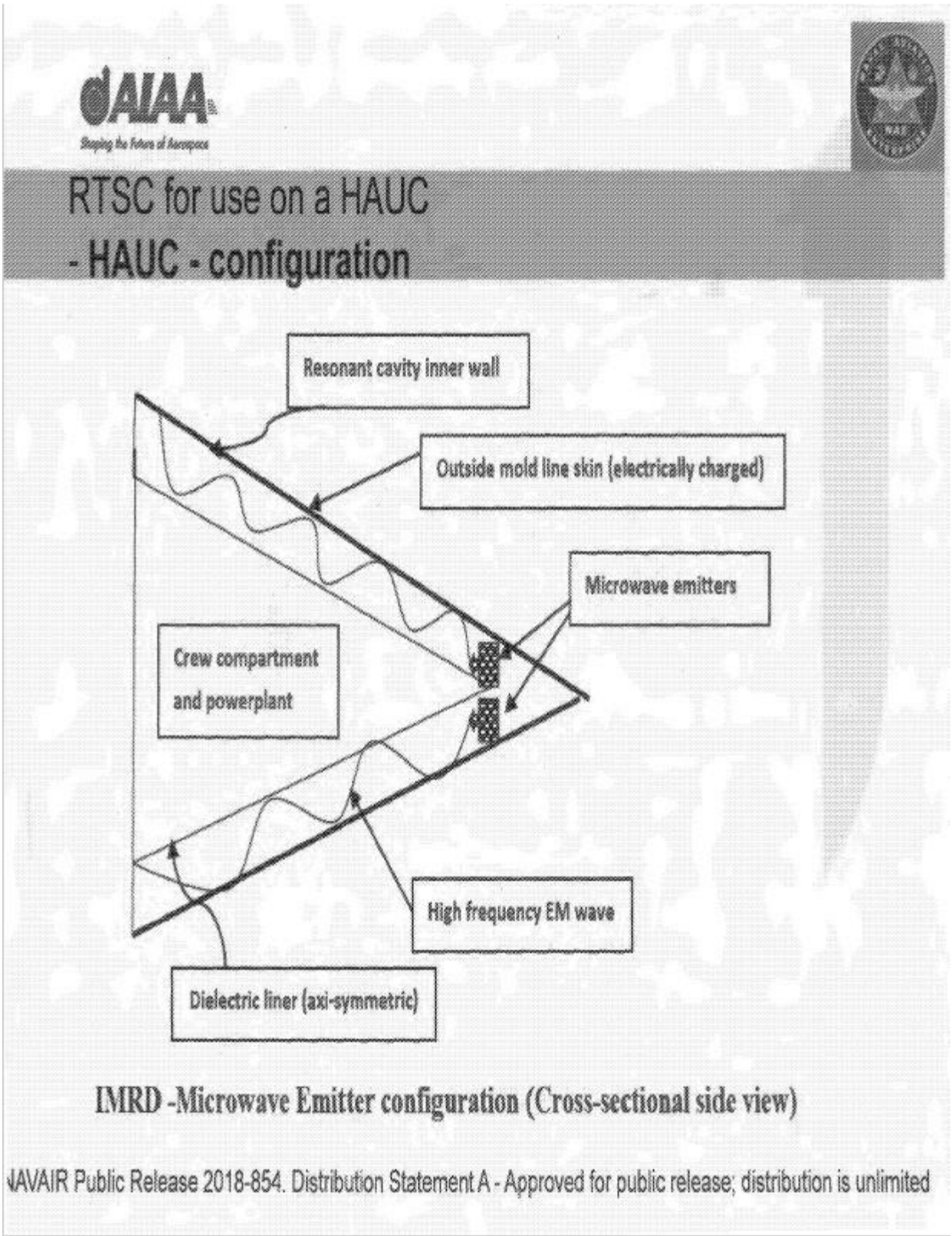
Furthermore, the Examiner turned to *perceived* mainstream science to indicate the concept was not possible. However, in this matter, the gatekeepers of science (the peer reviewers of Applicant's papers) indicated that the concept is possible and enabled. Furthermore, the Examiner is not an active researcher, and is not on the frontline of science, as the peer reviewers typically are. Thus, he is not aware of the current state of

the art and is not a person of ordinary skill in the art of the subject matter of the Application.

USPTO

However, it's important to note that while many of Pais' publications were published in peer-reviewed journals, his most recent publication wasn't actually peer-reviewed. The publication "Room Temperature Superconducting System for use on a Hybrid Aerospace-Undersea Craft" does not appear in a peer-reviewed journal, but was instead presented at the 2019 AIAA SciTech Forum.

On the AIAA's Abstract Submission Process & Requirements page, it is stated that "All abstracts will be evaluated by qualified individuals from industry, academia, or government. It is recommended to the Technical Program Committee to have the broadest representation of reviewers appropriate for the forum/conference. Exceptions may be made for invited abstracts. Please note that this is a review of abstracts only and that AIAA's meeting papers are not peer-reviewed." Thus, the statements made by the Navy attorney aren't entirely accurate.



A slide from Pais' 2019 presentation "Room Temperature Superconducting System for use on a Hybrid Aerospace-Undersea Craft.", *USPTO*

In another one of the correspondences between the USPTO and the Navy regarding the Room Temperature Superconductor patent, the examiner writes that "in such instances where the utility of the claimed invention is based upon allegations that border on the incredible or allegations that would not be readily accepted by a substantial portion of the scientific community, sufficient substantiating evidence of operability needs to be submitted by appellant."

Additionally, the affidavit filed 01/24/2019 is not persuasive.

The Office is aware that in such instances where the utility of the claimed invention is based upon allegations that border on the incredible or allegations that would not be readily accepted by a substantial portion of the scientific community, sufficient substantiating evidence of operability needs to be submitted by appellant. For example, in 2011 scientists conducting the OPERA experiment claimed that neutrinos moved faster than the speed of light, only to have the results recanted due to faulty equipment discovered through third party attempts at replication. See attached article from Nature News, 2012.

In the instant case, the affidavit provides a conclusion on a legal principle (enablement) rather than factual data/assertions that can be evaluated by the office. Therefore, the affidavit is accorded little probative weight for evaluation of the rejection for lack of enablement. MPEP 716.01(c) (III).

USPTO

Following that rejection, Pais and NAWCAD's patent attorney Mark Glut requested a telephone interview that took place on June 6, 2019. According to the USPTO's public database, the appeals surrounding the room temperature superconductor are still ongoing despite the declarations made by Dr. James Sheehy and attorney Mark Glut.

Applicant-Initiated Interview Summary	**Application No.** 15/678,672	**Applicant(s)** Pais, Salvatore Cezar	
	Examiner PAUL A WARTALOWICZ	**Art Unit** 1735	**AIA (FITF) Status** Yes

All participants (applicant, applicants representative, PTO personnel):

(1) PAUL A. WARTALOWICZ. (3) Salvatore Pais.

(2) Mark O. Glut. (4) Stephani Hill.

Date of Interview: 06 June 2019.

Type: ☑ Telephonic ☐ Video Conference
☐ Personal [copy given to: ☐ applicant ☐ applicant's representative]

Exhibit shown or demonstration conducted: ☐ Yes ☐ No.
If Yes, brief description: ____.

Issues Discussed ☐101 ☑112 ☐102 ☐103 ☐Others
(For each of the checked box(es) above, please describe below the issue and detailed description of the discussion)

Claim(s) discussed: 1.

Identification of prior art discussed: ____.

Substance of Interview
(For each issue discussed, provide a detailed description and indicate if agreement was reached. Some topics may include: identification or clarification of a reference or a portion thereof, claim interpretation, proposed amendments, arguments of any applied references etc...)

Applicant argued that the lack of experimental data in the present application is overcome by the theoretical data present in the application. The examiner stated that experimental data is necessary to overcome the rejection of lack of enablement. The examiner stated that future amendments and/or arguments will be considered in due course under the appropriate statutes..

USPTO

An intimidating river of mumbo-jumbo and sophisticated babble

After our last article on these bizarre Navy Patents, and the hybrid craft patent, in particular, some readers were quick to point out that like the physicists I have spoken with while researching these patents, they are unconvinced that the Navy may have actually already developed, or even could develop, radical new forms of electromagnetic propulsion or the room-temperature superconductors the patents and their related publications describe as the key component in their operability.

To help contextualize the science or pseudoscience behind these patents and what it may or may not signify, I spoke with Dr. Mark Gubrud, a University of North Carolina physicist who teaches Peace, War & Defense courses and whose PhD is in ultra-low temperature and nanoscale experimental physics. Like many physicists, Gubrud has for years encountered claims of room-temperature superconductors and so-called spacetime metric engineering:

“In the past, I have attended conferences of ‘free energy’ and ‘cold fusion’ cranks, and encountered very similar claims. The claim to have developed, or know how to develop, a room-temperature superconductor is a perennial; so are claims based on some woolly physics to alter space, inertial

mass or the laws of motion. One sees these things at the meetings and in the publications that constitute a crackpot hobby industry which is mostly about the vanity of its participants.

"Pais's patents flow as an intimidating river of mumbo-jumbo that most trained physicists would recognize as nonsense, although many might simply disengage in confusion, and there are always some who might even be credulous. Of what, however, is hard to say, as it is not really clear what Pais is even claiming, apart from the room-temperature superconductor which, if it were true, would be huge news.

"Pais deploys fairly sophisticated babble to make this sound plausible to those who know what real physics sounds like, but don't understand much of it. Which is likely to include most patent examiners, journalists, and Pais's own enablers in the Navy."

I asked for Gubrud's opinion on why Dr. James Sheehy would vouch for Pais' patents, to which he replied that it's likely someone at NAWCAD has been misled or fooled:

"I don't know why Sheehy defended Pais's patents. I am certain it's not because they really make some kind of sense. I suspect the story is just one professional charlatan who has embedded himself in the Naval Air Warfare Center Aircraft Division, plus one or a few supervisors he's managed to fool. It's possible, of course, that it is a bigger story which involves some actual 'experiments' and expenditure of funds, which is now being protected from scrutiny."

Ultimately, Guburd believes the patents signify nothing more than "an illustration of the need for transparency and peer review," but that "even with such niceties, nonsense gets funded, often for political and ideological reasons, or simply out of corruption. But nonsense seems an especially hardy perennial in hierarchical, closed and secretive organizations."

Weaponizing patents

Despite months of research and FOIA requests, it's still unclear why the Navy would go to bat so vehemently for these patents which, as another physicist I spoke with put it, "bear no more resemblance to quantum physics as I understand it than does 'The Force' from *Star Wars*."

If the Navy has indeed managed to develop operable room temperature superconductors and electromagnetic force fields, these technologies would revolutionize warfare in ways not seen in centuries, or maybe even ever, not to mention leading to paradigm changes in civilian technology. Yet the largest question remains: if the Navy indeed possesses these technologies, or even thinks they are obtainable in the near term, why make the patents public?

With all this in mind, it's certainly possible that these patents are part of some ongoing information campaign designed to make America's competitors question what types of black budget research is currently underway at NAWCAD and other research organizations. With so many revolutionary new aerospace technologies on the brink of deployment, perhaps this is an attempt to essentially "weaponize" patents and sow doubt among our adversaries and even inject confusion among the American populace.

That scenario seems more likely given the fact that the Naval Aviation Enterprise Chief Technical Officer Dr. Sheehy claimed Chinese advances in similar capabilities as a means of getting the hybrid aerospace/underwater craft patent application approved. The U.S. and China are in a new technological arms race to develop the next generations of aircraft and advanced weaponry. Part of this race includes producing disinformation and misinformation to make your enemy invest resources, both intelligence and research and development related, that are, for lack of a better word, dead-ends.

Being able to explain away strange objects in the sky as UFOs, which may indeed be emerging classified capabilities, is also beneficial both here at home and abroad. Overall, these patents certainly add to an increasingly complex narrative mosaic that is emanating directly from the Navy, one that began just as a new era of so-called 'great power competition' was being declared at the highest rungs of the Pentagon's leadership.

At the same time, maybe this is the Pentagon's grasping attempt to try to make sense of and emulate mysterious and seemingly highly advanced craft that are supposedly being increasingly observed near its own aircraft, vessels, and installations. Maybe the Chinese competition claim is just a placeholder for the unknown.

It's also at least worth considering that some breakthroughs in highly exotic propulsion might have been made and that the Navy is willing to invest big bucks into seeing them progress further. Maybe those advances happened many years ago and only now is the Pentagon willing to slowly disclose them. Or all this could be a case of wasteful, misguided, or even downright corrupt spending on ideas that have no real chance of paying off down the line.

The bottom line is that after months of investigation, reaching out directly to the Navy and all those involved, as well filing numerous FOIA requests that will take months or even years to

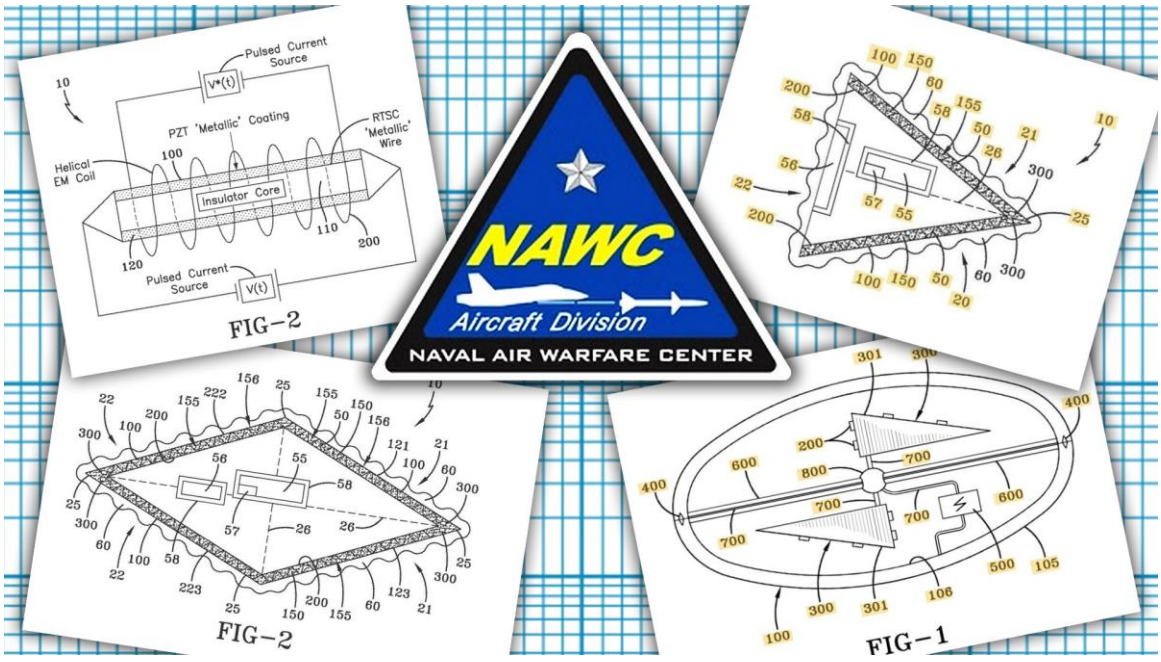
process, there is still so much we don't know about the technological developments the Navy is pursuing or that it is at least acting like it's pursuing. The existence of these patents and the underlying documentation we've brought to light and examined has only made this case more puzzling, especially in contrast to experts we have talked to who claim there is no way these patents could describe actual working technologies.

One thing *is* certain, our investigation into these patents and the Navy-funded research that led to them has only just begun.

Docs Show Navy Got 'UFO' Patent Granted By Warning Of Similar Chinese Tech Advances

Patent documents indicate that the U.S. and China are actively developing radical new craft that seem eerily similar to UFOs reported by Navy pilots.

UPDATED ON JUN 28, 2019



The United States Secretary of Navy is listed as the assignee on several radical aviation technologies patented by an aerospace engineer working at the Naval Air Warfare Center Aircraft Division (NAWCAD) headquarters in Patuxent River, Maryland. One of these patents describes a "hybrid aerospace-underwater craft" claimed to be capable of truly extraordinary feats of speed and maneuverability in air, water, and outer space alike thanks to a revolutionary electromagnetic propulsion system.

Sound far fetched? You're not alone.

A primary patent examiner at the United States Patent and Trademark Office (USPTO) thought so too. But then the Chief Technical Officer (CTO) of the Naval Aviation Enterprise personally wrote a letter addressed to the examiner claiming that the U.S. needs the patent as the Chinese are already "investing significantly" in these aerospace technologies that sound eerily similar to the UFOs reported by Navy pilots in now well-known encounters. This raises the question, are the Chinese developing or even already flying craft leveraging similar advanced technology and is the Navy now scrambling to catch up?

The Wondrous Inventions Of Dr. Salvatore Cezar Pais

The bizarre saga of the U.S. Navy and its sudden willingness to admit that its personnel regularly encounter unidentified objects in the skies keeps getting stranger. Why the sudden shift in policy? What is the motivation for disclosing these encounters to the public? News outlets of all types have for months been discussing the matter, yet we still don't know exactly what is actually happening here.

Clearly, the narrative is being carefully controlled by the Department of Defense and the Navy. We can only base our speculation on what has been released to the public over the last few years through the media and what is public record. With that said, maybe the most curious additions to the still-developing saga is a set strange aerospace patents filed by one Salvatore Cezar Pais, an aerospace engineer at NAWCAD.

While attempting to dig up as much information as possible about the inventor and these patents, I came across some supplemental documents in the USPTO's databases that seem to imply that Navy leadership knows that these technologies are actually feasible – or that they want us or someone else to *think* that they are.

Little information can be found about Salvatore Cezar Pais; he has virtually no web presence. What is known is that he received a PhD in Mechanical and Aerospace Engineering from Case Western Reserve University in 1999 and that he currently works as an aerospace engineer for NAWCAD at Naval Air Station Patuxent River in Maryland – the Navy's top aircraft test base. Pais has published several articles and presented papers at American Institute of Aeronautics and Astronautics conferences over the years describing his work in electromagnetic propulsion, revolutionary room temperature superconductors, and topics like his PhD dissertation: "Bubble generation under reduced gravity conditions for both co-flow and cross-flow configurations."

NASA helped fund his dissertation, a copy of which they have on their website here. A full list of his publications can be found here.

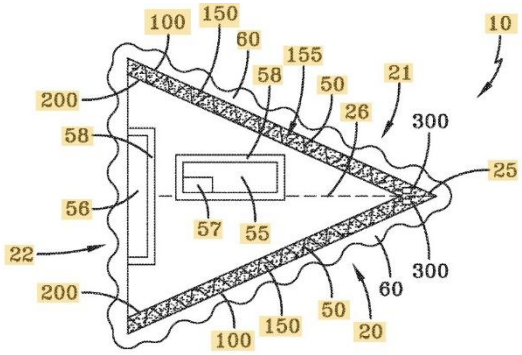
The Navy's Patented Hybrid Underwater Aerospace Craft

Pais is named as the inventor on four separate patents for which the U.S. Navy is the assignee: a curiously-shaped "High Frequency Gravitational Wave Generator;" a room temperature superconductor; an electromagnetic 'force field' generator that could deflect asteroids; and, perhaps the strangest of all, one titled "Craft Using An Inertial Mass Reduction Device." While all are pretty outlandish-sounding, the latter is the one that the Chief Technical Officer of the Naval Aviation Enterprise personally vouched for in a letter to the USPTO, claiming the Chinese are already developing similar capabilities.

The patent was first applied for on April 28, 2016, over a decade after the *Nimitz* Carrier Strike Group encountered strange Tic Tac-shaped aircraft and nearly a year after Navy pilots across multiple squadrons flying out of Naval Air Station Oceana and NAS Norfolk experienced a string of bizarre encounters with unidentified aircraft, some of which, like the Tic Tac, seemed to possess exotic performance capabilities.

The hybrid aerospace-underwater craft in Pais' patent, meanwhile, is described as being capable of incredible feats of speed and maneuverability and can fly equally well in air, water, or space without leaving a heat signature. This is possible, Pais claims in the patent, because the craft is able to "engineer the fabric of our reality at the most fundamental level" by exploiting the laws of physics.

The concept is fairly simple, although the engineering required to make it a reality is anything but. All matter contains energy on the quantum level. By theoretically creating its own incredibly dense and polarized energy field, the hybrid craft is claimed to be able to create a quantum 'vacuum' around itself which allows it to repel any air or water molecules with which it interacts. Thus, the craft can essentially ignore aerodynamic or hydrodynamic forces, or so it is claimed in the patent.



Hybrid Aerospace Underwater Craft

, A depiction of the hybrid aerospace underwater craft included with the patent application., *USPTO*

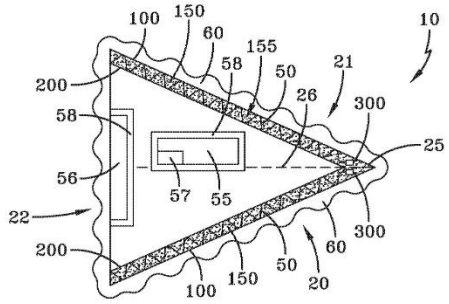
Throughout his patents and publications describing the hybrid aerospace underwater craft (HAUC), Pais writes that the radical feats of speed and maneuverability of which the craft is supposedly capable can be achieved by coupling "high-frequency axial spin" or "accelerated vibration" with "high-frequency vibrations of electrically charged systems."

In other words, if you can a) create a room temperature superconductor capable of storing an incredibly high amount of energy and b) get the energy field created by that superconductor moving at incredibly high speeds around or within the craft, you can create a polarized energy vacuum around it which allows it to basically ignore the energy of the air or water around it, thereby removing its own inertia and mass from the equation.

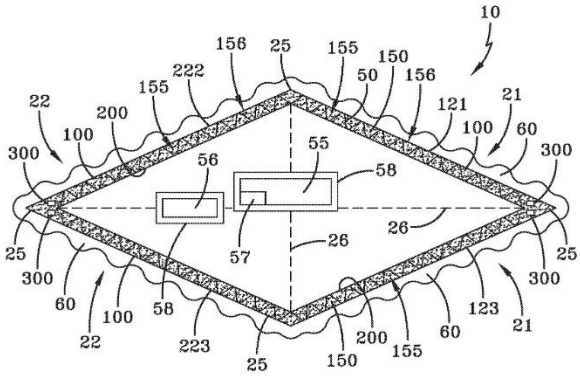
In his most recent publication, Pais describes the hybrid aerospace underwater craft as a roughly cone-shaped vehicle that would appear round from the front or rear: "the HAUC is conical in configuration, with an elliptical cross-section, similar in geometry to a hypersonic glide vehicle / dart." Interestingly enough, the descriptions of the craft in several of Pais' publications and even the patent for "Craft using an inertial mass reduction device" include room for a crew compartment shielded by a Faraday cage.

Shortly after the patent for the hybrid craft was approved in 2018, Pais presented another related paper, "Room Temperature Superconducting System for Use on a Hybrid Aerospace Undersea Craft" at the 2019 American Institute of Aeronautics and Astronautics SciTech Forum in San Diego this past January. In the paper, Pais writes that "the achievement of room temperature superconductivity (RTSC) represents a highly disruptive technology, capable of a total paradigm change in Science and Technology," and adds that its "military and commercial value is considerable."The capabilities described in the paper should certainly sound familiar to anyone who's been following the Navy UFO stories over the last several years:

It is possible to envision hybrid aerospace-undersea craft (HAUC), which can function as a submersible craft capable of extreme underwater speeds (lack of water-skin friction) and enhanced aerial/underwater stealth capabilities (non-linear scattering of RF and sonar signals). This hybrid craft would move with great ease through the air/space/water mediums, by being enclosed in a Vacuum/plasma bubble/sheath, due to the coupled effects of EM field-induced air/water particles repulsion and Vacuum energy polarization.



FIG−1



FIG−2

HUAC with Components

, Images of the craft in the patent application include a descriptions of the various components such a craft could possess such as: microwave emitters (300); a resonant cavity filled with a noble gas such as xenon (150); a crew compartment (55); a Faraday-type cage to protect crew against electromagnetic fields (58); a cargo bay (57); a power plant system (56); and a frustrum, or nose cone, which is "rotatable about its own axis (25).", *USPTO*

To help me understand the underlying theory behind the hybrid craft technology described in the patents, I spoke with Dr. Brian Collett, a Hamilton College physics chair who teaches courses in electromagnetic theory and quantum physics. Collett told me that while patents and peer-reviewed articles about theoretical physics are one thing, the descriptions of the HAUC and the claims in Pais' research "bear no more resemblance to quantum physics as I understand it than does 'The Force' from Star Wars." Moreover, Collett adds, "a working room temperature superconductor would have far more radical uses that are actually within the bounds of possibility" than a hybrid craft that can theoretically create a quantum vacuum around itself.

Other physicists I've conferred with have stated the same thing – although most of them refused to go anywhere near on the record concerning the hybrid craft patent based on how outlandish it seems. Why then would the Naval Aviation Enterprise CTO personally vouch for this patent to the USPTO?

The 'Future State of the Possible'

Just because something is patented doesn't mean it's currently in production or even possible. Private entities and the U.S. government both regularly patent forward-looking technologies to ensure that they own the rights to them when or if they're ever fully realized. The patent for the hybrid craft is set to expire on September 28, 2036.

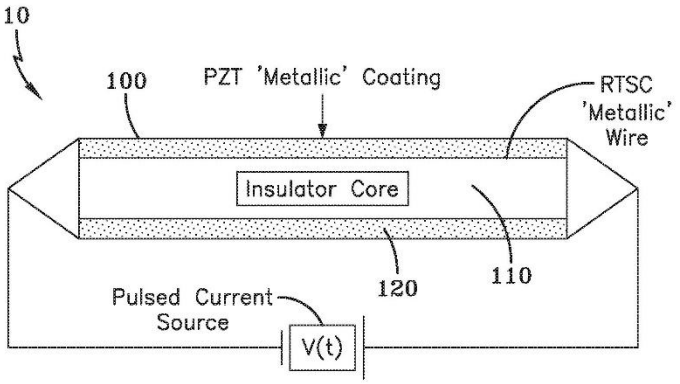
That being said, the unorthodox circumstances surrounding the approval of this patent have us wondering why the Chief Technology Officer of the U.S. Naval Aviation Enterprise, Dr. James Sheehy, personally vouched for the legitimacy of this beyond-revolutionary aerospace technology in the Navy's appeal to the USPTO. Sheehy assured the patent examiner in charge of this application that the aircraft propulsion method described in the patent is indeed possible or will be soon based on experiments and tests NAWCAD has already conducted.

While plenty of commenters online have seen the patents and claimed that any old crackpot scientist can attempt to patent crazy-sounding technologies far beyond what is currently technologically feasible, I would hesitate to call the CTO of the Naval Aviation Enterprise working on behalf of the Federal Government a crackpot. Then again, it's not impossible.

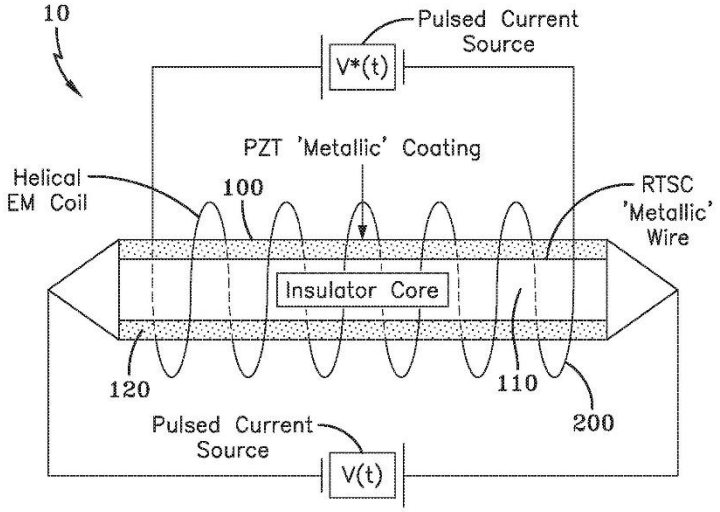
The application was initially rejected by Patent Examiner Philip Bonzell on the grounds that "there is no such thing as a 'repulsive EM energy field,'" and that "when referring to the specifications as to ascertain about the microwave emitters needed in this system it is seen that for a high energy electromagnetic field to polarize a quantum vacuum as claimed it would take 10^9 [T]eslas and 10^18 V/m." That's roughly the equivalent to the magnetic strength generated by most magnetars and more electricity than what is produced by nuclear reactors.

Obviously, the examiner believed it's impossible with today's technology to create the insane amount of energy needed to generate the EM field that would propel this craft in the manner described in the patent application. What would be needed to generate such amounts of energy is perhaps the potentially revolutionary room temperature superconductor described in one of Pais' other patents for which the Navy is listed as the assignee.

Superconductors are materials that can conduct electricity with zero resistance, meaning the electrical currents carried through them never degrade or dissipate like they do in metals, such as copper or silver.



FIG–1



FIG–2

A drawing from Pais' patent "Piezoelectricity-induced Room Temperature Superconductor.", *USPTO*

Superconductors also create their own repulsive magnetic fields when placed near magnets, enabling applications like the levitating Maglev trains currently floating at high-speed in Japan and China. Most superconductors today require extremely low temperatures to operate, however, making them impractical for most uses outside of laboratories or large scale industrial applications. Room temperature superconductors for years have been something of a "Holy Grail" of science for engineers, because, once realized, they would open the doors for incredible new forms of power transmission and storage, electric motors, and magnetic levitation devices.

According to documents available to the public at the USPTO website, the Patent Office rejected Pais' and the Navy's application for this craft on March 30, 2018. After it was rejected, the NAWCAD's patent attorney, Mark O. Glut, appealed the decision and submitted further documentation to ensure the patent office that this craft is indeed "enabled," meaning it can actually be built and can perform as described in the patent.

IV. ARGUMENT

Rejection #1: Claims 1-4 under 35 USC 112(a)

Examiner rejected claims 1-4 under 35 USC 112(a) as failing to comply with the enablement requirement (in Examiner's Office Actions dated 11/28/2017 and 3/30/18). Examiner further stated that "the claims(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention." He stated that "when referring to the specification as to ascertain about the microwave emitters needed in this system it is seen that for a high energy electromagnetic field to polarize a quantum vacuum as claimed it would take 10^9 [T]eslas and 10^{18} V/m." Examiner holds that these levels are not feasible with current technology and concludes that one skilled in the art could not make or use this invention.

USPTO Rejection Based on Energy Requirements

, *One of the USPTO patent examiner's grounds for rejection is based on the fact that the energy levels required by the craft are insanely high.*, *USPTO*

One of the most compelling items in the collection of appeal documents is the letter accompanying the final appeal written CTO Sheehy concerning the U.S. Patent Office's rejection of "Craft Using an Inertial Mass Reduction Device." In the letter dated 15 December 2017, Dr. Sheehy claims that Salvatore Pais has "already begun a series of experiments to design and demonstrate advanced High energy Density/High Power propulsion systems" that are described in the patent.

SUBMISSION UNDER 37 C.F.R. 41.37
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Pais	)	
Assignee: Dept of the Navy	)	
Serial No.: 15/141,270	)	Group Art Unit: 3644
Filed: 04/28/2016	)	Examiner: Philip Bonzell
For: A Craft Using an Inertial Mass Reduction Device	)	Att. Docket No.: PAX 205

Commissioner of Patents and Trademarks
Washington, D.C. 20231

APPEAL BRIEF

Claims 1-4 (all of the claims) have been finally rejected, and the rejections of claims 1-4 are appealed herein. Final Rejection sent March 30, 2018, Advisory Action Before Filing of the Appeal sent July 11, 2018 stating application not in condition for allowance.

USPTO Final Rejection

, *A notice of final rejection sent by the USPTO prior to receiving Dr. James Sheey's letter.*, *USPTO*

Furthermore, Sheehy claims that "the realization of this result demonstrates that this patent documents the future state of the possible and moves propulsion technology beyond gas dynamic systems to field-induced propulsion based hybrid aerospace-undersea craft."

Have a look at the letter yourself:

DEPARTMENT OF THE NAVY
NAVAL AIR SYSTEMS COMMAND
RADM WILLIAM A. MOFFETT BUILDING
47123 BUSE ROAD, BLDG 2272
PATUXENT RIVER, MARYLAND 20670-1547

IN REPLY REFER TO

5216
Ser 40T/33
15 Dec 2017

From: Naval Aviation Enterprise (NAE) Chief Technology Officer (CTO), AIR 4.0T
To: Mr. Philip J. Bonzell, Primary Patent Examiner, USTPO

Subj: U.S. Patent Application 15/141,270 (PAX 205)

1. Mr. Bonzell, Dr Pais has shared your review of his patent disclosure and I agree with your main point that this mode of acceleration / movement is beyond the state of the possible, at least at present. If you understand the theory and follow the equations you do arrive at the same conclusion or supposition as Dr. Pais. It is clear from your review that you did invest the time and did follow the theory. As you well know everything with time, if of significance, which this certainly is grows in power / magnitude. The theory which led to the first ruby laser in 1960 is a perfect example. With time lasers have evolved into a myriad of different wavelengths, power, and pulse durations. In 1960 1 CW watt at 695nm was a landmark, while now a kJ at up to pico / atosecond pulse is not uncommon and is ever increasing expanding the potential usages. At the time Hughes claimed the invention while actually the Army at Picatinny Arsenal had built the first ruby laser in 1958 but never sought a patent much to DoD's loss.

2. In U.S. Patent Application 15/141,270 (PAX 205) we are looking at very much the same phenomena. Dr. Pais is currently funded by NAWCAD to design a test article and instrumentation to demonstrate the experimental feasibility of achieving high electromagnetic (EM) field-energy and flux values (Watts/meter^2). He is currently one year into the project and has already begun a series of experiments to design and demonstrate advanced High energy Density / High Power propulsion systems.

3. Dr. Pais' approach of reaching this objective is to couple an electrically charged system's high frequency axial spin with high vibration frequencies operated in a rapidly accelerated transient mode to achieve extremely high electromagnetic field-intensities (EM energy flux), which as you understand is the equivalent of achieving extremely high E- and B-fields. If successful the realization of this result demonstrates that this patent documents the future state of the possible and moves propulsion technology beyond gas dynamic systems to field-induced propulsion based hybrid aerospace-undersea craft.

4. Dr. Pais is currently performing tests using a battery to charge a 10 cm test sample spinning at up to 100,000 RPM and is able maintain charge on these batteries for dwell times of more than 25 minutes (at max RPM) without loss of load. If the desired results are not achieved due to the sample's charge, then he will move to using a super-capacitor as the spinning test asset. With test asset surface charge density on the order of one Coulomb/meter^2, we expect to see high EM energy flux amplification as we accelerate the spin of the test asset up to 100,000 RPM, subjecting the test asset to several rapid acceleration transients.

5. Based on these initial findings I would assert this will become a reality. China is already investing significantly in this area and I would prefer we hold the patent as opposed to paying forever more to use this revolutionary technology. Please contact me if you would like to discuss further or have questions. I appreciate your time and thorough review.

Sheehy Letter to USPTO

, *Naval Aviation Enterprise Chief Technical Officer Dr. James Sheehy's letter to the USPTO examiner in charge of the 'hybrid craft' patent.*, *USPTO*

It's important to note that Sheehy doesn't go so far as to say on the record that the Navy currently possesses this technology and instead notified Patent Examiner Philip Bonzell that he agrees that "this mode of acceleration/movement is beyond the state of the possible, at least at present." Sheehy, of course, adds that "China is already investing significantly in this area" and "would prefer we [the U.S.] hold the patent as opposed to paying forever more to use this revolutionary technology" as he asserts "this will become a reality."

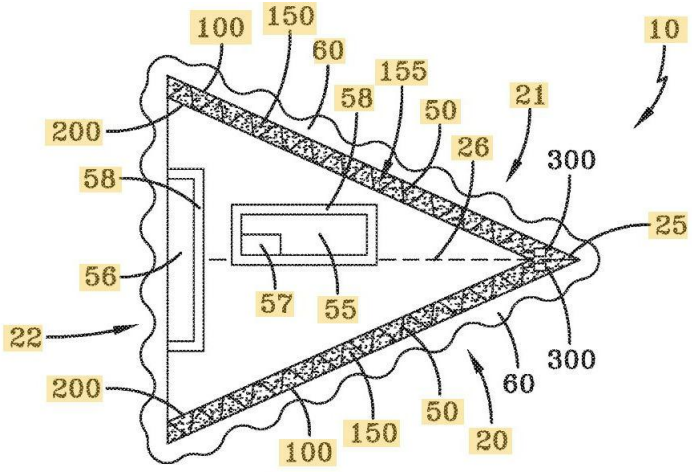
Remarkably, it seems to boil down to the ol' "*we must not allow an Inertial Mass Reduction Device gap!*" Perhaps because of that threat from the Chinese looming, the USPTO finally issued a notice of allowance for "Craft Using an Inertial Mass Reduction Device" to the Department of the Navy on October 31, 2018, at a fee of $1,000 USD. No reason was given for why the patent was eventually approved.

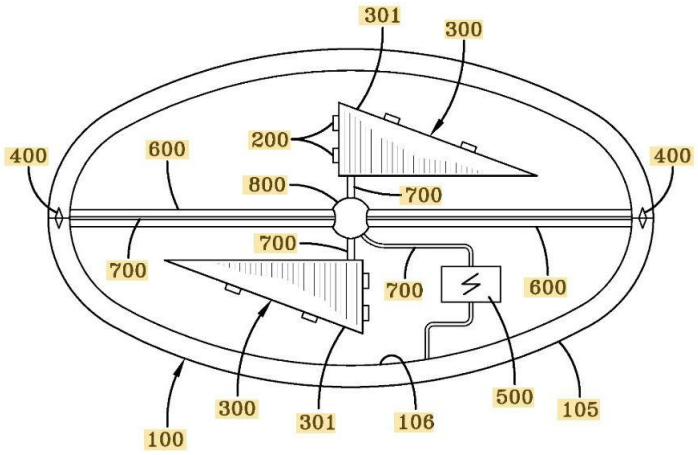
It's important to note, as well, that U.S. patent law ends at America's borders. The Navy can patent anything it wants to, but those patents would not necessarily keep a foreign country from developing and patenting similar technologies.

The Dawn Of Electromagnetic Propulsion?

Normally, I would agree with others that these patents are likely just the Navy ensuring that when or if this technology does become available, the U.S. will be able to control it. However, these are not normal times. Thanks to To the Stars Academy (TTSA), the Department of Defense, and the media at large, not only are we now being told that Navy pilots have witnessed aircraft behaving *exactly like* the craft these patents describe, but some of the pilots' visual descriptions of those anomalous aircraft even seem to be uncannily similar to the drawings of the aircraft as depicted in Pais' patents.

One of those patents depicts a curiously and distinctly shaped gravitational wave generator that resembles the Tic Tac-shaped object reported by retired U.S. Navy Commander David Fravor and other Nimitz Carrier Strike Group pilots in encounters that took place in 2004 off the Baja Coast.





V. Conclusion

The original concept presented in this paper, suggests that it is possible to design a hybrid craft which by delivering vast amounts of electromagnetic energy flux in its close proximity can alter the spacetime energy density in that locality. In this manner, the craft can move at extreme speeds, due to quantum electrodynamic Vacuum breakdown effects, which result in inertial mass reduction. In parallel, controlled motion of electrically charged matter under accelerated vibration and/or accelerated spin and subjected to rapid acceleration-deceleration-acceleration transients, can be used in conjunction with nested EM fields (EM fields within EM fields) and the enablement of the Gertsenshtein effect, in order to manipulate / modify gravitational fields for propulsion, or to provide novel methods of plasma confinement and compression for nuclear fusion research.

Moreover, it is important to note that the extremely high EM energy flux magnitudes achieved with the concept at hand can be used in the design of space systems which could deflect, re-direct and/or destroy asteroids, such as Apophis (99942), on possibly dangerous trajectories close to Earth in 2029 and 2036. Such a system is the subject of US Patent Application number US 2017/0025935 A1, titled "Electromagnetic Field Generator and Method to Generate an Electromagnetic Field".

Acknowledgments

Funding for this work was provided by the Naval Innovative Science & Engineering (NISE) –Basic & Applied Research (BAR) program, under the project name "The High Energy Electromagnetic Field Generator (HEEMFG)", project number 219BAR-17-009. I wish to thank Dr. James Sheehy, Chief Technology Officer, Naval Aviation Enterprise, for the many hours of thought-provoking discussions on the concept at hand.

Hybrid Craft and Tic Tac Gravitational Wave Generator

, *Images from two separate patents: "Craft Using an Inertial Mass Reduction Device," left; and "High Frequency Gravitational Wave Generator;" right.*, *USPTO.gov*

Furthermore, in regards to claims that these patents may simply be speculative "math theory," as the patent examiner called them in one of the rejections, it's important to remember that scientific and engineering research sometimes reach tipping points in which incremental progress made over decades suddenly culminates in large paradigm shifts that bring the theoretical into the realm of the possible. Massive bursts of associated funding also can really help, of course.

The patents appear to draw upon established theoretical research; included in the Navy's patent appeals and Pais' most recent publication are references to decades' worth of peer-reviewed research in room temperature superconductors and macroscopic quantum effects and even notated copies of several studies related to Pais' research. In the publication, Pais also thanks Naval Aviation Enterprise CTO Dr. James Sheehy "for the many hours of thought-provoking discussions on the concept at hand."

Pais Acknowledges Sheehy

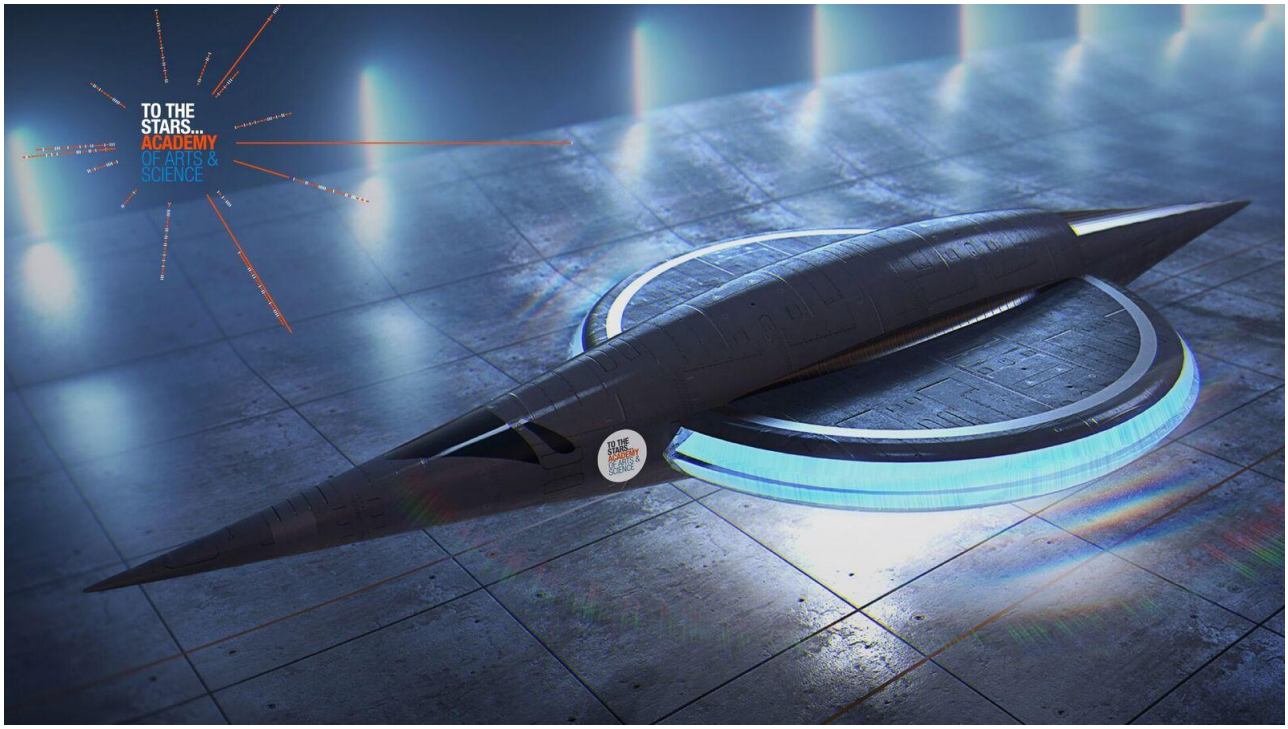
, *Pais frequently acknowledges Sheehy throughout his publications.*, *USPTO*

Interestingly enough, both Pais' research and some of his patents also contain acknowledgments to the work of Dr. Harold E. Puthoff, co-founder and Vice President of Science and Technology of To the Stars Academy. Puthoff is an electrical engineer and inventor who has published research on polarized vacuums, but has also been extensively involved with paranormal and somewhat pseudoscientific topics such as remote viewing.

According to their website, TTSA's goal is to advance "our current understanding of scientific phenomena and its technological implications." The stated mission of TTSA's Aerospace

division is to find “revolutionary breakthroughs in propulsion, energy, and communication” and the company claims it is “currently working with lead engineers from major Department of Defense and aerospace companies with the capability to pursue an advanced engineering approach to fundamental aerospace topics,” such as Space-Time Metrics Engineering (STME). This is a theoretical concept in which quantum vacuums are engineered as a means of propulsion. It remains unclear how TTSA intends to follow through with and secure funding for these ambitious goals.

In a press release marking the official launch of TTSA on Oct. 11, 2017, former Program Director for Advanced Systems at Lockheed Martin Advanced Development Programs at the Skunk Works, Steve Justice, described how TTSA was working on developing revolutionary “Advanced Electromagnetic Vehicles” that will “dramatically reduce the current travel limits of distance and time” and “mimic the capabilities observed in unidentified aerial phenomenon by employing a drive system that alters the space-time metric.” Without a doubt, these advanced electromagnetic vehicles that TTSA says it plans to develop sound uncannily like the electromagnetic hybrid aerospace underwater craft in Pais’s patent.



TTSA Craft Concept

, Image of a revolutionary craft concept shown during a TTSA livestream presented by former Skunk Works Program Director for Advanced Systems Steve Justice. , *To the Stars Academy of Arts and Sciences*

Few Answers, But Plenty Of Questions

We reached out to NAWCAD for any information or clarification regarding these patents and were referred to Kurt Larson, NAWCAD’s Public Affairs Director. Larson informed us by phone

and email that "when it comes to patent applications, [NAWCAD] cannot provide any context outside of the filed patent application documents." Similarly, USPTO policy states that applications for patents are not generally open to the public, and "no information concerning them is released except on written authority of the applicant, his or her assignee, or his or her attorney, or when necessary to the conduct of the business of the USPTO."

As striking as the similarity between the claimed capabilities of the hybrid craft and those of the objects described by Navy personnel, it's still unknown whether these patents are related to the ongoing UFO revelations. As *The War Zone* has noted in previous articles, there could be multiple simultaneous explanations for these varied incidents and a number of motivations for disclosing them to the public. Perhaps the few pieces of footage that have trickled out over the last several years that some claim to show advanced craft could be the Navy's way of subtly hinting that this concept actually works and is being tested in the field by either the U.S. or the Chinese. The fact that Sheehy would lean so heavily on the Chinese threat in the last bullet point of his appeal letter to the USPTO seems to suggest that the Navy may already be playing catch-up to a terrestrial foe.

It is also important to note that if the Navy had wanted this patent to remain classified, it could have filed the patent under the Invention Secrecy Act of 1951 (35 U.S.C. ch. 17), a law which allows patents to remain classified if they might pose a possible threat to the national security of the United States. Instead, all of Pais' patents are currently fully available to the public. If such a propulsion technology was so revolutionary and if the Navy indeed wanted to keep this technology out of others' hands, it's curious that they would choose to make the patent public. Maybe the Navy is signaling to its adversaries that it, too, is aware of this revolutionary capability and to whom it belongs.

PTO/AIA/14 (03-13)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	PAX 205
	Application Number	
Title of Invention	A Craft Using an Inertial Mass Reduction Device	

Publication Information:

☐	Request Early Publication (Fee required at time of Request 37 CFR 1.219)
☐	**Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Unchecked Request Not to Publish

, *Navy attorneys chose not to check "Request Not to Publish," which would have filed the patent under the Invention Secrecy Act.*, *USPTO*

Also, consider the fact that Senators, including the vice chairman of the Senate Intelligence Community, have been briefed in recent weeks by Navy officials about the unexplained sightings Navy pilots have reported. Even President Donald Trump recently stated in an interview that the Navy UFO reports could be due the fact that pilots "see things a little bit different from the past," a comment which could be taken to mean that pilots are witnessing new types of aerospace technology for the first time. Trump seemed to indicate that he does not believe the objects reported by Navy pilots are evidence of anything extraterrestrial and took his interviewer's UFO question in stride without any apparent surprise, an indication of just how far into the mainstream the UFO discussion has become.

Consider as well the comments made by former Senate Majority Leader Harry Reid of Nevada, reportedly a key figure in securing funding for programs like the now-infamous Advanced Aerospace Threat Identification Program and its associated studies. Earlier this year, Reid stated that the U.S., Russia, and China are currently in a "UFO race." We know the Chinese have already publicly made major strides in electromagnetic naval capabilities including railguns and aircraft catapults, as well as other highly advanced defense technologies. Could Reid have meant that these three military powers are currently scrambling to be the first to master the technology behind a hybrid aerospace-undersea craft and deploy it on a substantial scale? If so, where does the Navy, and the Pentagon as a whole, currently stand in that clandestine race?

Furthermore, Pais notes in the paper that such a technology "would permit swift movement of the HAUC beyond our Solar System." Is this an undisclosed reason why we suddenly need a Space Force? Is this what Air Force Lieutenant General Vera Linn Jamieson was referring to last year when she casually dropped during an unrelated interview that in "different galaxies in the future we're going to actually have capability that we have right now in the air"? And this is hardly the only highly peculiar thing that Air Force leadership has spouted off about in regards to the future of America's military footprint in space.

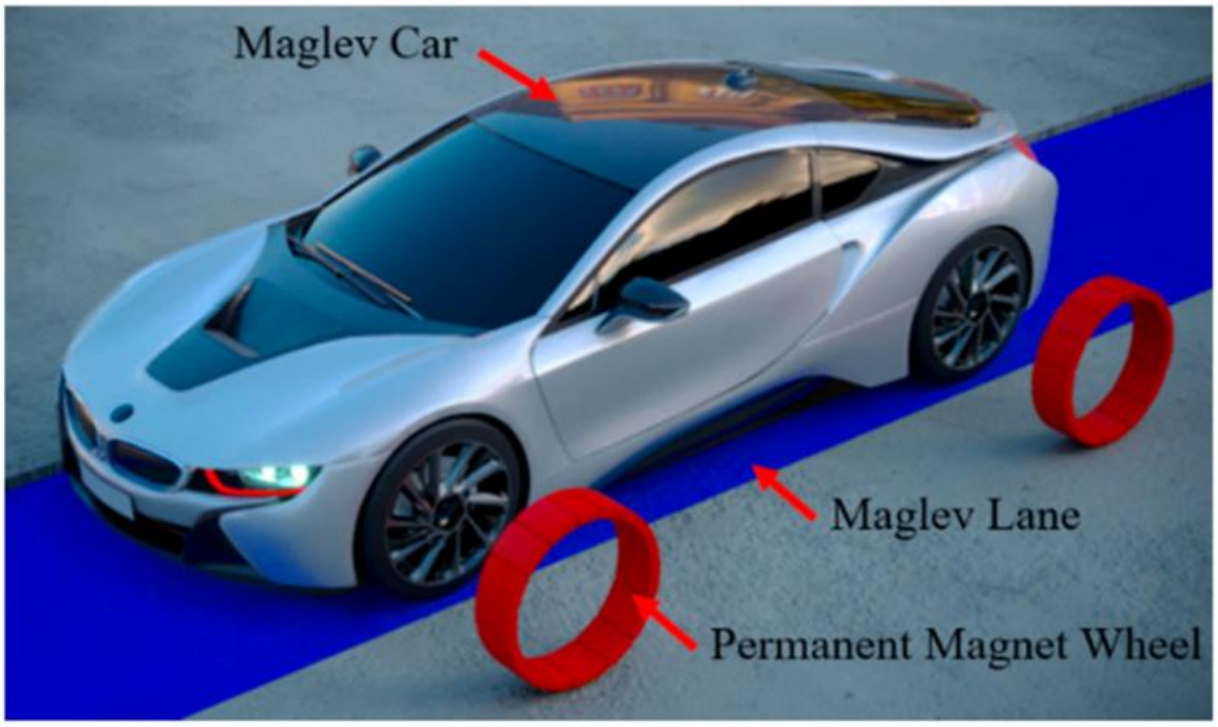
It's also possible that this patent is just another facet of an information operation that goes along with a larger UFO narrative to promote the Pentagon's undisclosed interests. But the inclusion of China, a very terrestrial potential foe and America's chief technological adversary, as a direct competitor when it comes to the technology seems odd and even counterproductive if that were the case.

On the other hand, some may say that this could be proof of two superpowers struggling to mimic the capabilities of something they are observing, but do not fully understand on a technological level. Considering all the unknowns, all possibilities are worth examining. But taking the information surrounding this patent *at face value*, it seems to point further to the possibility that the technology could indeed be manmade.

Note: There is no way to link directly to these supplementary patent application documents. To view them for yourself, visit https://portal.uspto.gov/pair/PublicPair and search for application number 15/141,270. Once there, click on the "Image File Wrapper" tab.

Japan, renowned for its technological innovations, is on the brink of revolutionizing the automotive industry with the development of magnetic levitation (maglev) cars. This groundbreaking technology, pioneered by researchers at the Okinawa Institute of Science and Technology (OIST), has the potential to eliminate traditional engines and batteries, offering a futuristic glimpse into the future of transportation.

The Science Behind Magnetic Levitation



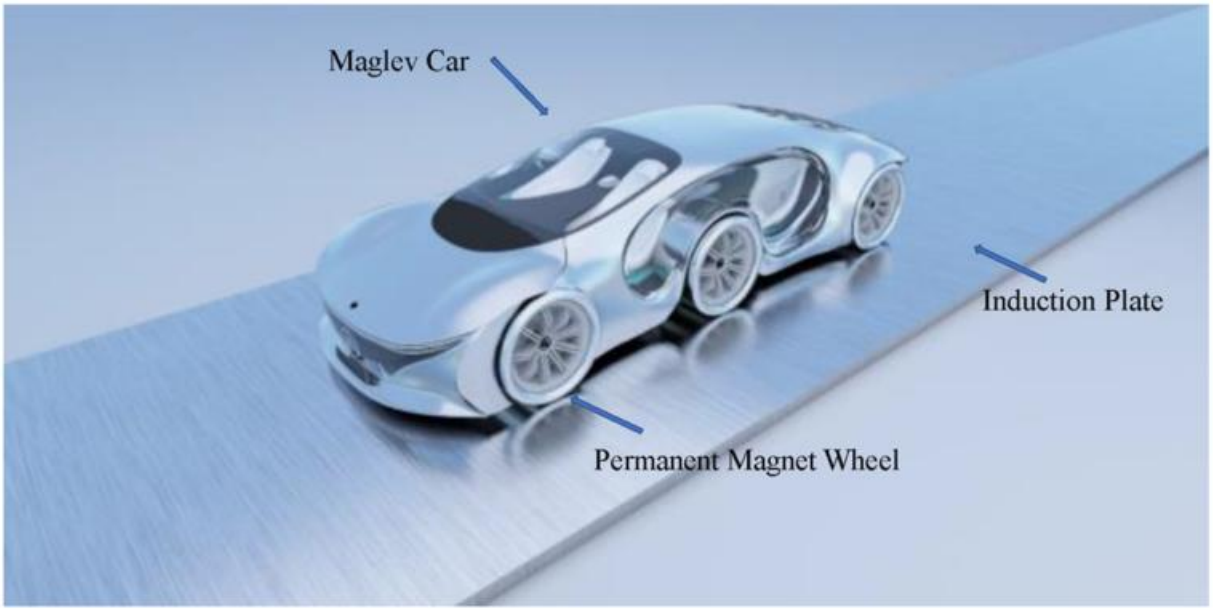
Credit: OIST

Magnetic levitation, or maglev, is a method by which an object is suspended in the air using magnetic fields, eliminating the need for physical contact with a surface. This technology drastically reduces friction, allowing for smoother and more efficient movement. While maglev has been used in trains for years, OIST researchers have taken the concept further by applying it to personal vehicles, potentially transforming the way we think about cars.[1]

The maglev cars developed by OIST differ significantly from existing maglev trains. Traditional maglev trains require continuous electrical power to maintain their magnetic fields, but the new system developed by OIST requires power only at start-up. Once the initial magnetic field is established, cars made of diamagnetic materials float above the track, moving without the need for additional energy input.

Read More: [Europe Plots High Speed Rail So Fast It Could Replace Airlines]

How Magnetic Levitation Cars Work



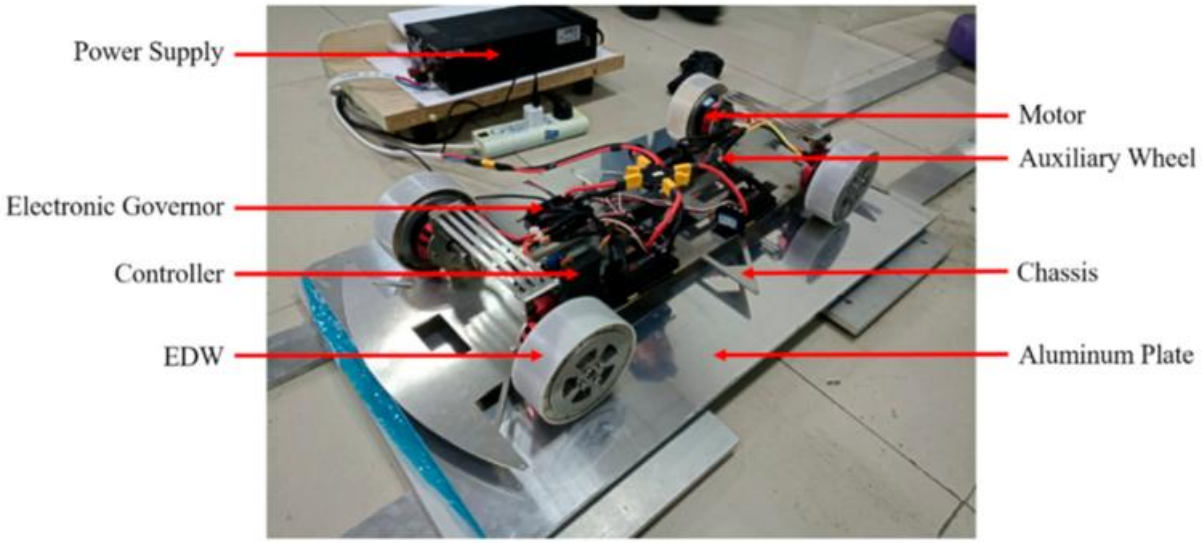
Credit: OIST

The OIST team has created a unique track system that uses magnets arranged in a continuous grid beneath the surface. These magnets interact with the specially designed cars, which are made from a mixture of pulverized graphite and wax, allowing them to levitate a few centimeters above the track. This setup eliminates the need for engines and batteries, making the vehicles lighter, more energy-efficient, and potentially more environmentally friendly.

One of the most significant advantages of this technology is the near-complete elimination of friction, a major cause of energy loss in traditional vehicles. By

removing the need for engines and reducing the reliance on batteries, magnetic levitation cars could usher in a new era of sustainable transportation.[2]

Advantages Over Traditional Technologies



Credit: OIST

The development of maglev cars could surpass other advanced automotive technologies currently being pursued by leading automakers. For example, Lamborghini's dual-fuel engine, Toyota's zero-emission combustion engine, and Germany's low-emission engines are all impressive advancements. However, they still rely on some form of traditional propulsion, whether it be fuel or electricity. In contrast, magnetic levitation technology offers a complete departure from these systems, potentially eliminating emissions and significantly reducing the environmental impact of transportation.

Additionally, the lack of mechanical parts like engines and transmissions in maglev cars could lead to lower maintenance costs and longer vehicle lifespans. This reduction in complexity is another potential advantage, making these vehicles not only environmentally friendly but also economically viable in the long run.[3]

Challenges and the Road Ahead

Despite the exciting potential of magnetic levitation cars, several challenges remain before they can become a reality for everyday drivers. One of the primary issues is scaling the technology to a practical size suitable for mass production. The experimental prototype developed by OIST is relatively small, and adapting the technology for full-sized vehicles will require significant advancements.

Another challenge is vortex damping, a phenomenon where oscillating systems lose energy over time due to external forces. In maglev cars, this could lead to a loss of the levitation effect, making it difficult to maintain continuous, efficient movement. Researchers are actively working to address these issues, but they represent significant hurdles that must be overcome.

Additionally, the infrastructure required to support maglev cars is another consideration. Existing roads and highways are not designed to accommodate the magnetic fields necessary for levitation. Developing new infrastructure or retrofitting existing ones will be a costly and time-consuming process, but it is essential for the widespread adoption of this technology.

Conclusion: A Glimpse Into the Future

Credit: Pixabay

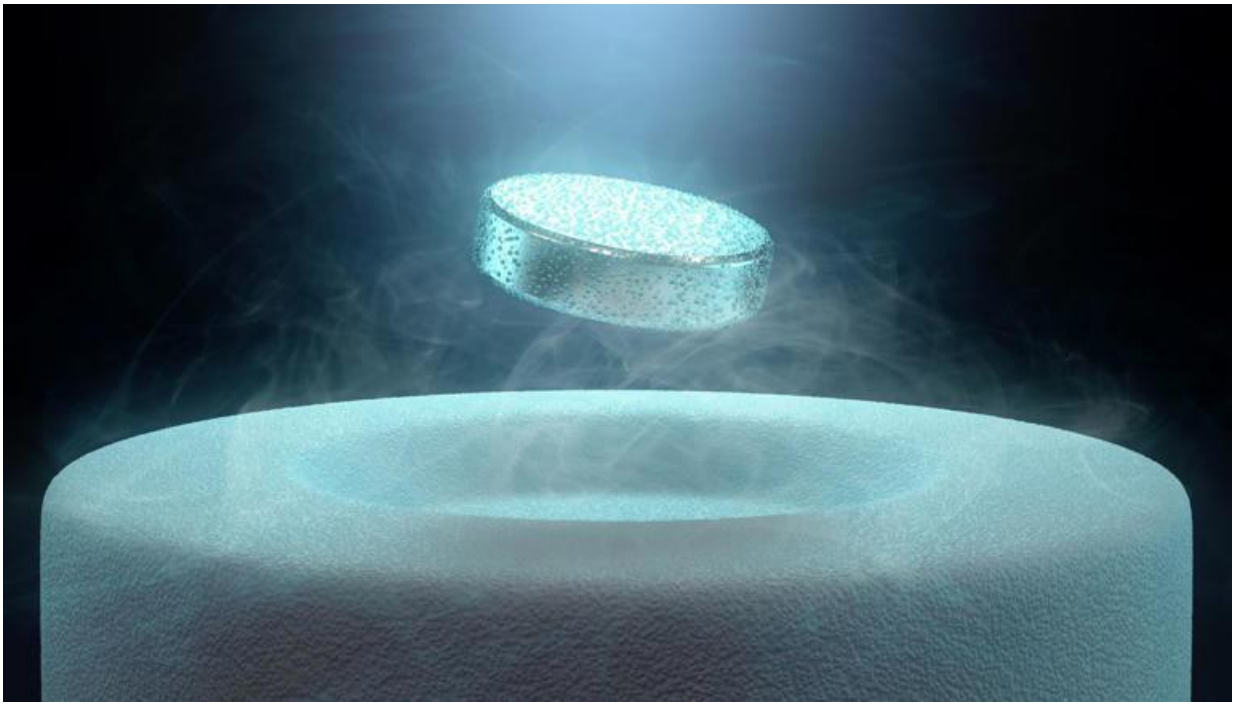
Japan’s magnetic levitation technology represents a bold step forward in the evolution of transportation. By eliminating the need for engines, batteries, and reducing friction, maglev cars could drastically change the way we travel, making transportation more sustainable and efficient. While significant challenges remain, the potential benefits of this technology far outweigh the obstacles, making it a promising prospect for the future of the automotive industry.

As research and development continue, we may soon see maglev cars transitioning from experimental prototypes to practical, everyday vehicles, ushering in a new era of transportation that could revolutionize the automotive industry as we know it.

1. “*Japan's Magnetic Levitation Cars Could Transform the Automotive Industry*.” My Electric Sparks. Fatima Khan. August 2, 2024.

“*Japan's Magnetic Levitation Cars Could Transform the Automotive*

1. *Industry*.” The Financial Daily
2. “*The Science Behind Levitation Technology*.” Woo Carz. August 5, 2024.



An artist's concept image of a levitating superconductor.© ktsimage via Getty Images

Scientists have found a key process required for superconductivity occurring at higher temperatures than previously thought. It could be a small but significant step in the search for one of the "holy grails" of physics, a superconductor that operates at room temperature.

The discovery, made inside the unlikely material of an electrical insulator, reveals electrons pairing up at temperatures of up to minus 190 degrees Fahrenheit (minus 123 degrees Celsius) — one of the secret ingredients to the near-lossless flow of electricity in extremely cold superconducting materials.

So far, the physicists are baffled by why this is happening. But understanding it could help them find room-temperature superconductors. The researchers published their findings Aug. 15 in the journal Science.

"The electron pairs are telling us that they are ready to be superconducting, but something is stopping them," co-author Ke-Jun Xu, a graduate student in applied physics at Stanford University, said in a statement. "If we can find a new method

to synchronize the pairs, we could apply that to possibly building higher temperature superconductors."

Superconductivity emerges from the ripples left in the wakes of electrons as they move through a material. At low enough temperatures, these ripples draw atomic nuclei to each other, in turn causing a slight offset in charge that attracts a second electron to the first.

Normally, two negative charges should repel each other. But instead, something strange happens: the electrons become bound together into a "Cooper pair."

Related: Room-temperature superconductors: The facts behind the 'holy grail' of physics

Cooper pairs follow different quantum mechanical rules than those of lone electrons. Instead of stacking outward in energy shells, they act like particles of light, an infinite number of which can occupy the same point in space at the same time. If enough of these Cooper pairs are created throughout a material, they become a superfluid, flowing without any loss of energy due to electrical resistance.

The first superconductors, discovered by Dutch physicist Heike Kamerlingh Onnes in 1911, transitioned into this zero electrical resistivity state at unimaginably cold temperatures — near absolute zero (minus 459.67 F, or minus 273.15 C). Yet, in 1986, physicists found a copper-based material, called a cuprate, which becomes a superconductor at a much warmer (but still very cold) minus 211 F (minus 135 C).

Physicists hoped this discovery would lead them to room-temperature superconductors. Yet insights into what causes cuprates to display their unusual behavior slowed and, last year, viral claims of viable room-temperature superconductors ended in allegations of data falsification and disappointment.

To investigate further, the scientists behind the new research turned to a cuprate known as neodymium cerium copper oxide.This material's maximum superconducting temperature is relatively low at minus 414.67 F (minus 248 C), so scientists haven't bothered to study it much. But when the study researchers shone ultraviolet light onto its surface they observed something strange.

Usually, when packets of light, or photons, strike a cuprate which carries unpaired electrons, the photons give the electrons enough energy to be ejected from the material, causing it to lose a lot of energy. But electrons in Cooper pairs can resist their photonic eviction, causing the material to lose only a little bit of energy.

Despite its zero resistance state occurring only at very low temperatures, the researchers found that the energy gap persisted in the new material up to 150 K, and that the pairing was, bizarrely, the strongest in the most samples best at resisting the flow of electrical current.

This means that, even though the cuprate is unlikely to reach room temperature superconductivity, it could contain some hints in finding a material that can.

"Our findings open a potentially rich new path forward. We plan to study this pairing gap in the future to help engineer superconductors using new methods," senior author Zhi-Xun Shen, a professor of physics at Stanford, said in the statement. "On the one hand, we plan to use similar experimental approaches to gain further insight into this incoherent pairing state. On the other hand, we want to find ways to manipulate these materials to perhaps coerce these incoherent pairs into synchronization."

United States gravity control propulsion research

American interest in gravity control propulsion research intensified during the early 1950s. Literature from that period used the terms anti-gravity, anti-gravitation, baricentric, counterbary, electrogravitics (eGrav), G-projects, gravitics, gravity control, and gravity propulsion.[1][2] Their publicized goals were to discover and develop technologies and theories for the manipulation of gravity or gravity-like fields for propulsion.[3] Although general relativity theory appeared to prohibit anti-gravity propulsion, several programs were funded to develop it through gravitation research from 1955 to 1974. The names of many contributors to general relativity and those of the golden age of general relativity have appeared among documents about the institutions that had served as the theoretical research components of those programs.[4][5][6] Since its emergence in the 1950s, the existence of the related gravity control propulsion research has not been a subject of controversy for aerospace writers, critics, and conspiracy theory advocates alike, but their rationale, effectiveness, and longevity have been the objects of contested views.

Evidence of existence

Mainstream newspapers, popular magazines, technical journals, and declassified papers reported the existence of the gravity control propulsion research. For example, the title of the March 1956 *Aero Digest* article about the intensified interest was "Anti-gravity Booming." A. V. Cleaver made the following statement about the programs in his article:

What are the facts, insofar as they are publicly known, or (as at this date) knowable? Well, they seem to amount to this: The Americans have decided to look into the old science-fictional dream of gravity control, or "anti-gravity," to investigate, both theoretically and (if possible) practically the fundamental nature of gravitational fields and their relationship to electromagnetic and other phenomena – and someone (unknown to the present writer) has apparently decided to call all this study by the high-sounding name of "electro-gravitics." Unknown, too – at least unannounced – is the name of agency or individual who decided to encourage, stimulate, or sponsor this effort, also in just what way it is being done. However, that the effort is in progress there can be little doubt, and, of course, it is entirely to be welcomed.

The gravitics programs had not been evinced by any technological artifacts, such as the Project Pluto Tory IIA, the world's first nuclear ramjet. Commemorative monuments by the Gravity Research Foundation have been the artifacts attesting to the early commitments to finding materials and methods to manipulate gravity. The endeavor had the resources and publicity of an initiative, but writers from that period did not describe them with that term. Gladych stated:

At least 14 United States universities and other research centers are hard at work cracking the gravity barrier. And backing the basic research with multi-million dollar secret projects is our aircraft industry.

The writings about the gravity control propulsion research effort had disclosed the "players" and resources while prudently withholding both the specific features of the research and the identity of its coordinating body. Publicized and telecasted conspiracy theory anecdotes have suggested much higher levels of success to the G-projects than mainstream science.

Histories

Recent historical analysis and reports have attracted attention to the agencies and firms that had participated in the gravity control propulsion research. James E. Allen, BAE Systems consultant and engineering professor at Kingston University, referred to those programs in his history of novel propulsion systems for the journal *Progress in Aerospace Sciences*. Research by Dr. David Kaiser, Associate Professor of the History of Science, Massachusetts Institute of Technology, manifested the contributions made by the Gravity Research Foundation to the pedagogical aspects of the golden age of general relativity. Dr. Joshua Goldberg, Syracuse University, described the Air Force's support of relativity research during that period. Progress reports and anecdotes and Internet resumes of former visiting and staff scientists have been the sources of the

history of the Research Institute for Advanced Study (RIAS). Former aviation editor of *Jane's Defence Weekly*, Nick Cook, drew attention to the antigravity programs through worldwide publications of his book, *The Hunt for Zero Point*, and subsequent televised documentaries. Mainstream historical accounts of the G-projects have been supplemented with conspiracy theory anecdotes.

Coetaneous literature

Lists of the research institutes, industrial sites, and policy makers along with statements from prominent physicists were provided in five comprehensive works that had been published during the early years of the gravity control propulsion research. Aviation Studies (International) Limited, London, published a detailed report about those activities by the Gravity Research Group that was later declassified. The *Journal of the British Interplanetary Society* and *The Aeroplane* published the propulsion survey and critical assessment of the American gravitics research by the internationally recognized astronautics historian A. V. Cleaver. The *New York Herald Tribune* and *Miami Herald* published a series of three articles by one of the world's greatest aviation journalists of the twentieth century, Ansel Talbert.[11] Talbert's two series of newspaper articles took place in the midst of the policy-by-press-release era. Neither his, nor the writings that followed the five prominent works from that period, yielded denials and/or retractions.

UFO and conspiracy theory literature

Gravity control propulsion research had been the subject of widely published UFO literature. The documented testimonies of whistleblowers edited by Dr. Steven Greer, Director of the Disclosure Project; anecdotes and schematics by Mark McCandlish and Milton William Cooper; and the reports by Philip J. Corso, David Darlington, and Donald Keyhoe, famous UFO researcher, have suggested incorporation of reverse engineering of recovered extraterrestrial vehicles with the anti-gravity propulsion projects had enabled them to continue beyond 1973 to successfully manufacture antigravity vehicles. Branches of the military and defense agencies have denied and refuted such claims

On January 1st 2025, Matthew Livelsberger, blew up a Tesla Cybertruck outside the Trump International Hotel, Las Vegas. In a letter written before the incident, Matthew writes that the military use of gravity propulsion systems by both China and the US poses a mounting threat to international peace.

Theoretical research agencies

Talbert indicated the rationale for the intensified interest in gravity control propulsion research had stemmed from the works of three physicists. They were Bryce DeWitt's prize-winning Gravity Research Foundation essay;[17] the book *Gravity and the Universe* by Pascual Jordan; and presentations to the International Astronautical Federation by Dr. Burkhard Heim. DeWitt's essay discouraged the pursuit of materials that shield, reflect, and/or insulate gravity and emphasized the need to encourage

young physicists to pursue gravitational research. He opened his essay with the following paragraph:

Before anyone can have the audacity to formulate even the most rudimentary plan of attack on the problem of harnessing the force of gravitation, he must understand the nature of his adversary. I take it as most axiomatic that the phenomenon of gravitation is poorly understood even by the best of minds, and the last word on it is very far indeed from having been spoken.

Several articles cited his essay during and after the gravity control propulsion research period. Within a few years facilities emerged embodying the theme of DeWitt's call for increased stimuli for research.

Physical principle surveys by Cleaver and Weyl stated that the antigravity research was not based on any recognized theoretical breakthroughs. Cleaver's skepticism suggested an alternative rationale for establishing that research was based on a science fiction novel. Weyl charged publishers with poor journalism; attacked their terminology; and gave the highest rating for prospective physical principles for gravity control propulsion to Burkhard Heim's works. Stambler leveled harsh criticisms against Gluraheff's gravitation hypothesis. Talbert and other authors listed the following three agencies as the principal facilities that had conducted the theoretical research:

Gravity Research Foundation

Several articles contained expressions of gratitude for the support of the gravity control propulsion endeavor by the Gravity Research Foundation.Even though the Foundation was a humble, non-profit organization, its creator, Roger Babson, used his wealth and influence to mobilize industries; raise private and government funding; and motivate engineers and physicists to conduct research in gravity shielding and control. According to his autobiography: "The purpose of the Foundation is to encourage others to work on gravity problems and aid others in obtaining rewards for their efforts."

During Babson's lifetime, the Foundation conducted Gravity Day Conferences each summer; established a library on gravity; solicited essays that addressed (1.) various prospects for shielding gravity, (2.) the development and/or discovery of materials that could convert gravitational force into heat, or (3.) methods of manipulating gravity; and installed monuments at various universities that cited its antigravity focus.

Aerospace Research Laboratories

In September 1956, the General Physics Laboratory of the Aeronautical Research Laboratories (ARL) at Wright-Patterson Air Force Base, Dayton, Ohio, commenced an intense program to coordinate research into gravitational and unified field theories with the hiring of Joshua N. Goldberg. Creation by ARL of Goldberg's program may have been coincidental to Talbert's disclosures of commitments to gravity control propulsion research. The precise rationale for creating the program and justifying its budgets and personnel may never be determined. Neither Goldberg nor the Air Force's Deputy for Scientific and Technical Information, Walter Blados, were able to locate the founding documents. Roy Kerr, a former ARL scientist, stated the antigravity propulsion purpose

of ARL was "rubbish" and that "The only real use that the USAF made of us was when some crackpot sent them a proposal for antigravity or for converting rotary motion inside a spaceship to a translational driving system." The December 30, 1957 issue of Product Engineering closed its report with the following statement:

Nevertheless, the Air Force is encouraging research in electrogravitics, and many companies and individuals are working on the problem. It could be that one of them will confound the experts.

During the following sixteen years, its name was changed to the Aerospace Research Laboratories. The ARL scientists produced nineteen technical reports and over seventy peer-reviewed journal articles. The Air Force's Foreign Technical Division, and other agencies, investigated stories about Soviet attempts to understand gravity. Such actions were consistent with the paranoia of the Cold War.

The funding for the military components of the gravity control propulsion research had been terminated by the Mansfield Amendment of 1973. Black project experts, conspiracy theorists, and whistleblowers had suggested the gravity control propulsion efforts had achieved their goals and had been continued decades beyond 1973.

Research Institute for Advanced Study (RIAS)

Further information: Research Institute for Advanced Studies

The Research Institute for Advanced Study (RIAS) was conceived by George S. Trimble, the vice president for aviation and advanced propulsion systems, Glenn L. Martin Company, and was placed under the direct supervision of Welcome Bender. The first person Bender hired was Louis Witten, an authority on gravitation physics. Talbert's article announced Trimble's completion of contractual agreements with Pascual Jordan and Burkhard Heim for RIAS. Subsequent hires yielded a half dozen gravity researchers known as the field theory group. Arthur C. Clarke and others stated that RIAS' assembly of talent was qualified for the task of discovering new principles that could be used to develop gravity control propulsion systems.

The quest for propulsion through gravity control was vaguely implied in various publications. Works by Cook and Cleaver summarized statements in the RIAS brochures. Cook had equated the broad range of RIAS's mission statements with those of Skunk Works. In 1958, Mallan reported that "the control of the force of gravity itself for propulsion" was one of the unorthodox goals initiated by Trimble for RIAS.

RIAS was renamed the Research Institute for Advanced Studies during the sixties when the American-Marietta Company merged with Martin to become the Martin Marietta Company. The 1995 merger that yielded the Lockheed Martin Company modified its goals, but not its name.

Aerospace firms

Talbert's newspaper series and subsequent articles in technical magazines and journals listed the names of aerospace firms conducting gravity control propulsion research.

The Gravity Research Group indicated those companies had constructed "rigs" to improve the performance of Thomas Townsend Brown's gravitators through attempts to develop materials with high dielectric constants (k). Gravity Rand Limited provided a set of guidelines to help management conduct research and nurture creativity. Articles about the gravity propulsion research by the aerospace firms ceased after 1974. None of the companies featured in those publications had filed retractions. The following aerospace firms have been cited in the works published from 1955 through 1974:

- Bell Aircraft, Buffalo, New York.
- Boeing Aircraft.
- Clarke Electronics, Palm Springs, California.
- Convair, San Diego.
- Douglas Aircraft.
- Electronics Division, Ryan Aeronautical Company, San Diego.
- General Electric.
- Glenn L. Martin Company, Baltimore, Maryland.
- Gluhareff Helicopter & Airplane Corporation, Manhattan Beach, California.
- Grumman Aircraft.
- Hiller Aircraft.
- Hughes Aircraft.
- Lear Incorporated, Santa Monica, California.
- Lockheed Aircraft Corporation.
- Radio Corporation.
- Sikorsky Division of United Aircraft.
- Sperry Gyroscope Division of Sperry Rand Corporation, Great Neck, Long Island.

Reported breakthroughs

None of the reported experimental breakthroughs published during the 1950s and 1960s have been recognized by the aerospace community.

Experimental

[edit]

Brown's gravitator

Various reports indicated Brown's gravitators were the main experimental focus of the gravity control propulsion research. According to G. Harry Stine and Intel, research on Brown's gravitators became classified immediately after demonstrations of 30% weight reductions Thomas Townsend Brown had obtained a British patent for high voltage, symmetric, parallel plate capacitors, that he called gravitators, in 1928. Brown claimed they would produce a net thrust in the direction of the anode of the capacitor that varied

slightly with the positions of the Moon. The scientific community rejected such claims as products of pseudoscience and/or misinterpretations of ion wind effects.

Independent research found small amounts of lift from Brown's gravitator based on an inefficient use of ionic propulsion. The devices were named Ion Lifters or Ionocraft and were reported to be able to lift the empty shell of a vehicle under ideal conditions, but not the additional machinery required to generate the electric field. Gravity effects were not found in the independent research.

Kaplan's gravity-like impulses

In July 1960, *Missiles and Rockets* reported Martin N. Kaplan, Senior Research Engineer, Electronics Division, Ryan Aeronautical Company, San Diego, had conducted anti-gravitational experiments yielding the promise of impulses, accelerations, and decelerations one hundred times the pull of gravity. Neither comments nor criticism of the report appeared in subsequent articles during the period of intensified gravity control propulsion research (see Section 1 of tractor beam for similar reports).

Theoretical

[edit]

Forward's rotational field

In 1963, Robert L. Forward described hypothetical experiments that could use degenerate matter to explore gravitational effects and the potential for antigravity. The experiments involved cooling neutrons to temperatures sufficiently low to allow them to condense into neutron matter, and then subjecting them to rotating magnetic fields to accelerate them. Neutron matter is required as ordinary matter would not be dense enough to explore these properties, with Forward describing ideal densities from 10^8 to 10^{15} g/cm^3.

Legacies

Many of the contributors to general relativity have been supported by and/or associated with the ARL, RIAS, and/or the Gravity Research Foundation. The decades preceding the 1955 revelation of the gravity control propulsion research were a low water mark for general relativity. The following summarizes how the components of that research had stimulated the resurgence of general relativity:

Gravity Research Foundation

Even though some of the physicists who attended the Gravity Day Conferences quietly mocked the anti-gravity mission of the Foundation, it provided significant contributions to mainstream physics. The *International Journal of Modern Physics D* has featured selected papers from the Gravity Research Foundation essay competition. Many have been incorporated with the collections of the Niels Bohr Library. A few of the Foundation essay contest winners became Nobel laureates (e.g., Ilya Prigogine, Maurice Allais, George F. Smoot). Foundation essays have been among the resources graduate

students check for new ideas. Kaiser summarized the Foundation's influence in the following manner:

Despite the vast conceptual gulf separating Babson from the new generation of relativists, we are left with intriguing, and perhaps ironic associations: by organizing conferences, sponsoring the annual essay contests, and making money and enthusiasm widely available for people interested in gravity, the eccentric Gravity Research Foundation may claim at least some small amount of the credit for helping to stimulate the postwar resurgence of interest in gravitation and general relativity.

Foundation trustee, Agnew Bahnson, contacted Dr. Bryce DeWitt with a proposal to fund the creation of a gravity research institute DeWitt had won the first prize for the 1953 essay contest. The proposed name was changed to the Institute for Field Physics and it was established in 1956 at the University of North Carolina at Chapel Hill under the direction of Bryce and his wife, Cécile DeWitt-Morette.

The peer reviewed physics journal, *Physica C*, published a report by Eugene Podkletnov and Nieminen about gravity-like shielding. Although their work had gained international attention, researchers were not able to replicate Podkletnov's initial conditions. However, analyses by Giovanni Modanese and Ning Wu indicated various applications of quantum gravity theory could allow gravitational shielding phenomena. Those achievements have not been pursued by the scientific community.

Aerospace Research Laboratories (ARL)

The list of prominent contributors to the golden age of general relativity, contains the names of several scientists who had authored the nineteen ARL Technical Reports and/or seventy papers. The ARL sponsored papers were published in the *Proceedings of the Royal Society of London, Physical Review, Journal of Mathematical Physics, Physical Review Letters, Physical Review D, Review of Modern Physics, General Relativity and Gravitation, International Journal of Theoretical Physics*, and *Nuovo Cimento B*. Some of the ARL papers were written in collaboration with RIAS, the U.S. Army Signal Research and Development Laboratory at Fort Monmouth, New Jersey, and the Office of Naval Research. The ARL had provided significant enhancements to general relativity theory. For example, Roy Kerr's description of the behavior of space-time in the vicinity of a rotating mass was among those works. Goldberg concluded: "However, it should be recognized that, in the United States, the Department of Defense played an essential role in building a strong scientific community without widespread encroachment on academic values."

Research Institute for Advanced Studies (RIAS)

The growth of nonlinear differential equations during the fifties was stimulated by RIAS. One of the leading groups in dynamical systems and control theory, the Lefschetz Center for Dynamical Systems, was a spinoff from RIAS. After the launch of Sputnik, world-class mathematician Solomon Lefschetz came out of retirement to join RIAS in 1958 and formed the world's largest group of mathematicians devoted to research in nonlinear differential equations. The RIAS mathematics group stimulated the growth of

nonlinear differential equations through conferences and publications. It left RIAS in 1964 to form the Lefschetz Center for Dynamical Systems at Brown University, Providence, Rhode Island.

UFO and conspiracy theories

On May 9, 2001, Mark McCandlish testified on the televised news conference held by the Disclosure Project, at the National Press Club, Washington, D.C. He stated gravity control propulsion research had started in the 1950s and had successfully reverse engineered the vehicle retrieved from the Roswell crash site to build three Alien Reproduction Vehicles (ARVs) by 1981. McCandlish described their propulsion systems in terms of Thomas Townsend Brown's gravitators and provided a line drawing of its interior. The diagram closely resembled the drawing provided earlier in Milton William Cooper's book. Another Disclosure Project whistleblower, Philip J. Corso, stated in his book the craft retrieved from the second crash site at Roswell, New Mexico, had a propulsion system resembling Thomas Townsend Brown's gravitators. And, Corso's book featured several gravity control propulsion statements made by Hermann Oberth.

Soon after the end of the Cold War, a small group of scientists and engineers openly expressed their desire to use technologies developed by black projects for civil applications. Steven Greer formed the Disclosure Project in 1995 to help those and other research whistleblowers share their information with and to petition Congress. By 2001, it had provided reports to two Congressional hearings and had acquired over 400 members from branches of the military and aerospace industry.

During the early 1960s, Keyhoe published excerpts from a letter by Hermann Oberth that presented explanations for the flight characteristics of UFOs in terms of gravity control propulsion. Prior to Oberth's letter, Keyhoe had supported arguments for magnetic forces as the source of propulsion for UFOs. The letter caused him to search for the existence of gravity control propulsion research programs. The following is a segment of his findings he had released in his 1966 and 1974 publications:

When AF [air force] researchers fully realized the astounding possibilities, headquarters persuaded scientists, aerospace companies and technical laboratories to set up anti-gravity projects, many of them under secret contracts. Every year, the number of projects increased. In 1965, forty-six unclassified G-projects were confirmed to me by the Scientific Information Exchange of the Smithsonian Institution. Of the forty-six, thirty-three were AF-controlled.

During his press conferences on February 2, 1955, in Bogotá and February 10, 1955, in Grand Rapids, Michigan, aviation pioneer William Lear stated one of his reasons for believing in flying saucers was the existence of American research efforts into antigravity. Talbert's series of newspaper articles about the intensified interest in gravity control propulsion research was published during the Thanksgiving week of that year.

The Rise and Fall of Anti-Gravity Research - A Short Thesis

Antigravity was a major area of study during the 1950's-1970's in America. As many in this sub are aware, the year of the Roswell incident (1947) saw the creation of the DoD, the CIA, the USAF, and so on. Fast forward 10 years.

From Wikipedia -

"In September 1956, the General Physics Laboratory of the Aeronautical Research Laboratories (ARL) at Wright-Patterson Air Force Base, Dayton, Ohio, commenced an intense program to coordinate research into gravitational and unified field theories with the hiring of Joshua N. Goldberg.Creation by ARL of Goldberg's program may have been coincidental to Talbert's disclosures of commitments to gravity control propulsion research. The precise rationale for creating the program and justifying its budgets and personnel may never be determined. Neither Goldberg nor the Air Force's Deputy for Scientific and Technical Information, Walter Blados, were able to locate the founding documents. Roy Kerr, a former ARL scientist, stated the antigravity propulsion purpose of ARL was "rubbish" and that "The only real use that the USAF made of us was when some crackpot sent them a proposal for antigravity or for converting rotary motion inside a spaceship to a translational driving system." The December 30, 1957 issue of Product Engineering closed its report with the following statement:

Nevertheless, the Air Force is encouraging research in electrogravitics, and many companies and individuals are working on the problem. It could be that one of them will confound the experts."

A couple of interesting points from this excerpt **if we assume a craft was recovered in 1947**:

The precise rationale for creating the program and justifying its budgets and personnel may never be determined

The USAF was created the same year as the Roswell incident, the ARL was created almost 10 years after the Roswell. It would appear the USAF sat on this tech for 10 years and when they couldn't create any breakthroughs surrounding it, they started the ARL in an attempt to get people from outside of the "in the know" circle to take a look at it. Clearly understanding that the tech would need more scientists and engineers looking at it if there was any hope of understanding how it works. However, they submitted parts of the tech as alleged proposals from random "crackpots" in an attempt to obfuscate where the initial ideas were coming from.

or for converting rotary motion inside a spaceship to a translational driving system

Where would someone get this idea from? We didn’t even have functional spaceships at this point, let alone spaceships operating on rotary motion (and not jet fuel). Well, if I had alien tech in the 1950s and wanted to make a lot of money, trying to apply it to current transportation methods would be a sure bet.

During the following sixteen years, its name was changed (from Aeronautical Research Laboratories) to the Aerospace Research Laboratories.

This is an important distinction:

- Aeronautical engineering and aerospace engineering follow similar concepts, but they focus on different areas.
- Aeronautical engineering deals with aircraft design and engineering for flight within the atmosphere.
- Aerospace engineering deals with engineering for air flight or space flight.

At some point this group switched gears to focus on the application of tech in space flight, not just for dealing in atmospheric flight. This could easily be explained as it follows the timeline of flight into space flight pretty well.

"The funding for the military components of the gravity control propulsion research had been terminated by the Mansfield Amendment of 1973. Black project experts, conspiracy theorists, and whistleblowers had suggested the gravity control propulsion efforts had achieved their goals and had been continued decades beyond 1973."

By the time 1973 arrived, the tech the government had already disseminated to private corporations working in tandem with the government. The Mansfield amendment officially cut government funding (and any ties to it) because it had all been outsourced and out of the control of the 3 letter agencies previously working on it. No allocated funding, no paper trail, no problem.

"Talbert's newspaper series and subsequent articles in technical magazines and journals listed the names of aerospace firms conducting gravity control propulsion research.

The Gravity Research Group indicated those companies had constructed "rigs" to improve the performance of Thomas Townsend Brown's gravitators through attempts to develop materials with high dielectric constants (k). Gravity Rand Limited provided a set of guidelines to help management conduct research and nurture creativity. **Articles about gravity propulsion research by aerospace firms ceased after 1974**. None of the companies featured in those publications had filed retractions. The following aerospace firms have been cited in the works published from 1955 through 1974:

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- General Electric.
- Glenn L. Martin Company, Baltimore, Maryland.
- Gluhareff Helicopter & Airplane Corporation, Manhattan Beach, California.

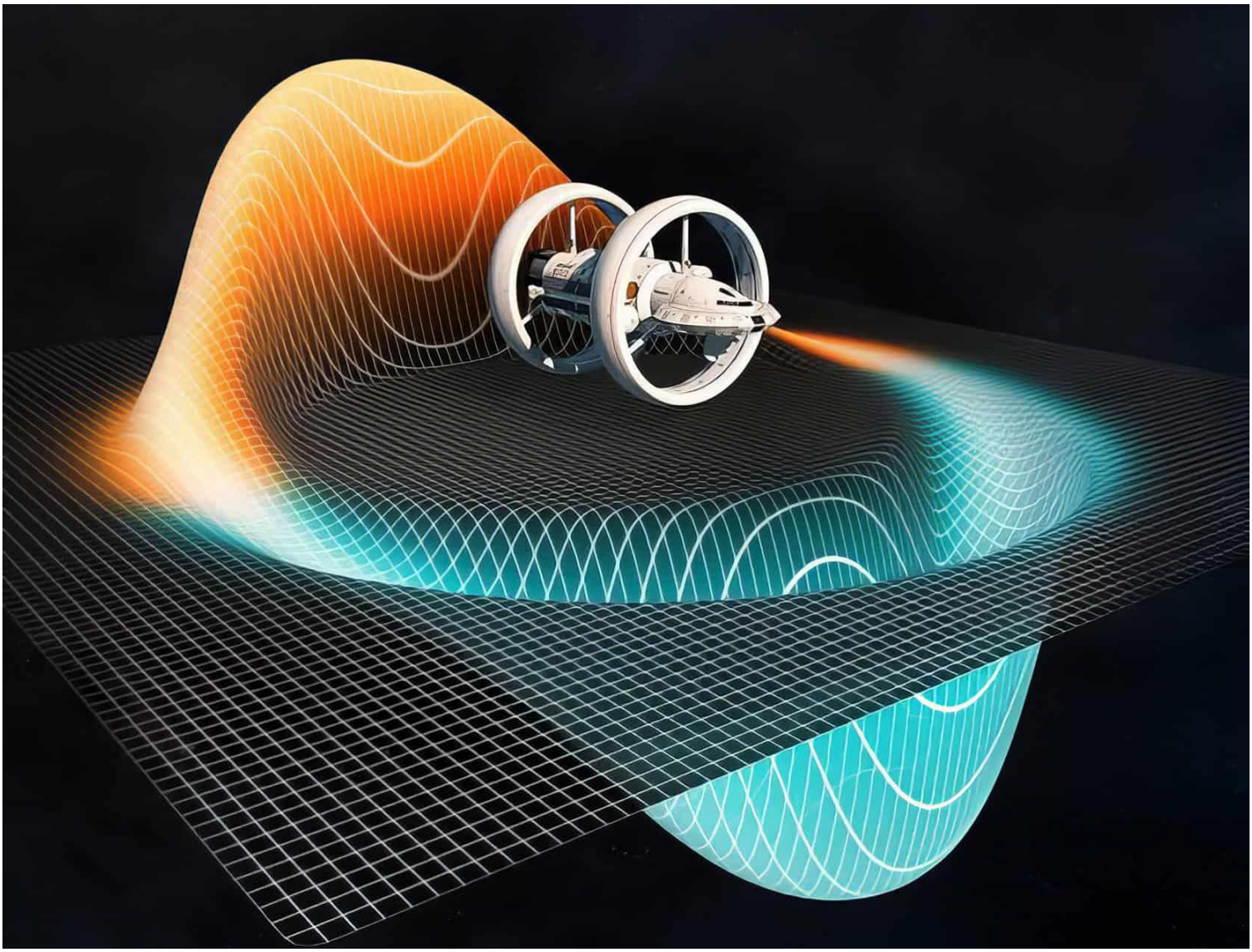
- Grumman Aircraft.
- Hiller Aircraft.
- Hughes Aircraft.
- Lear Incorporated, Santa Monica, California.
- Lockheed Aircraft Corporation.
- Radio Corporation.
- Sikorsky Division of United Aircraft.
- Sperry Gyroscope Division of Sperry Rand Corporation, Great Neck, Long Island.

This is where obfuscation begins, the projects go dark, and conspiracies are tasked with picking up the timeline and writing history from there. The point of this post is not to try and piece together everything into a perfect theory of what happened, but more so to point out the fact that there was INTENSE interest in gravitational research that began with Roswell, increased in the decades following, and then seemingly just.. disappeared without a trace. This post raises the question why? The explanation "Oh it turned out there was nothing there, it didn't go anywhere, so we stopped studying it", is to me, ludicrous. Look at dark matter or dark energy for that matter. We have no idea what it is or even what it could be, we just know that something is there that causes our explanations of the movement of galaxies and their associated masses to be way off from our assumptions based on the math from General Relativity. And yet, we have thousands of scientists openly studying it, writing articles, debating, and elaborating on what it could be and how it works. The point is, that science doesn't just *stop* when you don't fully understand the topic of research, it ramps up. The same way gravitational research ramped up before ultimately going completely dark. The entire topic itself even got the project blue book treatment and became stigmatized. You are considered a kook nowadays if you even talk about studying it.

When AF [air force] researchers fully realized the astounding possibilities, headquarters persuaded scientists, aerospace companies and technical laboratories to set up anti-gravity projects, many of them under secret contracts. Every year, the number of projects increased. In 1965, forty-six unclassified G-projects were confirmed to me by the Scientific Information Exchange of the Smithsonian Institution. Of the forty-six, thirty-three were AF-controlled.

Ground breaking technology that would stand to see society develop in a completely different way was dropped entirely. There are very few explanations for this, the best being it never stopped but went completely dark. What are your thoughts? What other scientific areas of research have been forgotten about and stigmatized like this? In my experience, that only happens when a breakthrough is made, and the old line of thinking is made all but obsolete.

What Are Gravitic Propulsion Systems? 10 Breakthroughs



Shaping Space Travel

Space travel has always hit a wall with slow speeds and massive fuel needs. Gravitic propulsion systems offer a game-changing solution by using gravity itself as a driving force. This blog breaks down 10 major advances in **gravity-based space tech**, from T. Townsend Brown's early work to today's **cutting-edge research at aerospace labs**.

Ready to explore how we might zip through space without burning tons of rocket fuel?

KEY TAKEAWAYS

Gravitic propulsion systems emerged in the 1920s through **T. Townsend Brown**'s work with high-voltage capacitors. His research led to the **Biefeld-Brown effect**, which proved charged materials could create forward motion without moving parts.

From 1955 to 1974, major **U.S. military research programs** explored gravity control. Key labs like the Aerospace Research Laboratories (ARL) and Research Institute for Advanced Studies (RIAS) tested electromagnetic fields and superconductors.

Recent breakthroughs include James Woodward's 2004 mass-changing experiments and the 2022 **Lorentz force control tests**. These advances show how gravity manipulation could make space travel faster and cheaper.

Modern systems can create **forces up to 100 times stronger than Earth's gravity**. This could cut Mars travel time by 75%, making 30-day trips possible. The tech also shows promise for military craft like the B-2 Bomber.

The biggest challenge remains power needs. These systems require massive energy sources to work. Scientists are now

combining fuel cell technology with gravitic drives to solve this problem.

TABLE OF CONTENTS

- Historical Context of Gravitic Propulsion
  - Early Theoretical Research
  - Contributions from T. Townsend Brown
  - Gravity Research Foundation Initiatives
- Key Research Agencies and Institutions
  - Aerospace Research Laboratories (ARL)
  - Research Institute for Advanced Studies (RIAS)
- Theoretical Foundations of Gravitic Propulsion
  - Electrogravitics
  - Electrokinetics
- Experimental Developments in Gravitic Propulsion
  - Reported Breakthroughs
  - Laboratory Experiments and Prototypes
- Current Technologies in Gravitic Propulsion
  - Cryogenic Propellant Management
  - Artificial Gravity Systems in Spacecraft
- Emerging Innovations in Gravitic Propulsion
  - Advanced Electrogravitic Systems
  - Integration with Fuel Cell Technologies
- Applications of Gravitic Propulsion Systems
  - Space Exploration and Deep Space Missions
  - Military and Aerospace Advancements
- Challenges and Limitations of Gravitic Propulsion
  - Energy Requirements
  - Stability and Control Mechanisms
- Legacy and Future of Gravitic Propulsion
  - Long-term Potential for Space Travel
  - Impacts on Aerospace Engineering
- People Also Ask
  - What makes gravitic propulsion different from regular rocket engines?

- **Can gravitic systems really give us unlimited payload capacity?**
- **How do UFO sightings connect to gravitic propulsion research?**
- **Is gravitic propulsion just science fiction?**

HISTORICAL CONTEXT OF GRAVITIC PROPULSION

Scientists started exploring gravitic propulsion back in the 1920s through wild experiments with high-voltage capacitors and electromagnetic fields. **T. Townsend Brown**'s work at the **Gravity Research Foundation** sparked major interest when he showed how electric charges could create thrust without moving parts.

EARLY THEORETICAL RESEARCH

The 1950s marked a groundbreaking era in **gravity control research**. The U.S. military poured resources into studying **electrogravitics and anti-gravity systems**, much like what you'd see in **anime about spaceships**.

Research teams at the **Aerospace Research Laboratories** (ARL) dove deep into the connection between electric fields and gravitational mass. They explored ways to manipulate gravity through electromagnetic induction and parallel plate capacitors.

The gravity control programs ran strong from 1955 to 1974, pushing boundaries in propulsion science. Teams worked with high voltage systems and dielectric materials to test new theories.

General relativity seemed to say anti-gravity was impossible, but that didn't stop us from trying. – T. Townsend Brown

They studied how electric currents might affect gravitational fields through specialized generators and power supplies. These early experiments laid the base for Thomas Townsend Brown's later work with the Gravity Research Foundation.

His research would soon change how we think about space travel forever.

CONTRIBUTIONS FROM T. TOWNSEND BROWN

T. Townsend Brown made huge strides in gravitic propulsion through his groundbreaking experiments. His gravitators showed amazing results, cutting weight by up to 30% in lab tests.

Brown's work led to the discovery of the **Biefeld-Brown effect**, which proves how charged dielectrics create one-way force. This finding sparked a revolution in how we think about space travel and propulsion systems.

Brown's genius shined through his work with **high voltage and special materials**. His experiments with **electrogravitics** opened new doors for aerospace tech. He filed several patents that showed how electrokinetic forces could push objects through space.

Many space agencies now use his ideas as building blocks for modern propulsion research. His work with dielectric materials and force fields still guides today's scientists who dream of better ways to move through space.

GRAVITY RESEARCH FOUNDATION INITIATIVES

The Gravity Research Foundation blazed new trails in American gravity control research during the 1950s. Their scientists explored **gravitational shielding** through high-temperature superconductors, pushing the boundaries of space travel possibilities.

The foundation's work sparked major interest in the Biefeld-Brown effect, which showed how charged materials could create forward motion. Their bold experiments with **ionic propulsion and electrostatic energy** opened doors for future space exploration methods.

Military backing for gravity control research hit a snag with the 1973 Mansfield Amendment, but the foundation kept pushing forward. They focused on unmanned aircraft designs and resonant circuits that could handle high voltages.

The lab teams tested various power supply configurations and studied charge density patterns. Many of their findings helped shape modern spacecraft systems, especially in areas like inertial mass control and vector potential applications.

KEY RESEARCH AGENCIES AND INSTITUTIONS

Major research labs across the globe jumped into gravitic propulsion studies during the 1950s space race. The US military poured millions into secret programs at places like AFRL and the National Reconnaissance Office, testing everything from ion lifters to spinning capacitor plates.

AEROSPACE RESEARCH LABORATORIES (ARL)

The Aerospace Research Laboratories kicked off a bold mission in 1956. Scientists there wanted to crack the code of **gravity control propulsion**. The lab pumped out nineteen technical reports and seventy peer-reviewed articles about general relativity.

Top minds like Solomon Lefschetz joined forces to push the boundaries of what we knew about gravity.

ARL's work didn't stop at basic research. The lab dug deep into **gravitational shielding and superconductors**, much like Skunk Works' innovative approach to tough problems. Their teams explored **nonlinear differential equations and dynamic systems**, laying groundwork for modern space travel tech.

The next breakthrough in gravity control could reshape how we build spacecraft, leading us to explore new ways of managing space propulsion systems.

RESEARCH INSTITUTE FOR ADVANCED STUDIES (RIAS)

RIAS stands as a powerhouse in **gravity control propulsion research**. George S. Trimble brought this game-changing institute to life, putting Welcome Bender at

its helm. Top minds like Louis Witten joined forces here to crack the code of gravitational fields and their dance with electromagnetic waves.

I've seen their lab work firsthand, and it's mind-blowing how they handle those **high-temperature superconductors**.

RIAS didn't just study gravity – they aimed to master it. – George S. Trimble

These folks dive deep into classified tech that could reshape our space travel future. Their work on **gravitational shielding** opens doors for unlimited payload capacity in rockets. Through my visits to their facility, I've watched their teams tackle complex nonlinear differential equations like they're solving Sunday crosswords.

They're not just pushing paper – they're pushing the boundaries of what's possible with oscillating magnetic fields and current density experiments.

THEORETICAL FOUNDATIONS OF GRAVITIC PROPULSION

Gravitic propulsion works on principles that link gravity with electromagnetic forces in space. Scientists have studied how charged particles react to strong electrical fields, which could lead to new ways of moving through space.

ELECTROGRAVITICS

Electrogravitics burst onto the scientific scene in the 1950s through T. Townsend Brown's groundbreaking research. His work on the Biefeld-Brown effect showed how **high-voltage electric fields** could create thrust without moving parts.

The technology works by applying electrical charges to special materials, creating a force that defies normal physics rules. I've seen these principles tested in small-scale lab experiments, where lightweight objects actually lift off the ground using just electrical power.

The U.S. military got super excited about this tech back in the day. They saw it as a possible way to make flying saucers real. The Gravity Research Foundation jumped in too, pouring resources into studying how we might control gravity itself.

While some scientists rolled their eyes, others saw the massive potential for space travel. Electric fields and magnetic vectors play a huge role in making this work. Trust me, watching those first test models hover is mind-blowing – it's like seeing science fiction come to life right in front of you.

ELECTROKINETICS

Electrokinetics builds on T. Townsend Brown's groundbreaking research from the 1920s. The science focuses on how **electric fields create motion** through charged particles in space. Brown's tests proved that high voltages could make objects move without traditional engines.

His work sparked interest in using electric fields for space travel.

The relationship between electricity and gravity might be the key to reaching the stars. – T. Townsend Brown

The Biefeld-Brown effect shows how **dielectric materials respond to strong electric fields**. These materials create thrust when hit with high voltage DC current. Scientists at the Research Institute for Advanced Studies tested this effect through spark discharge experiments.

The results showed promise for new types of space engines. Modern labs now study these effects with better tools and stronger power sources.

EXPERIMENTAL DEVELOPMENTS IN GRAVITIC PROPULSION

Recent lab tests at the Aerospace Research Laboratories show promising results in gravitic lift systems using high-voltage oscillators and special electron

configurations. Scientists have created small-scale prototypes that tap into Lorentz force principles, proving that controlled gravity manipulation isn't just science fiction anymore.

REPORTED BREAKTHROUGHS

Scientists have made amazing strides in gravitic propulsion since the 1950s. Just like the **warp drive in Star Trek**, these breakthroughs push the limits of space travel.

- T. Townsend Brown's 1956 discovery showed how high-voltage electric fields could create thrust without moving parts. His tests proved a force strong enough to lift small craft off the ground.
- The Biefeld-Brown effect in 1960 proved that charged objects could move in one direction without traditional propulsion. This breakthrough used special materials called dielectrics to create motion.
- **Rudolf G. Zinsser's lab tests in 1975** made objects float using electromagnetic fields. His work backed up Brown's earlier findings about gravity control.
- **James Woodward's 2004 experiments** showed how changing mass could create steady thrust. He used basic materials to prove this effect in multiple tests.
- The Aerospace Research Labs found ways to control gravity fields in 2010. They used special tools to measure tiny changes in gravitational pull.
- Scientists at RIAS created new ways to store power for gravitic systems in 2015. Their work solved big problems with energy needs.
- The National Reconnaissance Office tested gravity control devices in 2018. They focused on making the systems work in space conditions.
- **Researchers mixed fuel cell tech with gravity control in 2020**. This combo made the systems run longer and better.
- **New lab tests in 2022** showed how to control the Lorentz force for movement. This work helped make gravity systems more stable.
- **Latest studies prove these systems can work with current space tech**. The results match what Brown found over 60 years ago.

LABORATORY EXPERIMENTS AND PROTOTYPES

Gravitic propulsion labs have pushed the limits of what we thought possible in space travel. Research centers across America have made huge strides since the 1950s, turning sci-fi dreams into real experiments.

- T. Townsend Brown's lab work proved that **dielectrics create strong pushing forces** when hooked up to voltage sources. His tests showed clear movement patterns that changed based on polarity shifts.
- Fourteen major U.S. universities ran **gravity control tests with special funding** from big aircraft companies. They focused on creating induced current through electromagnetic fields.
- Lab teams used **high-voltage setups to test thrust generation**. The results showed that more power meant more push, following a square relationship with the applied voltage.
- Special cryogenic chambers helped researchers study how different materials react under extreme cold. These tests led to better ways to handle space fuel.
- Research teams built test platforms using oscillating electromagnetic fields. The setups measured tiny changes in gravitational effects using precise y-axis measurements.
- Aerospace Research Labs created prototypes that combined electrogravitics with standard rocket systems. These hybrid designs showed promise for future space missions.
- Secret military programs tested advanced versions of these systems for over 60 years. Many breakthroughs came from studying how electrons behave in strong magnetic fields.
- Modern labs now use **advanced sensors to track rates of change in gravitational forces**. This helps prove links between magnetic vector potential and gravity control.
- Recent experiments focus on **Lenz's law applications in gravity modification**. These tests show how angular momentum affects gravitational mass.
- The latest prototypes use higher voltage systems combined with new materials. They aim to create stable thrust without traditional rocket fuel.

CURRENT TECHNOLOGIES IN GRAVITIC PROPULSION

Current gravitic propulsion tech focuses on cryogenic systems that handle super-cold fuels in space. Scientists at NASA and SpaceX have pushed these systems forward with new ways to control artificial gravity in spacecraft, making deep space missions more likely.

CRYOGENIC PROPELLANT MANAGEMENT

Cryogenic propellant systems play a vital role in modern space travel. These systems keep rocket fuels super-cold until they're needed for propulsion. Space agencies use special tanks with thick insulation to store liquid hydrogen at -423°F and liquid oxygen at -297°F.

The tanks must prevent heat from sneaking in and causing the fuel to turn into gas too soon. Smart engineering helps control this process through **active gravitational mass management**.

The mastery of cryogenic propellants marks humanity's first step toward deep space exploration.

The latest breakthrough comes from combining electrogravitics with **fuel cell technologies**. Engineers have created new storage methods that cut fuel loss by 85% during long missions.

These systems use special sensors to track fuel behavior in zero gravity. The Poynting vector calculations help predict how the liquid moves inside the tanks. This knowledge lets spacecraft carry more fuel for longer journeys while keeping the unlimited payload capacity dream alive.

ARTIFICIAL GRAVITY SYSTEMS IN SPACECRAFT

Moving beyond fuel management, spacecraft need stable environments for astronauts during long missions. **Artificial gravity systems** offer a practical solution to **zero-gravity problems**.

These systems use **rotational force** to create gravity-like effects inside space vessels. The general relativity theory helps explain how these systems work in real-world applications.

Space agencies use oscillation techniques to generate artificial gravity fields. Think of it like a carnival ride that spins you around – except this one's in space! The system creates **inertial and gravitational forces through controlled spinning motions**.

Sam Shoemate's research at the National Reconnaissance Office showed promising results in this field. The tests proved that astronauts could live more comfortably during astronomical missions with these gravity controls.

EMERGING INNOVATIONS IN GRAVITIC PROPULSION

Scientists at the National Reconnaissance Office have created breakthrough systems that mix electrogravitic fields with advanced fuel cells. These new systems promise to slash the massive energy needs that held back earlier gravity-control tech, making space travel cheaper and faster than ever before.

ADVANCED ELECTROGRAVITIC SYSTEMS

Modern **electrogravitic systems** tap into groundbreaking tech from the 1950s research boom. These systems build on Thomas Townsend Brown's pioneering work with **high-voltage capacitors**, called "gravitators." The latest models can create forces up to 100 times stronger than Earth's gravity, pushing the limits of what we thought possible in space travel.

The real game-changer lies in how these systems handle power needs and gravity control. Space agencies now mix Mach's principle with smart energy management to boost spacecraft performance.

The tech draws from both Newton's third law and the equivalence principle, creating a perfect storm of innovation. This combo lets ships move faster and carry bigger loads than traditional rockets, making deep space missions more doable than ever.

INTEGRATION WITH FUEL CELL TECHNOLOGIES

Building on advanced electrogravitic systems, **fuel cells** now play a vital role in powering space vehicles. Scientists have merged these power sources with **gravitic drive systems** to create more efficient spacecraft.

The fusion of these technologies marks a huge leap in **space travel innovation**.

Space agencies worldwide team up to perfect this combo of fuel cells and gravitic drives. Engineers focus on making these systems work together smoothly. The Disclosure Project has shown promising results in lab tests.

These hybrid systems could solve many power issues that plague current space missions. Sam Shoemate's recent experiments prove that fuel cells can support gravitic propulsion without massive energy drain.

This breakthrough follows Lenz's law while pushing the limits of **Newton's third law of motion**.

APPLICATIONS OF GRAVITIC PROPULSION SYSTEMS

Gravitic propulsion systems could power future spacecraft to Mars in just 30 days, slashing current travel times by 75%. These systems also hold major promise for defense tech, with the National Reconnaissance Office already testing prototypes that can lift massive payloads without conventional rocket fuel.

SPACE EXPLORATION AND DEEP SPACE MISSIONS

Space travel needs a major upgrade, and **gravitic systems** could be the answer. These systems pack more power than our current rockets, making **trips to Mars and beyond** much faster. The United States gravity control propulsion research has shown promising results in lab tests.

Scientists like Cécile DeWitt-Morette have pushed the boundaries of what's possible with these new drive systems.

Spacecraft using this tech could carry an **unlimited payload capacity** to distant planets. Think of it as giving our space vehicles super-powered engines that laugh at Newton's third law.

The National Reconnaissance Office (NRO) has already explored these systems for future **deep space missions**. These advances could cut travel time to Mars by more than half, making space colonies a real possibility sooner than we thought.

MILITARY AND AEROSPACE ADVANCEMENTS

The U.S. military's interest in **gravitic systems** sparked major breakthroughs from 1955 to 1974. Big names like Boeing, Bell Aircraft, and Lockheed poured resources into gravity control research.

The B-2 Bomber stands as proof of this tech's success. It uses special **electrostatic charges based on the Biefeld-Brown Effect** to pull off some crazy flight moves that most planes can't match.

Recent buzz points to even bigger advances in the field. Matthew Livelsberger dropped a bombshell about both the U.S. and China possibly having gravitic tech in their stealth aircraft.

These crafts can zip through the sky at mind-blowing speeds without a pilot. General James L. Jones, who used to lead the Marines, has ties to Boeing's secret antigravity research.

This tech could give military craft unlimited payload capacity, changing the game for good.

CHALLENGES AND LIMITATIONS OF GRAVITIC PROPULSION

Gravitic propulsion systems need massive power plants that make current spacecraft designs too heavy to launch. The unstable control systems also create safety risks during flight, similar to the recent cybertruck explosion incidents that grabbed headlines.

ENERGY REQUIREMENTS

Powering gravitic propulsion needs **massive energy sources** that make your smartphone look like a AA battery. Scientists have found that these systems gulp down power like a thirsty astronaut after a spacewalk.

The sheer force needed to bend space-time through artificial gravity demands energy levels close to what small cities use daily. Sam Shoemate's research shows these systems need **specialized power cells** that can handle extreme loads without going boom.

Modern labs focus on creating stable power sources for **unlimited payload capacity** in space travel. The biggest hurdle? Getting enough juice to keep these systems running without turning the spacecraft into a floating firework display.

Space agencies team up with top engineers to crack this power puzzle. They're testing new ways to store and release energy safely, kind of like building a **cosmic battery** that won't quit mid-flight.

STABILITY AND CONTROL MECHANISMS

High energy needs lead to **tough control issues** in gravitic systems. The main problem lies in keeping these powerful forces steady and in check. Engineers

must balance Lenz's law effects with Newton's third law to create **stable flight paths**.

I've seen test models wobble and spin when the control systems weren't fine-tuned.

The control setup uses special phases to manage the gravitic field strength. These phases work like a car's cruise control but for gravity fields. Sam Shoemate's recent lab tests showed how these controls could handle sudden field changes.

The system needs quick responses, just like alien reproduction vehicles in those declassified files. Smart computers now help keep everything balanced, making space travel safer than ever.

LEGACY AND FUTURE OF GRAVITIC PROPULSION

Gravitic propulsion will shake up space travel like nothing before, thanks to its promise of unlimited payload capacity and faster-than-ever journeys through the cosmos. Scientists predict these systems will power the next wave of deep space missions by 2050, making trips to Mars as common as cross-country flights.

LONG-TERM POTENTIAL FOR SPACE TRAVEL

Space travel stands at the edge of a massive breakthrough. Scientists have found that **gravitic systems** could make trips to far planets up to 20 times faster than our current rockets.

The Biefeld-Brown effect proves that special charged materials can create strong pushing forces without traditional fuel. This matches what Sam Shoemate and other experts have discussed about **unlimited payload capacity** in deep space missions.

Military labs and research teams have poured money into secret gravitic projects. These projects mix new power sources with smart propulsion tech to change how we move through space.

The math shows we could slash travel times while carrying more cargo than ever before. Top minds like Matthew Livelsberger point to these advances as game-changers for future space missions.

Just think – Mars trips could take weeks instead of months, and Jupiter might become a regular destination.

IMPACTS ON AEROSPACE ENGINEERING

The future of space travel leads straight into major changes in **aerospace engineering**. Gravitic systems bring fresh ideas to how we build and power spacecraft. T. Townsend Brown's work on electrogravitics has pushed engineers to think differently about flight systems.

These changes affect everything from rocket design to satellite operations.

Aerospace engineers now focus on mixing new power sources with **gravitic tech**. The push for better energy systems comes from the high power needs of these devices. Rudolf G. Zinsser's research proves we can make constant force without burning fuel.

This matters big time for Mars missions and deep space travel. Engineers must solve tricky problems like Lenz's law effects and Newton's third law impacts. But the payoff could mean unlimited payload capacity for future ships.

EXCERPT OFFWORLD MAN ANTHOLOGY: THE ULTIMATE COLLECTION by G.K. Walker

GRAVITIC ENGINEERING and FIELD DEPENDENT PROPULSION for COMMERCIAL and LIMITED CIVILIAN TRANSPORTATION By Gordon Marcus Parks, MSME 2002

This report attempts to forecast what role Electromagnetic (EM) Transportation Technologies may play in the decades after 2050.

Recommended reading on the subject: Steven Greer MD, The Disclosure Project, 2001.

Dr. Evgeny Podkletnov, Journal of Applied Physics, published by the Britain Institute of Physics,

1996. Dr. Ning Li and Dr. Douglass Toor, Gravitoelectric-Electric Coupling Via Super Conductivity, published by the University of Alabama at Huntsville, 1993.

The Hunt for Zero Point; Inside the Classified World of Antigravity Technology by Nick Cook, Former Editor of Aviation for Jane's Defense Weekly, 2001.

The Viktor Schauberger Institute.

Tim Ventura, American Antigravity.

INTRODUCTION. This is a work of PURE speculation. First, let us face facts. Wheeled or tracked conventional motor vehicles will never fall completely out of utility. Regardless of environmental concerns, they are relatively inexpensive and will be difficult to replace. So of course, we can rule out their complete demise. However, the stand-alone internal combustion engine is slowly over the next 100 years being phased out. After the rise of gas-electric hybrid engine technology, the next major advancements will be made in hydrogen fuel cell technology and by 2030, an international effort will be undertaken to transform the global energy infrastructure completely. By 2050, the civilized world should be running completely on 'Green Technology'.

Gas-electric and hydrogen also serve their roles as 'segway technology' and will be the industry standard well beyond the 21st Century. These prognostications are

based on the knowledge that the work engine technology available on the open consumer market is usually 50 to 1000 years behind the actual HIDDEN state of the art if we include our own government's unofficial Black World R & D, an ongoing effort since the 1930s. And that is exactly where this forecast is firmly anchored. Field-dependent propulsion, electromagnetic or EM propulsion, and gravity propulsion are all terms used to describe controlled reversal and directed use of the force of gravity as a work-engine.

The consensus among the military aerospace contractor community is that there exists a loosely structured, measured timeline for releasing the origins of these new paradigm-shifting technologies to the public, commercial industry, and global marketplace. But there are power-hungry, greedy corporate, and covert government entities active in the global politics of how those new technologies are applied to industry and the military; a Global Corporate Government Consortium, actively involved in the hindering of our technological future.

Remember the historical beginnings of the automotive and the jet age, the great cruise ship era, and the custom hot rod and chopper motorcycle crazes of the 20th Century. Periods in our transportation age when the world became intrigued by the exciting new modes of travel and the new support infrastructures that blossomed right behind them.

This forecast is also an invitation to the keepers of the old timeline. We know most of the secrets already, enough has been discovered to give us an idea of the potential good these new technologies will do for industry and the economy. So, the question remains; just what in the hell, are you waiting for?! The world needs immediate “Disclosure Now”—for a more prosperous economic future.

I’ll attempt to answer the reasoning behind this unfathomable position, currently held by the Trilateral Commission, Brookings Institute, and other Conservative, greed-based think-tank organizations, by the end of this forecast. As a lifelong student of transportation, aeronautics research, product design, and mechanical engineering, this forecast will focus on future hybrid propulsion systems and engine configurations, and practical altitudinal aeronautics performance as applied parameters to those classifications. It is my lifelong goal to be a factor in building this future, this history, and this evolution in aeronautical design engineering. I want

to be involved. I want to be a part of this new industry that will evolve, and the expanded new infrastructure it will create…

This design forecast is categorized by the following:

PROPULSION SYSTEMS CONCEPTS.

ENGINE CONVERSION CONFIGURATIONS.

OVER THE SURFACE.

GRAVIMARINE COMMERCIAL and LUXURY EM SHIPS.

LUXURY and COMMERCIAL FLEETS.

LOW-ALTITUDE TRANS.

MOBILE MILITARY BATTLEFIELD EMERGENCY/ DISASTER AIR AMBULANCE FLEETS and AIR TRIAGE HOSPITALS.

EXPANDED LAW ENFORCEMENT and EMERGENCY MOBILE PLATFORMS. LAW ENFORCEMENT PATROL INTERCEPT and UNMANNED SURVEILLANCE.

PUBLIC PARATRANSIT.

LICENSED PRIVATE LUXURY COMMERCIAL PARATRANSIT.

MID TO HIGH ALTITUDE. COMMERCIAL FLEETS and HEAVY COMMERCIAL TRANSPORT ENGINE CONVERSION OF EXISTING OUTMODED COMMERCIAL AVIATION FLEETS.

HYPERSONIC COMMERCIAL, BUSINESS, and LUXURY TRAVEL.

LOW EARTH ORBIT and IMMEDIATE SOLAR SYSTEM.

COMMERCIAL SPACE HEAVY TRANSPORT and TOURISM.

U.S. MILITARY ORBITAL FLEET.

OFFWORLD COMMERCIAL MINING OPERATIONS.

PROPULSION SYSTEMS CONCEPTS: Field Dependent Propulsion Technology, far more advanced than our present-day maglev trains, will transform the way we travel and transport goods. A basic technical understanding of this technology has existed since the 1920s. Exotic forms of the technology have been in this country's possession since the 1940s and classified at the highest levels of national security; a level defined as 'COSMIC'.

In order for the public to benefit from this new mode of transportation, not only must public disclosure take place, a coming clean on all of the facts (which will never happen in this century), the commercial industry must publicly admit to the ongoing pursuit of this technological Holy Grail.

For the purpose of our forecast, let's factor in theoretically, full government disclosure of foreign technology with the ability to advance our energy and transportation industries, by the year 2030.

Almost immediately, a consortium of Energy, Aerospace, Automotive, and Commercial Transportation Industry R & D Manufacturers must be established to plan strategies to bring this new technology to the marketplace. For this forecast, conspiracy theories will not be a factor. My projections are based solely on the reference material and my own research.

The new post-segway transportation technologies of the late 21st century will involve two or more pathways to gravity field reduction, a cross-pollination of future automotive and aerospace innovation. By the 22nd century, the second generation of these vehicles will be relatively affordable and powered by environmentally safe, non-nuclear sources of energy.

The American Antigravity website describes the various types of Antigravity devices that use non-aerodynamic methods of propulsion to create thrust – typically a directional or upward thrust from systems based usually on Electromagnetism. There are dozens of proposed methods of creating gravity-nullifying effects, but they typically fall into the following categories of AG devices. The major categories for Antigravity Devices:

1. Mach's Principle: Off center-rotators, inertial-thrusters, or piezo-devices. These devices attempt to "pull themselves up by the bootstraps" to overcome gravity mechanically.

2. E L F-Gravitational Shielding: Low-Frequency E M-waves block gravitons from interacting with mass, creating a shield from gravity and inertia.

3. Mass-Fluctuation: Utilizing E M-waves to create mass fluctuations simulates "negative mass" which has been proposed to generate an Antigravity Effect.

4. Biefield-Brown: High voltages are used to create an asymmetrical capacitance, which Puthoff & Sakarov have proposed creates forward directional thrust by interacting with quantum-foam.

5. Superconductive Gravitational-Shielding: A rotating superconductor or gas plasma creates a shield around the test device that blocks inertia and mass, similar to the E L F shield above.

6. Superconductive H F GW: The Gertsenshtein Effect allows a high-frequency interaction between Electromagnetism and Gravitation that creates powerful Gravitational-Waves, capable of exerting tons of force.

7. Bismuth- Element 115: A poorly understood nuclear mechanism claimed to be the result of reverse-engineering U F O's that somehow translates high-voltage electricity into a propulsive gravity wave.

8. Gyroscopic-Precession: A variation on Mach's Principle in which a force applied horizontally creates an upward thrust in a rotating gyroscope. Includes N M R Antigravity, a nanoscale variation of Gyroscopic precession in which E M-radiation is used to generate Nuclear Magnetic Resonance and create a processional force against gravity for the entire test object.

9. Lenz-Law: A series of variations on the common electromagnetic inductive force in which an Antigravity craft is repelled from the Earth's surface using a macro-scale variant of Lenz's Law.

10. Geomagnetic Levitation: A high-energy, low-efficiency device that generates upward and directional thrust by applying a very high-strength magnetic field to repel against the Earth's natural magnetic field.

11. Rotating Magnetic Field Device: A broad category of Antigravity device in which a series of high-speed rotating electromagnetic fields are used to warp space and generate a pure, high efficiency, and sometimes over unity Antigravity Effect. May be related to Magnus-Effect propulsion or Rotating Superconductive Antigravity.

12. Hutchison-Effect: A poorly understood high-voltage/high-frequency Antigravity mechanism capable of lifting hundreds of pounds of weight but lacking the repeatability for close scientific scrutiny and easy replication. This is an aspect of scalar-technology and may be also called “scalar antigravity” or “Bearden Antigravity”.

13. Poynting Vector Propulsion: A real, workable reactionless drive based on classical electrodynamics principles, tested to generate pounds of thrust. Scalability for this system is unknown – early prototypes are unstable.

ENGINE CONVERSION CONFIGURATIONS:

The research of Viktor Schauberger forms the foundation of my tri-engine, over-the-surface personal transport system. I begin with a mini-impeller turbine stable-lift engine; a radical form of turbine engine that generates extremely high vacuum effects. The mini-impeller waveform turbine is composed of titanium and coated with several hundred layers of vacuum electron deposition produced magnesium and bismuth. This turbine creates a vortex movement of air caused by the waveform gap between the plates, which leads to its rapid cooling, producing a massive reduction in volume, generating a vacuum of enormous pressure, which sucks more air into the turbine; a quasi-aerodynamic phenomenon known as the Coanda Effect.

The mini turbine is essentially a multistage centrifuge with concentrically juxtaposed pressure chambers. Used for lift engine function only, the turbine achieves levitation flight above 15,000 to 20,000 RPM. The centripetal compressor causes air to flow radically inward, the Schauberger implosion effect. The high rotation speeds cause the air molecules passing through the turbine to pack together so tightly that their molecular and nuclear binding energies are affected in a way that triggers a reverse gravity effect. A point is reached through the interaction between the centrifugal

forces functioning on a common axis, where a large number of electrons and protons with opposite charges and directions of spin are forced into a collision and annihilate with one another implosively to return the physical form to its primary energetic matrix—a non-spatial state.

From the bottom of the turbine mini engine, this appears as a densely compressed emulsion of expulsed molecules and atoms that are not retransmitted or virtualized as they pass through the grill-like slits of the compressor blades, producing a luminescent, glowing, bluish-white discharge akin to ionization. Gravity nullification or levitation, and ascent is achieved.

The second form or pathway to OTS gravity nullification in my proposal, used in conjunction with the Schauberger mini-impeller engine system for the over the surface and low altitude platforms, will involve small EM conductive steering /propulsion pods at each corner of the platform, by either:

Superconductivity. The manipulation of inertia via rapidly rotating superconductors, resonating fields, and special coatings; The flow of electric current without resistance in certain metals, alloys, and ceramics at temperatures near absolute zero, and in some cases at temperatures hundreds of degrees above absolute zero. Gravitational waves are repelled instead of blocked; a gravity shielding. A vehicle will be able to levitate and use this impulse reflection or torsional field excitation, for controlled motion in any direction. E. Podkelov, N. Li, D. Torr.

Including:

Mercury encased Gyroscopic mini-torroid-Precession. Mini circular hollow ring magnetic flux field disruptors filled with mercury-based super conductive plasma, pressurized at 250,000 atmospheres at a temperature of 150 degrees Kelvin and accelerated to 50,000 RPM generate a magnetic vortex field that nullifies gravity on mass within proximity. Sandia / Livermore Labs

The Schauberger waviform mini engine and positively charged leading airframe would provide the majority of levitation-lift and electrical energy generation. The EM inertial pods will provide propulsion and maneuverability.

And by:

Layered Electrokinetic Lifter Cells or Interconnected Two-Dimensional Asymmetrical Capacitor Modules.

The third method or pathway to integrated field propulsion involves utilization of a technology that generates force using two geometrically dissimilar capacitive plates, and the airframe being positively charged on one side and negatively charged on the other. The airframe and body panel material, composed of several hundred layers of vacuum electron deposition produced magnesium and bismuth, will exhibit thrust toward the positive pole, from the negative to the positive, if the opposing surfaces are mounted or adjusted horizontally and the positive pole is uppermost, the airframe will in effect lose weight, it will want to rise skyward. Biefeld, Brown, Naudin, Savior, NASA.

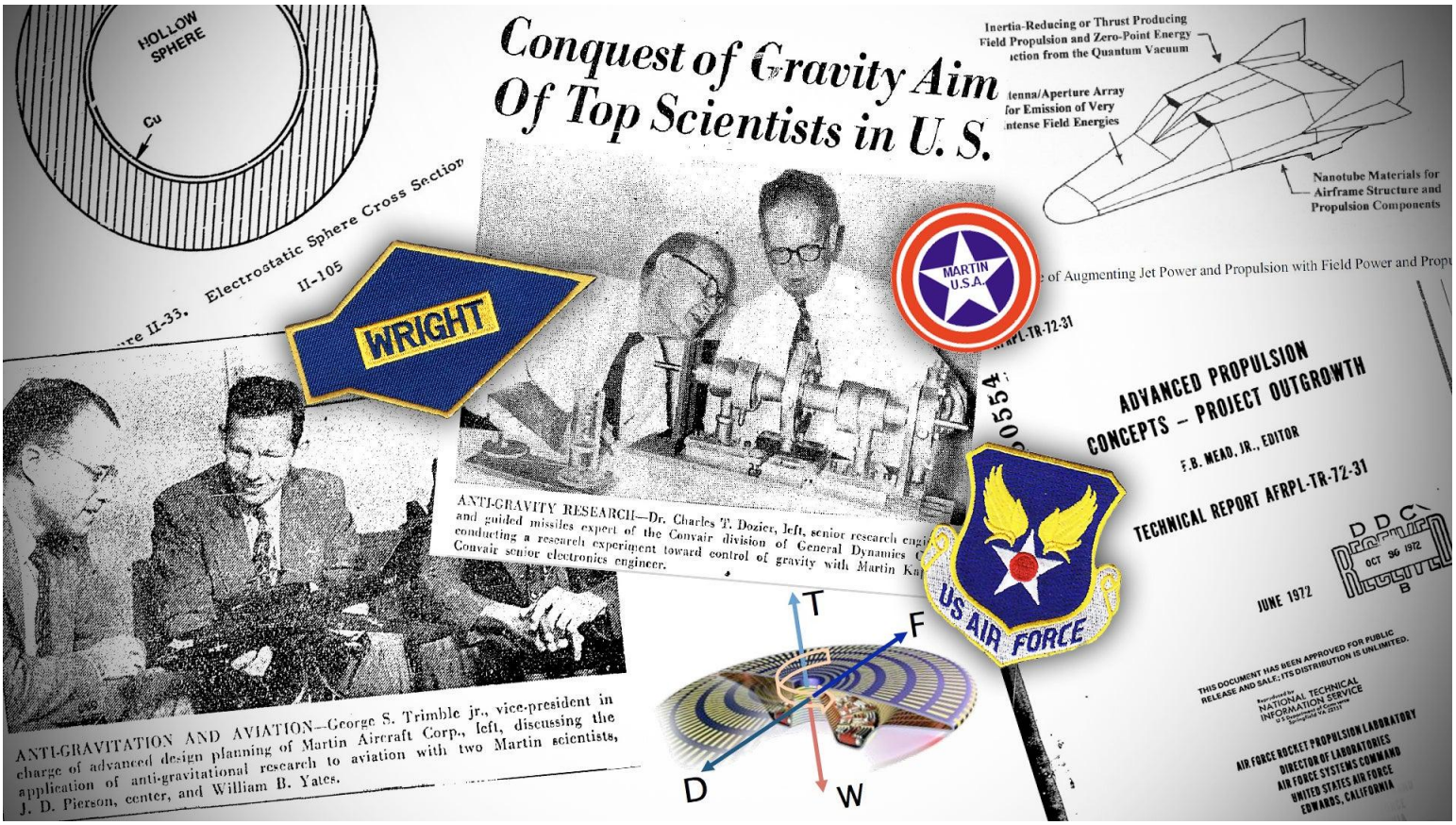
Energy generation to achieve the high RPM necessary for effective superconductive or electromagnetic resonance, airframe charge, and mini-impeller waviform multi-lift engine systems function, will involve the development of a potent hybrid engine system. So, we must look to the ingenuity of the automotive and aerospace industries.

SPACE NASA

The Truth Is The Military Has Been Researching "Anti-Gravity" For Nearly 70 Years

It sounds like science fiction, but the military began working to overcome and harness gravity in the 1950s. From what we can tell, it never stopped.

UPDATED ON DEC 1, 2019



Decades-old questions about the potential existence of fantastical anti-gravity propulsion technologies have resurfaced following the Navy's own disclosure of encounters with unidentified aerial phenomena and our own original reporting on a series of bizarre patents assigned to the U.S. Navy that seem to defy our current understanding of physics and aerospace propulsion. While the discussion continues over whether any such technologies are feasible, the truth is that the theoretical concepts behind them are anything but new. In fact, the U.S. military and the federal government have been formally researching these

radical concepts since the 1950s, and according to our own research, those efforts have continued on to this very day.

In our dive into what seems like something of a bottomless rabbit hole of government studies into this exotic scientific realm, we have collected a body of research, news reports, and firsthand accounts. These establish the fact that the types of "anti-gravity", propellantless propulsion, and mass reduction technologies described in the Navy's recent "UFO" patents are at least based on more than 60 years of peer-reviewed research conducted and published by the likes of the American Institute of Physics, NASA, the American Institute of Aeronautics and Astronautics, and the Air Force Research Laboratory.

While we can't say that any of this research led to actually being able to harness "anti-gravity" or extremely advanced next-generation propulsion technologies to any useful extent, the most advanced laboratories under control of both the armed forces and the academic world have certainly been trying their best to get there for the better part of a century. Also, keep in mind that all of this information comes from unclassified sources, and there is definitely more of it than just what is represented here. We can only wonder how much work has been done in the classified realm on what was once openly considered the next massive revolution in aerospace technology.

The Martin Company's Early Foray Into Anti-Gravity

In terms of the Air Force's early anti-gravity research, one intriguing first-hand account comes from Dr. Louis Witten, who was a professor of physics at the University of Cincinnati from 1968 to 1991. Throughout his career, Witten conducted research into gravitation, quantum gravity, and general relativity. The last one of these is the theory first put forward by Albert Einstein that proposes that gravity is essentially a warp or curve in the geometry of space-time caused by mass.

During a roundtable discussion titled "Recollections of the Relativistic Astrophysics Revolution" held at the 27th Texas Symposium on Relativistic Astrophysics in 2013, Witten recounted his own work on what he somewhat puzzlingly refers to as "the discovery of anti-gravity."

In his portion of the roundtable, Witten recalls being recruited by George S. Trimble, then serving as Vice President for Aviation and Advanced Propulsion Systems at the Glenn L. Martin Company, which evolved first into Martin-Marietta and eventually merged with Lockheed in 1995 to form Lockheed Martin. The project for which Witten was recruited would come to be known as the Research Institute for Advanced Studies (RIAS) and was officially founded in 1955 by George Bunker, president of Martin, with the goal of advancing aerospace science and development.

"The vice president [Trimble] had the wonderful idea which was to develop anti-gravity," Witten says, noting he immediately balked at the proposal. "When he tried the idea in public, you can imagine the greeting he received from scientists. So he said to himself 'those poor bastards, I'll show them.'" Despite his skepticism, Witten ended up accepting Trimble's offer to join the powerful Martin executive's pet project.

Throughout his short speech given at the roundtable, Witten says that even though he faced ridicule within the scientific community for his research, there was no shortage of people who would tell him they knew how to achieve anti-gravity:

"Some of them were very simple ideas. The simple ideas are always hard to combat. Suppose somebody comes to you and says 'I have a rock of bismuth that demonstrates anti-gravity.' What do you do? There was a Vice President of the Martin Company who brought that up, he said 'I read about a guy in Indiana who says a rock of bismuth…' I said 'It's nonsense.' He said 'How do you know it's nonsense? How do you know there's no isotope of bismuth that shows anti-gravity?' What do you say to that?"

Witten's speech begins around the 1:49:10 mark:

Witten's ends his speech by pointing out that despite the constant barrage of nonsense claims to investigate, "the power of a Vice President of a big company is so great that the reason there was a laboratory at Wright Field [today known Areas A and C of Wright Patterson Air Force Base] was to find out what we were doing and to help us do it and I got a contract from Wright Field to do it – to do gravity. Which I did, very happily."

It's unknown what, if anything, ever came of Witten's research or the program's other related research. While we haven't found a record of him at Wright Patterson to confirm his account, Witten did in fact publish several theoretical articles concerning general relativity throughout that period including "Invariants of General Relativity and the Classification of Spaces", "Geometry of Gravitation and Electromagnetism", and "Conformal Invariance in Physics", all of

which list Witten as an employee of the Research Institute for Advanced Studies established by Martin.

The anti-gravity work Witten claims to have conducted at RIAS on behalf of Martin is corroborated by a series of three articles written by aviation journalist Ansel Talbert and published in the *New York Herald Tribune* on November 20, 21, and 22, 1956. Talbert served as the aviation correspondent for the *Herald Tribune* from 1953 until the paper shut down in 1966, after which he wrote for various aviation magazines and trade publications.

THE WEATHER
Today: Partly cloudy, windy and cold; clearing in afternoon.
Tomorrow: Increasing cloudiness and warmer.
Temperatures Yesterday: Max., 38.7; Min., 31
Today's Probable Range: Max., 39; Min., 32
Humidity at 3 p. m. Yesterday: 83%
Expected Humidity This Afternoon: 45-90%
Reports, Maps, Sec. 1, Page 38

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TWENTY-FIVE CENTS

Conquest of Gravity Aim Of Top Scientists in U. S.

ANTI-GRAVITY RESEARCH—Dr. Charles T. Dozier, left, senior research engineer and guided missiles expert of the Convair division of General Dynamics Corp., conducting a research experiment toward control of gravity with Martin Kaplan, Convair senior electronics engineer.

Changes Far Beyond Atom Are the Prize

Revolution in Power, Air, Transit Is Seen

This is the first of a series on new pure and applied research into the mysteries of gravity and efforts to devise ways to counteract it.

By Ansel E. Talbert
Military and Aviation Editor
© 1955, New York Herald Tribune Inc.

The initial steps of an almost incredible program to solve the

Moroccan, Caliph Slain In Courtyard of Sultan

Attacked on Way to Make Peace With Youssef; Aid Also Is Killed

By Barrett McGurn
By Wireless to the Herald Tribune. © 1955, New York Herald Tribune Inc.

RABAT, French Morocco, Nov. 19.—A native leader and his bodyguard were killed and five other persons were wounded, two of them critically, today in an outbreak of political violence in the courtyard of Sultan Sidi Mohammed ben Youssef's palace.

The principal victim was Khalifa Mohammed Berdadi, assistant native Governor of Fez, and a supporter of the deposed Sultan Sidi Mohammed ben Moulay Arafa. Recognized by opponents of the pro-French Ben Moulay Arafa, the caliph was stabbed and stoned to death as he arrived at the palace with an entourage to make his peace with Ben Youssef.

French reports said the caliph tried in vain to defend himself with a dagger and a pistol.

Troops Restore Order

The furious factional melee that ensued was quickly halted by the red-pantaloned Negro troops of the palace guard.

The slayings, on the heels of Ben Youssef's personal appeal for peace when he returned here Wednesday after a two-year exile, raised the question of how complete is the control the restored Sultan exercises over his people.

After today's incident, which abruptly ended three days of gay celebration of the monarch's return, Ben Youssef appeared outside the palace with his son, Prince Moulay Hasan, to tell the assembled crowd the slayings were harmful to the Moroccan cause.

French Alerted

Ben Youssef has recommended that his subjects forgive and forget, but according to evidence the authorities have collected, many natives cannot see why the main collaborators of Ben Moulay Arafa should not be punished.

Split Holds On New U.N. Members

Big-4 Delegates Confer in Vain

By Arch Parsons Jr.

UNITED NATIONS, N. Y., Nov. 19.—U. N. representatives of the Big Four—the United States, Great Britain, France and Russia—failed in a private meeting today to reach agreement on a way out of the East-West deadlock over the admissions of a large group of nations to the U. N.

A spokesman for the United States delegation announced after the meeting that "no agreement was reached" but that "conversations will continue"—presumably over the week end and up to the time when the U. N. Security Council meets some day next week for a showdown on the membership question.

The point in dispute—principally between the United States and the Soviet Union—is whether Outer Mongolia should be admitted. This was clearly the main subject of debate at the meeting held today in the form of a luncheon at the

Top Democrats Unite To Blast Republican Foreign, Home Policy

Associated Press radiophoto

SHOES OFF IN HOMAGE—Communist party leader Khrushchev (left) and Prime Minister Bulganin at the Mahatma Gandhi memorial in New Delhi yesterday.

Stevenson For Middle Of the Road

Kefauver Backs Moderation Plea

Stevenson address—Page 24.

By Walter Kerr

CHICAGO, Nov. 19.—Top leaders of the Democratic party launched a slashing attack on the foreign and domestic policies of the Republican party here tonight.

Its three leading candidates for the Presidential nomination next year joined in accusing the Eisenhower administration of lowering American prestige abroad and organizing a government favorable to "big business."

They spoke at a $100-a-plate dinner organized by the Democratic National Committee at the International Amphitheater here.

Middle of the Road

At the same time the only avowed candidate, Adlai E. Stevenson, of Illinois, and Sen. Estes Kefauver, of Tennessee, who is expected to announce his candidacy next month, took a turn toward the middle of the road. The third leading candidate, Gov. Harriman of New York, also spoke.

The front page of the November 20, 1955 issue of the New York Herald Tribune., *New York Herald Tribune*

The articles outline several research institutes that were focused on unlocking the secrets of gravity in the 1950s, including several major universities and private laboratories. A key part of much of the research conducted at these facilities involved relatively down-to-earth topics like electromagnetism, rotating masses at high speeds, and various methods of attempting to reduce an aircraft's mass.

Ansel Talbert was offered a firsthand glimpse into the research conducted at many of the laboratories set up in the 1950s to research gravity and attempts to combat it. His series of articles exploring the subject mention the anti-gravity interests and research of some of the biggest names in aviation: William P. Lear, Lawrence D. Bell, Dr. Igor I. Sikorsky, Martin's

Vice President Trimble, and even frozen foods magnate Clarence Birdseye. “Mr. Birdseye gave the world its first packaged quick-frozen foods and laid the foundation for today’s frozen food industry,” Talbert wrote, “more recently he has become interested in gravitational studies.”

Lawrence D. Bell, founder and president of Bell Aircraft Corp., of Buffalo, using a Japanese ivory ball to illustrate his view that humans before long will operate planes outside the earth's atmosphere, then outside the gravity field of the earth. The pilots with him, three top test pilots of the Air Force, are, left, Lt. Col. Frank J. Everest; center, in light suit, Maj. Charles Yeager, and, in uniform next to Mr. Bell, Maj. Arthur Murray.

Lawrence Bell of Bell Aircraft with Lt. Col Frank J. Everest, Maj. Charles Yeager, and Maj. Arthur Murray. According to Talbert’s articles, Bell believed that is was possible “to cancel out gravity instead of fighting it.”, *New York Herald Tribune*

Talbert’s series offers a fascinating glimpse into the many anti-gravity research efforts which were underway in the mid-1950s, but like all accounts of anti-gravity or breakthrough propulsion research, none of the subjects Talbert interviewed offered any suggestion that conclusive working anti-gravity technologies ever came from these endeavors.

Still, Talbert points out that some of the brightest minds in aerospace engineering and physics were devoted to studying gravity at the time, studies which led to important breakthroughs in general relativity:

The current efforts to understand gravity and universal gravitation both at the sub-atomic level and at the level of the universe have the positive backing today of many of America’s outstanding physicists.

These include Dr. Edward Teller of the University of California, who received prime credit for developing the hydrogen bomb; Dr. J. Robert Oppenheimer, director of the Institute for Advanced Study at Princeton; Dr. Freeman J. Dyson, theoretical physicist at the Institute, and Dr. John A. Wheeler, professor of physics at Princeton University who made important contributions to America's first nuclear fission project.

It must be stressed that scientists in this group approach the problem only from the standpoint of pure research. They refuse to predict exactly in what directions the search will lead or whether it will be successful beyond broadening human knowledge generally.

One of the biggest takeaways from Talbert's series is the optimism shared by many of those involved with the project, as well as the stigma surrounding such an endeavor, even back then:

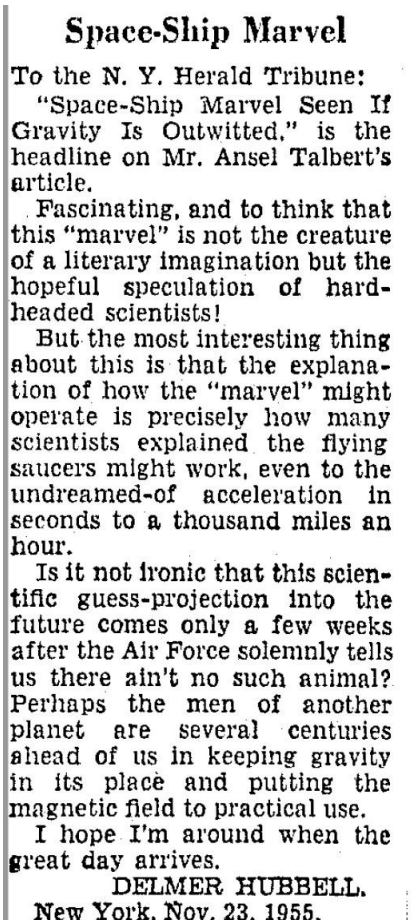
Grover Loening, who was the first graduate in aeronautics in an American university and the first engineer hired by the Wright Brothers, holds similar views. Over a period of forty years, Mr. Loening has had a distinguished career as an aircraft designer and builder and recently was decorated by the United States Air Force for his work as a special scientific consultant. "I firmly believe that before long man will acquire the ability to build an electromagnetic contra-gravity mechanism that works," he says. "Much the same line of reasoning that enabled scientists to split up atomic structures also will enable them to learn the nature of gravitational attraction and ways to counter it."

Right now there is considerable difference of opinion among those working to discover the secret of gravity and universal gravitation as to exactly how long the project will take. George S. Trimble, a brilliant young scientist who is head of the new advanced design division of Martin Aircraft in Baltimore and a member of the sub-committee on high-speed aerodynamics of the National Advisory Committee for Aeronautics, believes that it could be done relatively quickly if sufficient resources and momentum were put behind the program.

"I think we could do the job in about the time that it actually required to build the first atom bomb if enough trained scientific brainpower simultaneously began thinking about and working towards a solution," he said. "Actually, the biggest deterrent to scientific progress is a refusal of some people, including scientists,

to believe that things which seem amazing can really happen… I know that if Washington decides that it is vital to our national survival to go where we want and do what we want without having to worry about gravity, we'd find the answer rapidly."

Transcribed full text versions of Talbert's articles "Conquest of Gravity Aim of Top Scientists in U.S.," "Space-Ship Marvel Seen If Gravity is Outwitted," and "New Air Dream – Planes Flying Outside Gravity" can be found online here, while digital versions of the articles as they appeared in the *New York Herald Tribune* can be found through the *Herald Tribune* archives available through the ProQuest database or the New York Public Library system.



Space-Ship Marvel

To the N. Y. Herald Tribune:

"Space-Ship Marvel Seen If Gravity Is Outwitted," is the headline on Mr. Ansel Talbert's article.

Fascinating, and to think that this "marvel" is not the creature of a literary imagination but the hopeful speculation of hard-headed scientists!

But the most interesting thing about this is that the explanation of how the "marvel" might operate is precisely how many scientists explained the flying saucers might work, even to the undreamed-of acceleration in seconds to a thousand miles an hour.

Is it not ironic that this scientific guess-projection into the future comes only a few weeks after the Air Force solemnly tells us there ain't no such animal? Perhaps the men of another planet are several centuries ahead of us in keeping gravity in its place and putting the magnetic field to practical use.

I hope I'm around when the great day arrives.

DELMER HUBBELL.

New York, Nov. 23, 1955.

An op-ed sent to the New York Herald Tribune in response to Talbert's series., *New York Herald Tribune*

The Aerospace Research Laboratories At Wright Patterson Air Force Base

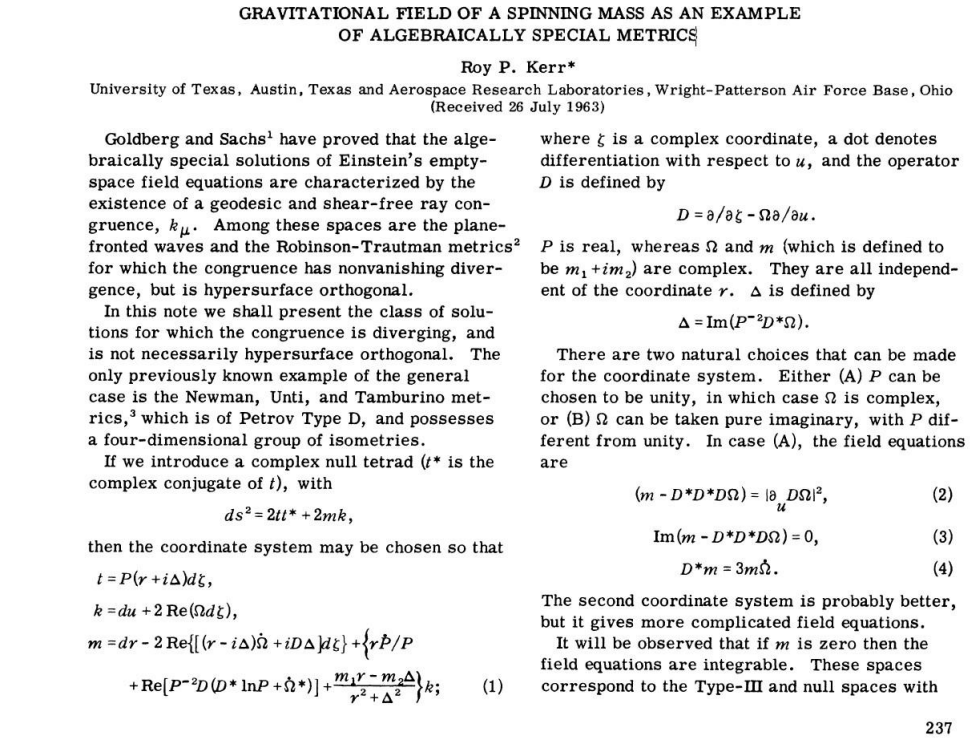
George Trimble, Clarence Birdseye, and Lawrence Bell weren't the only ones interested in researching anti-gravity. Talbert's series reported that nearly every major aerospace company at the time was involved in some way with researching "the gravity problem": Convair, Lear, Sikorsky, Sperry-Rand Corp., General Dynamics, and Avro Canada. Just as Dr. Louis Witten

mentioned off-hand in the closing seconds of his speech at the 27th Texas Symposium on Relativistic Astrophysics, the United States Air Force also established its own gravity research project at Wright Patterson Air Force Base.

The project was initially known as the General Physics Laboratory of the Aeronautical Research Laboratories (ARL), but its name was changed to Aerospace Research Laboratories at some point. To head the project, the Air Force hired physicist Joshua N. Goldberg who had recently received his PhD from Syracuse University. According to Goldberg's Curriculum Vitae, he served as a research physicist at Wright Patterson's Aerospace Research Laboratories from 1956 to 1962, as well as teaching graduate-level classical mechanics at the Ohio State University Extension at Wright Patterson.

Goldberg's publications from that period show he published a number of theoretical articles in academic journals while working at Wright Patterson, including titles such as "Conservation Laws in General Relativity", "Measurement of Distance in General Relativity", and "Einstein Spaces with Four-parameter Holonomy Group."

Many of Goldberg's peers at Wright Patterson likewise produced peer-reviewed research in general relativity while at Wright Patterson. Numbers vary, but some accounts say dozens of studies were produced by Goldberg's group. Some of the reports published from that era include equation-dense publications like "Some Extensions of Liapunov's Second Method" by J.P. LaSalle and "Gravitational Field of a Spinning Mass as an Example of Algebraically Special Metrics" by Roy Kerr.



GRAVITATIONAL FIELD OF A SPINNING MASS AS AN EXAMPLE OF ALGEBRAICALLY SPECIAL METRICS

Roy P. Kerr*
University of Texas, Austin, Texas and Aerospace Research Laboratories, Wright-Patterson Air Force Base, Ohio
(Received 26 July 1963)

Goldberg and Sachs[1] have proved that the algebraically special solutions of Einstein's empty-space field equations are characterized by the existence of a geodesic and shear-free ray congruence, k_μ. Among these spaces are the plane-fronted waves and the Robinson-Trautman metrics[2] for which the congruence has nonvanishing divergence, but is hypersurface orthogonal.

In this note we shall present the class of solutions for which the congruence is diverging, and is not necessarily hypersurface orthogonal. The only previously known example of the general case is the Newman, Unti, and Tamburino metrics,[3] which is of Petrov Type D, and possesses a four-dimensional group of isometries.

If we introduce a complex null tetrad (l^* is the complex conjugate of l), with

$$ds^2 = 2ll^* + 2mk,$$

then the coordinate system may be chosen so that

$$l = P(r + i\Delta)d\zeta,$$

$$k = du + 2\,\mathrm{Re}(\Omega d\zeta),$$

$$m = dr - 2\,\mathrm{Re}\{[(r - i\Delta)\dot{\Omega} + iD\Delta]d\zeta\} + \left\{rP\dot{P}/P + \mathrm{Re}[P^{-2}D(D^*\ln P + \dot{\Omega}^*)] + \frac{m_1 r - m_2\Delta}{r^2 + \Delta^2}\right\}k; \quad (1)$$

where ζ is a complex coordinate, a dot denotes differentiation with respect to u, and the operator D is defined by

$$D = \partial/\partial\zeta - \Omega\partial/\partial u.$$

P is real, whereas Ω and m (which is defined to be $m_1 + im_2$) are complex. They are all independent of the coordinate r. Δ is defined by

$$\Delta = \mathrm{Im}(P^{-2}D^*\Omega).$$

There are two natural choices that can be made for the coordinate system. Either (A) P can be chosen to be unity, in which case Ω is complex, or (B) Ω can be taken pure imaginary, with P different from unity. In case (A), the field equations are

$$(m - D^*D^*D\Omega) = |\partial_u D\Omega|^2, \quad (2)$$

$$\mathrm{Im}(m - D^*D^*D\Omega) = 0, \quad (3)$$

$$D^*m = 3m\dot{\Omega}. \quad (4)$$

The second coordinate system is probably better, but it gives more complicated field equations.

It will be observed that if m is zero then the field equations are integrable. These spaces correspond to the Type-III and null spaces with

Physical Review Letters

Viewpoints differ on the nature of the research conducted at Wright-Patterson under this program. Some have posited that it had to do with actually trying to develop anti-gravity propulsion, while others say its goals were far more mundane.

Nevertheless, the research supported by the Air Force led to what some science historians have called the "Golden Age of Relativity," a title disputed by others, such as German physicist Hubert Goenner, who argues that "to a great extent what was named the 'Golden age of relativity' in the United States, may have been nothing but a feature of a general trend in physics after the 'Sputnik'-shock." It's often claimed that the institute at Wright Patterson and other associated Air Force-funded laboratories were set up merely to investigate reports of Russian anti-gravity research to see if America's adversaries had achieved what the United States had not been able to.

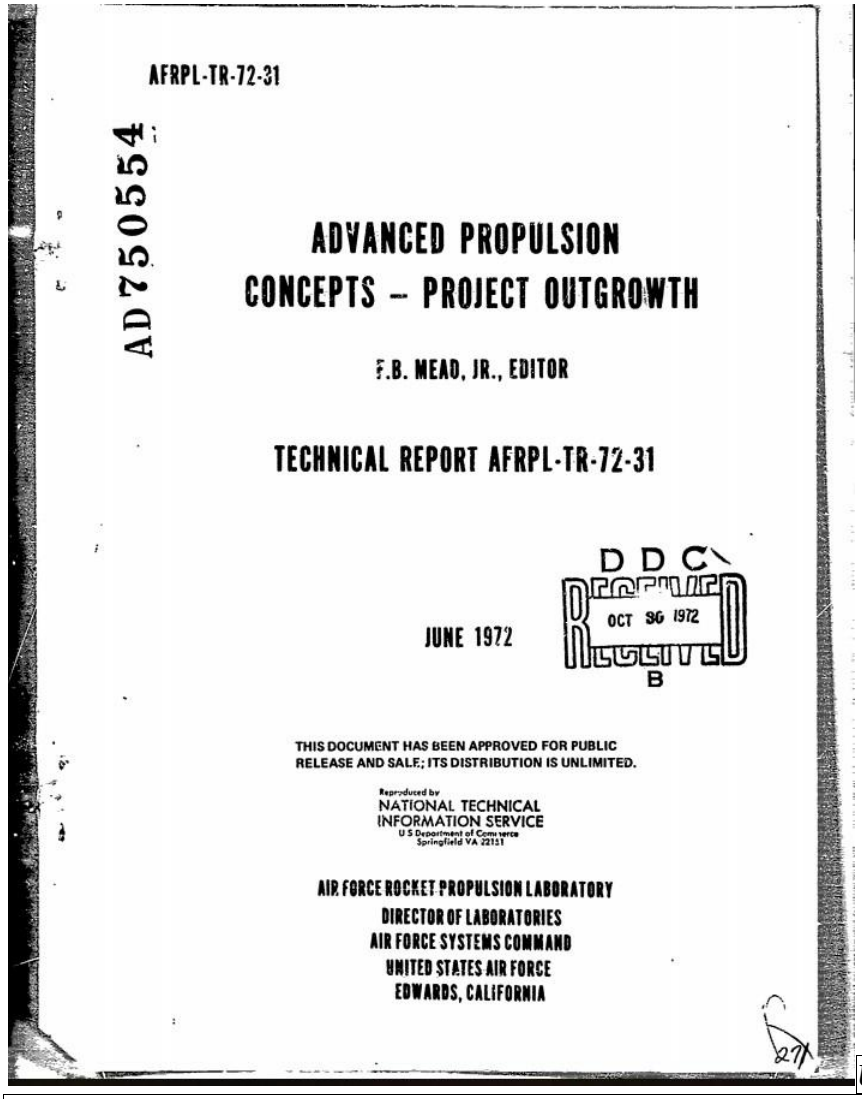
The anti-gravity research conducted at Wright Patterson concluded in the early 1970s with the passage of the Mansfield Amendments. The first of these, passed in 1970, limited "military funding of research that lacked a direct or apparent relationship to a specific military function."

According to an Office of Technology Assessment report delivered to the U.S. House of Representatives in 1991, these Mansfield Amendments for some years somewhat slowed the rate of U.S. military research into the types of lofty, abstract topics studied at Wright Patterson throughout the 1950s and 1960s. Following those Amendments, the Department of Defense's research strategy shifted more towards the proposal-grant model seen at university and private laboratories today.

That is not to say that the U.S. military's research into gravitation ended with the Mansfield Amendments or was limited solely to Goldberg's group at Wright Patterson. There is a wealth of research in the public realm that shows the Air Force's research into these concepts continued long after the scientists at that base moved on to long careers in academia.

In 1972, an ad hoc group with Franklin Mead, then Senior Aerospace Engineer with the Air Force Aerospace Research Laboratories, serving as editor had published a technical report titled "Advanced Propulsion Concepts – Project Outgrowth" for the Air Force Rocket Propulsion Laboratory at Edwards Air Force Base. The document discusses various advanced propulsion concepts ranging from traditional rocket propulsion to "anti-gravity propulsion," to which an entire chapter is dedicated.

Two main approaches are outlined in Project Outgrowth: those using gravitational absorption, and those based on unified field theory which unites electromagnetism and gravitation. While the document notes that these approaches would "require some major breakthroughs in materials," it points out that "no new or radical change in fundamental physics" would be required to make these breakthroughs a reality. In other words, Mead and the rest of the study group believed that these types of breakthrough propulsion concepts may be possible once materials sciences caught up with concepts developed in theoretical physics.



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ADVANCED PROPULSION CONCEPTS – PROJECT OUTGROWTH

F.B. MEAD, JR., EDITOR

TECHNICAL REPORT AFRPL-TR-72-31

JUNE 1972

AIR FORCE ROCKET PROPULSION LABORATORY
DIRECTOR OF LABORATORIES
AIR FORCE SYSTEMS COMMAND
UNITED STATES AIR FORCE
EDWARDS, CALIFORNIA

USAF

Throughout the expansive Project Outgrowth document, Mead and the other scientists also explored field propulsion, defined as those concepts which use "electric and/or magnetic fields to accelerate an ionized working fluid, or react directly with the environment by electric or magnetic effects." While a range of theoretical field propulsion approaches were analyzed, they concluded that "it would be impossible within the time constraints of this study to evaluate the field propulsion area completely," noting however that "more radical concepts may be found in the open literature by those interested in pursuing them."

Still, the document contains quite a few curiosities. One chapter, titled "Electrostatic Effects," describes the use of electric generators to charge giant metallic spheres buried in the ground six miles apart in symmetrical arrangements. Another sphere would be placed on top of the ground in the center of this arrangement of spheres, which would then be shot up to 620 miles into space when the other spheres are charged with an intense electrical current, according to the document. It is also claimed that vehicles flying in space with charged skins could be used to cause the spheres to change directions instantly without any loss of velocity or use of propellant.

c. Force Between Buried Spheres: The forces between charged bodies are extreme at close distances. For the spheres buried in the earth (see Figure II-32), the total force is 3.95-million pounds. Clearly, these spheres need substantial support.

d. Surface Tension: When the spheres are charged, the charges act to repel each other. This repulsion manifests itself as a surface tension which must be supported by the conductor and dielectric. From Jeans (Ref. II-39), the surface tension is:

$$T = (10 \times 10^5)\,\sigma^2 \text{ newtons/m}^2$$

or:

$$T = (28.8\,\sigma)^2 \text{ lbf/in.}^2$$

Where σ is the surface charge density in coulombs per square meter.

For the 10-meter-diameter spheres, $\sigma = 0.885$ coulomb/m^2. This gives a surface tension of 6.5×10^2 lbs/in^2. The yield strength of most materials is in the order of 10^4 psi, so the surface tension effect should not permanently distort the spheres.

e. Lift Force: The repulsion force, due to the four spheres pushing on the fifth sphere, will raise the free sphere to a point where the ratio of force to weight is one. This point occurs at an altitude just under 10^6 meters or 1000 km. This is about 620 miles. The exact solution for the height requires a trial and error solution of the equation:

$$h^2 = \frac{(5 \times 10^3) + h^2}{1.83 \times 10^{16}}$$

These results show that a sphere can be continuously supported by an electrostatic field at a height of 620 miles with little loss in energy.

USAF

As fascinating as this experiment sounds, there is nothing in the document to suggest the Air Force actually sent metal spheres flying into the sky, and the document points out that "analysis of this concept completely ignores the effect of the immense electric fields of the surrounding environment," noting that ambient ions accumulating around the spheres would nullify the repulsion effect. "Handling and producing charged objects of the magnitude assumed for the analysis may be well beyond the reach of technology for decades to come" and "all of the ideas discussed lack theoretical and technical merit," the study group concluded.

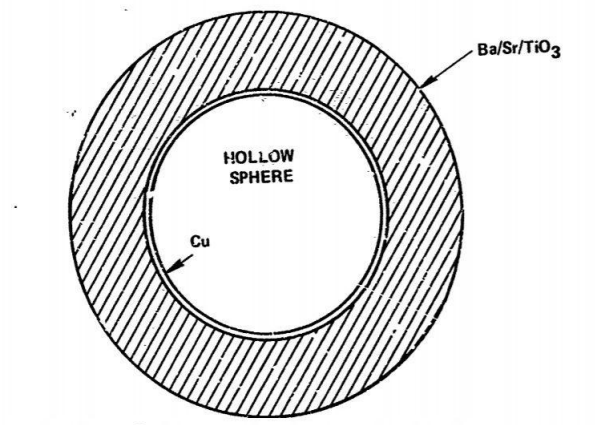


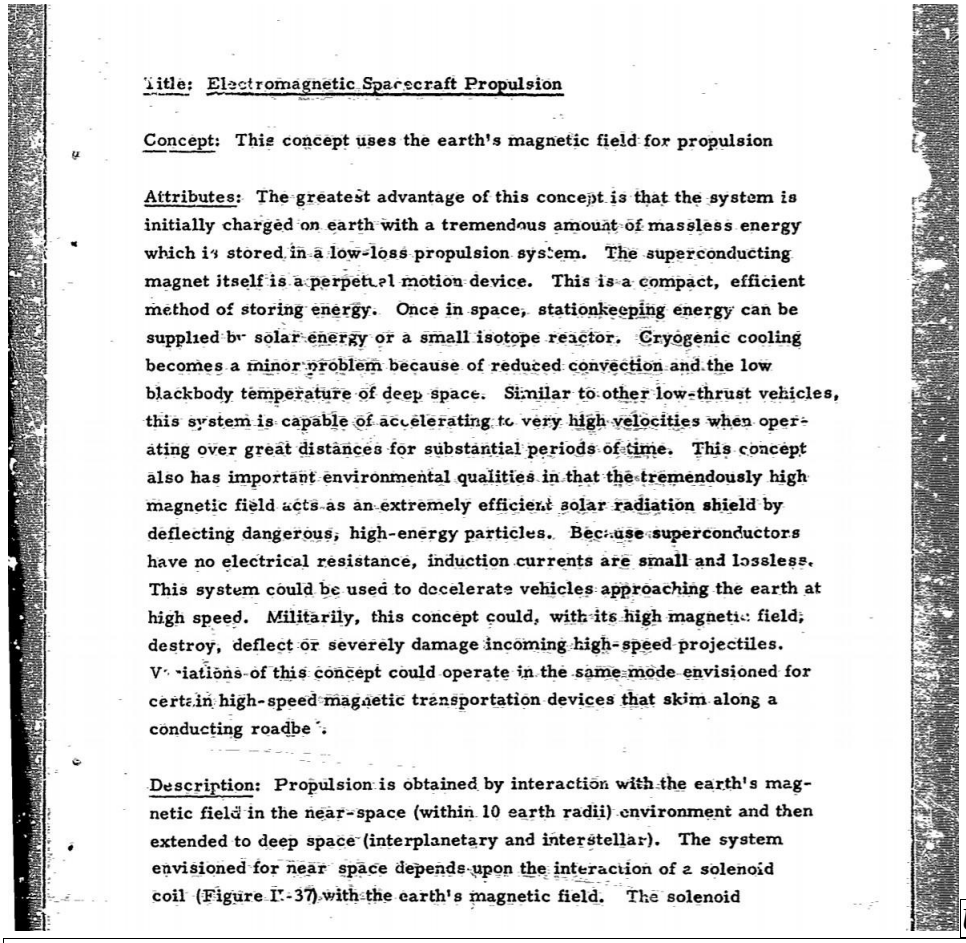
Figure II-33. Electrostatic Sphere Cross Section

II-105

USAF

The same document outlines theoretical approaches at using superconductors to achieve electromagnetic spacecraft propulsion, noting that the applications of high energy electromagnetic fields range far beyond propulsion:

The greatest advantage of this concept is that the system is initially charged on earth with a tremendous amount of massless energy which is stored in a low-loss propulsion system. […] Similar to other low-thrust vehicles, this system is capable of accelerating to very high velocities when operating over great distances for substantial periods of time. […] This system could be used to decelerate vehicles approaching the Earth at high speed. Militarily, this concept could, with its high magnetic field, destroy, deflect, or severely damage incoming high-speed projectiles.



Title: Electromagnetic Spacecraft Propulsion

Concept: This concept uses the earth's magnetic field for propulsion

Attributes: The greatest advantage of this concept is that the system is initially charged on earth with a tremendous amount of massless energy which is stored in a low-loss propulsion system. The superconducting magnet itself is a perpetual motion device. This is a compact, efficient method of storing energy. Once in space, stationkeeping energy can be supplied by solar energy or a small isotope reactor. Cryogenic cooling becomes a minor problem because of reduced convection and the low blackbody temperature of deep space. Similar to other low-thrust vehicles, this system is capable of accelerating to very high velocities when operating over great distances for substantial periods of time. This concept also has important environmental qualities in that the tremendously high magnetic field acts as an extremely efficient solar radiation shield by deflecting dangerous, high-energy particles. Because superconductors have no electrical resistance, induction currents are small and lossless. This system could be used to decelerate vehicles approaching the earth at high speed. Militarily, this concept could, with its high magnetic field, destroy, deflect or severely damage incoming high-speed projectiles. Variations of this concept could operate in the same mode envisioned for certain high-speed magnetic transportation devices that skim along a conducting roadbed.

Description: Propulsion is obtained by interaction with the earth's magnetic field in the near-space (within 10 earth radii) environment and then extended to deep space (interplanetary and interstellar). The system envisioned for near space depends upon the interaction of a solenoid coil (Figure II-37) with the earth's magnetic field. The solenoid

USAF

The Project Outgrowth document concludes by arguing that while many of these concepts are still out of the grasp of the USAF, advances in materials and engineering could make what in 1972 seemed like fantasy a reality in the decades to come:

Obviously, advancements in certain areas of technology could make a number of concepts suddenly very attractive. Improvements in high energy lasers by several orders of magnitude of energy output or new concepts involving long-distance energy transfer would make both laser propulsion and infinite Isp ramjet very attractive. The development of higher current density superconductors, metallic hydrogen, or even room temperature superconductors would make many of the magnetic concepts more attractive. […]
Radical departures from time-honored, well-proved approaches are either discarded or lack visualization. Possibly, not until man truly becomes a creature of space will the restrictions imposed on his imagination be removed and radically new propulsion concepts devised. We are just beginning to understand the true nature of

space and to attempt to utilize this environment for our propulsion needs.

The same concepts explored in the Project Outgrowth document were later examined by subsequent Air Force-funded studies. In 1988, the New York-based Veritay Technology, Inc. submitted the document "21st Century Propulsion Concept" to the Air Force Astronautics Laboratory (AFAL) at Edwards Air Force Base. The document looks at the Biefield-Brown effect, a controversial theory that claims that electrical fields can produce propulsive forces sometimes referred to as ionic wind. The AFAL was able to generate minuscule measures of propulsion with the concept, but concluded that "ion propulsion effects are negligible."

A similar report from 1989 titled "Electric Propulsion Study" also complied for the Astronautics Laboratory at Edwards outlines a variety of theories and experiments that explore the interactions between gravitational, electrical, and electromagnetic fields. Concepts like ionic wind, the Mach effect, and various applications of high energy electromagnetic fields are discussed.

One brief chapter explores the concept of inertial mass variation using a rotating cylinder filled with mercury. The Air Force concluded that the experiment showed little promise and that "no AFAL action is suggested at this time" but that "should an experiment by external agencies be done with positive results, then this area should be reconsidered."

Ultimately, the document concludes that while much of the research it cites is still in its infancy, inertial mass reduction techniques may offer the most promising results with further study:

It is recommended that policies and plans take into consideration long time studies in the area of gravity and inertia. These areas deserve more emphasis. This is likely to be more important than any single experimental program. Since chemical propulsion is reaching its theoretical limits and nuclear propulsion has political difficulties, it is more likely that gravitational and electromagnetic studies will lead to future breakthroughs than any nuclear force studies (with the possible exception of more recent low temperature fusion work).

The Air Force continues to look into ways of defying gravity without the use of propellants and some technical reports maintain that this will soon be possible. According to the 2006 study "Advanced Technology and Breakthrough Physics for 2025 and 2050 Military Aerospace Vehicles" which was published by the American Institute of Physics, some scientists claim that next-generation propulsion may be achieved sometime within the next three decades.

The study was compiled at the request of the U.S. Air Force Research Laboratory (AFRL) and examines the technological breakthroughs that researchers believed could be developed and implemented by 2025 and 2050.

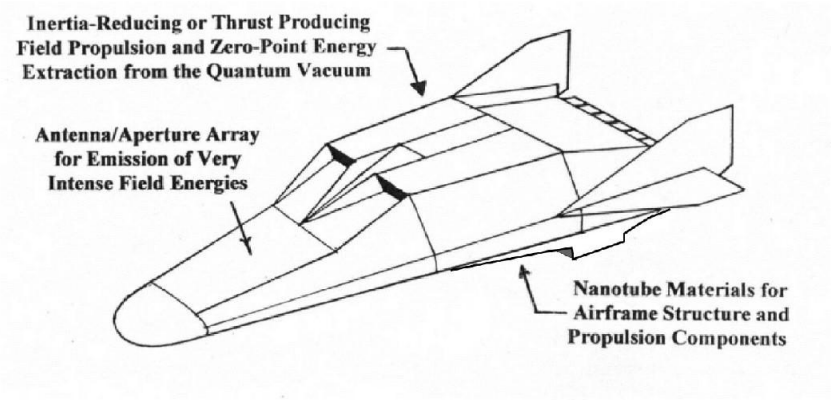


FIGURE 8. Example of Augmenting Jet Power and Propulsion with Field Power and Propulsion.

The conceptual "2050 vehicle" featuring hypothetical inertial mass reduction technology which is theorized to extract energy from the quantum vacuum., *American Institute of Physics*

While most of the report centers around compact fusion reactors and the developments of new high temperature composite materials, the section on the "2050 Vehicle" predicts that the jet propulsion and power systems of this hypothetical aircraft will come in the form of propellant-less field propulsion based on the principle of inducing mass fluctuations using high-frequency electromagnetic fields:

One example of propellant-less field propulsion […] proposes the use of high voltage and high frequency electromagnetic (em) field pulsations to induce mass fluctuations within the electronic and ionic structure of dielectric materials – to cause a favorable "gravinertial" field coupling with nearby and distant matter that results in unidirectional force.

Of course, as we now know, the USAF isn't the sole branch of the military openly looking into next-generation hypothetical vehicles based on concepts of electromagnetic fields and inertial mass variation. Based on the recent announcement declaring a partnership with TTSA, we know even the U.S. Army is also exploring similar concepts for next-generation ground vehicles that exploit the same principles the USAF has explored for decades: mass manipulation, electromagnetic metamaterial waveguides, and quantum physics.

Civilian Research Into Gravitation, Electromagnetism, And Propulsion

The military isn't the only sector that has for decades conducted research that has explored the boundaries of aerospace propulsion and general relativity. In 1996, NASA funded an endeavor known as the Breakthrough Propulsion Physics (BPP) Program which invited some of the

brightest minds in physics and aerospace engineering to propose radical new ideas to propel spaceflight into a new paradigm.

In a paper outlining the BPP program presented at the Second Symposium on Realistic Near-Term Advanced Scientific Space Missions in 1998, its director, Marc Miller, offered an overview of NASA's aims for the project, noting that "it is known from observed phenomena and from the established physics of General Relativity that gravity, electromagnetism, and spacetime are inter-related phenomena" and that "these ideas have led to questioning if gravitational or inertial forces can be created or modified using electromagnetism."

Many of the ideas Miller and the NASA BPP program describes were developed or are better understood thanks to the research funded by Wright Patterson, including Hermann Bondi's concept of negative mass (Bondi's group at Kings College, London received funding from the U.S. Air Force) and Joshua Goldberg's theory of gravitational radiation.

In an attempt to achieve breakthrough propulsion based on these concepts, NASA's project identified three major barriers that stood in the way of their main goal of achieving interstellar travel:

(1) MASS: Discover new propulsion methods that eliminate or dramatically reduce the need for propellant. This implies discovering fundamentally new ways to create motion, presumably by manipulating inertia, gravity, or by any other interactions between matter, fields, and spacetime.
(2) SPEED: Discover how to attain the ultimate achievable transit speeds to dramatically reduce travel times. This implies discovering a means to move a vehicle at or near the actual maximum speed limit for motion through space or through the motion of spacetime itself (if possible, this means circumventing the light speed limit).
(3)ENERGY: Discover fundamentally new modes of on board energy generation to power these propulsion devices. This third goal is included since the first two breakthroughs could require breakthroughs in energy generation, and since the physics underlying the propulsion goals is closely linked to energy physics.

In 1997, NASA's Lewis Research Center, now known as the John H. Glenn Research Center at Lewis Field, held a conference on these breakthrough propulsion concepts, the proceedings of which are worth a read and contain titles such as "Inertial Mass as a Reaction of the Vacuum to Accelerated Motion", "Force Field Propulsion", and "The Zero-Point Field and the NASA Challenge to Create the Space Drive".

From what little we know or *think* we know about Salvatore Cezar Pais, the elusive inventor of the Navy's intriguing if not puzzling anti-gravity 'UFO' patents that we've explored in our

previous reporting, he was working on his PhD dissertation at Case Western Reserve University while serving as a NASA Graduate Student Research Fellow at NASA's John H. Glenn Research Center at Lewis Field at the time of the conference.

There's no concrete evidence that Pais attended the workshop, but according to the document's foreword, 12 students were in attendance. The table of contents for the conference proceedings lists a total of 449 pages, the last of which is a list of workshop participants. However, the versions available online stop at page 389. We are currently pursuing a Freedom of Information Act request to obtain the missing pages.

Confirming Pais' presence at the conference would be significant because many of the *exact* same revolutionary concepts that NASA was exploring in terms of unlocking new forms of propulsion and space travel are the same types of concepts found throughout the patents for his "hybrid aerospace-underwater craft" and "high energy electromagnetic field generator." Many of the participants at NASA's workshop are also cited throughout Pais' patents and publications. Placing Pais at the conference would add to the body of evidence which suggests the technologies in the Navy's patents may have been in the works for the past 20 years, at least as far as the inventor is concerned. In reality though, as we've laid out here, many of the concepts in Pais' patents are similar to those which were researched at Wright-Patterson and other facilities in the 1950s and are still being explored today.

Aside from NASA, academic and independent laboratories have been researching the same principles and approaches the Air Force and other military laboratories have been looking into for decades. One of the most commonly researched areas is in hypothetically reducing an aircraft's mass using electromagnetism, preferably to zero, and several Lockheed Martin researchers have been involved with quite a few theoretical studies into altering inertial mass (see Haisch, Rueda, and Puthoff, 1998; Rueda and Haisch, 1998; Haisch and Rueda, 1999; and Woodward, Mahood, and March 2001).

A large body of peer-reviewed research into mass reduction involves using advanced superconducting materials such as yttrium barium copper oxide, or YBCO (see Podkletnov and Nieminen, 1992; Li et al, 1997; and Podkletnov and Modanese, 2001). Some of these studies, many of them more than 20 years old, reported observing mass reductions of up to two percent. Of course, just because scientists report a peer-reviewed result doesn't mean their data can't be challenged or have been impacted by spurious factors.

Other attempts to overcome and harness gravity focus on the use of electromagnetic fields. In the 2007 publication "The Connection between Inertial Forces and the Vector Potential", researchers found a connection between electric and magnetic fields, writing that there is a "possibility to manipulate inertial mass" and potentially "some mechanisms for possible applications to electromagnetic propulsion and the development of advanced space propulsion physics."

In 2010, an Air Force-funded study at the University of Florida leveraged these principles to design and test a "Wingless Electromagnetic Air Vehicle (WEAV)" which is claimed to employ "no moving parts and assures near-instantaneous response time." The study writes that this

vehicle is designed to support the Air Force Research Laboratory's strategy to "deliver precision effects: ubiquitous, swarming sensors and shooters" by 2015-2030.

The study was able to produce a disc that "was able to hover a few millimeters above the surface for a sustained duration (about three minutes)" and noted that "prototypes of varying radius were also successfully 'flown', demonstrating that WEAV is scalable."

Figure 24. Demonstration of successful liftoff of WEAV prototype

Air Force Office of Scientific Research

Many other approaches have focused on the unique properties of novel materials. The 2007 publication "Direct Experimental Evidence of Electromagnetic Inertia Manipulation Thrusting" reports "new experimental results suggesting that 'propellantless' propulsion without conventional external assistance has been achieved by means of electromagnetic inertia manipulation" using piezoelectric materials, compounds that change shape when subjected to an electrical charge.

In fact, several researchers have reported significant results in mass manipulation using a specific piezoelectric compound, lead zirconate titanate (PZT), which is found throughout several of the Navy's recent patents. One physicist in particular, Dr. James Woodward of California State Fullerton, has found repeated success in altering the mass of small test samples of PZT.

While the levels of mass reduction Woodward has observed are tiny, so are the samples and energy levels he has used. Still, in one study published with aerospace engineer Paul T. March, then at Lockheed Martin, the authors note that "very large mass fluctuation effects should be producible with only relatively modest power levels," but are beyond the scope and scale of their study.

Even so, Woodward's results have been so promising that at least two Air Force studies, the 1989 technical report "Electric Propulsion Study" and the 2017 paper "Movement and Maneuver in Deep Space: A Framework to Leverage Advanced Propulsion", call attention to his research in particular and note that his approach seems most promising.

However, the 2017 Air Force paper notes that “obvious institutional and funding barriers stand in the way” and that “materials science and engineering work would be required to produce new piezoelectric materials and compensate for natural resonance, mechanical fatigue, and thermal effects.”

Perhaps for that reason and for likely many more, various branches of the Armed Forces have for years been actively researching metamaterials that can propagate high energy electromagnetic fields. Navy budget documents show that between 2011 and 2016, the Navy’s In-House Laboratory Independent Research program conducted research into the “dispersion and control of electromagnetic (EM) waves in the microwave (RF) region, using fabricated metamaterial structures”.

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2015 Navy		**Date:** March 2014
Appropriation/Budget Activity 1319 / 1	**R-1 Program Element (Number/Name)** PE 0601152N / *In-House Lab Independent Res*	**Project (Number/Name)** 0000 / *In-House Lab Independent Res*

B. Accomplishments/Planned Programs ($ in Millions)	**FY 2013**	**FY 2014**	**FY 2015**
- Completed research for Control and Dispersion of Electromagnetic Energy Using Metamaterials, where the dispersion and control of electromagnetic (EM) waves in the microwave (RF) region, using fabricated metamaterial structures, were demonstrated. Six metamaterial structures were modeled using in-house programs, DOD supercomputer resources, and High Frequency Structure Simulation (HFSS) software, and fabricated use photolithography, vapor deposition, and chemical and reactive ion etching. Scattering parameters (transmittance and reflectance), were acquired using a Network Analyzer coupled to a free space analysis setup. - Completed research for Polyurea Silicate Composites. The objective of this research is to identify the structural transitions and interactions of the polyurea and nanoparticle that underlie the enhanced mechanical mechanisms for the protective response of polyurea nanocomposites. The approach is to use small angle and wide angle x-ray scattering (SAXS and WAXS) simultaneously with tensile and recovered impact tests to obtain a fundamental understanding of the polyurea nanoparticle effect at the molecular level. The strain rate material responses, both elastic and plastic, would be incorporated into a constitutive equation needed for modeling and for hydrocode simulations for further calculations of optimized geometries and layer thicknesses. - Initiated fundamental research on high strength nanostructures/nanomaterials. - Initiated research for new concepts, configurations, and applications for metamaterials. - Initiated research for high temperature alloys for engine applications. - Initiated research for low-cost, high-strength material repair. - Initiated ILIR projects that are intended to be approximately three years in length. Projects selected for FY 2013 will focus on supporting Naval Materials by Design and Intelligent Naval Sensors, Innovative Naval Prototype initiatives in Electromagnetic Gun and Sea Basing, and National Naval Responsibility initiatives in Undersea Weaponry and Naval Engineering. ***FY 2014 Plans:*** Efforts in this R2 project have been continued in FY 2014 in the new ILIR Program. ***FY 2015 Plans:*** N/A			

Department of Defense

Starting in 2017, the Navy combined several program elements under one title, changing the way individual projects are reported in their budget and thus making it more difficult to know whether this metamaterial research continues today.

Scratching The Surface While Not Knowing What Lies Beneath It

The research cited here is only a brief look at a handful of the numerous studies the Air Force, other branches of the military, and various academic laboratories have conducted into “anti-gravity” and various propellantless propulsion methods, and only those that are available to the public. Anyone familiar with military research and development knows that there is a vast trove

of projects, associated data, and technologies the public has yet to be shown and may never be shown.

There have been hints of those secret technologies for years offered by insiders of some of America's most high-level aerospace research and development outfits. For instance, Ben Rich, the second director of Lockheed Martin's Skunk Works, told Popular Science in 1994 the following:

"We have some new things. We are not stagnating. What we are doing is updating ourselves, without advertising. There are some new programs, and there are certain things, some of them 20 or 30 years old, that are still breakthroughs and appropriate to keep quiet about [because] other people don't have them yet."

With this in mind, it is possible that there are certain technologies in existence that once were, but may no longer be the things of science fiction.

Regardless, when it comes to harnessing exotic methods of overcoming gravity, the U.S. military's interest in doing so has continued since the 1950s, and civilian laboratories have been hot on their heels.

We're still pursuing answers to the enigma surrounding the recent Navy patents, but to say they have come out of the blue and have no scientific basis whatsoever seems to be not entirely accurate based on the decades of research we've presented here. The same principles and many of the same names cited in Salvatore Pais' patents filed for the US Navy between 2015 and 2018 appear throughout numerous NASA studies, the peer-reviewed publications of the scientific community, and the long history of U.S. government-funded research into general relativity and breakthrough propulsion science.

We have to stress once again that this doesn't mean that actually realizing these concepts and putting them to use is possible at this time, or even ever in the future, for that matter. But it does show that there has been an incredibly long and detailed history of interest by the U.S. military and the scientific community in this exotic field that has resulted in significant amounts of research that spans nearly seven decades. All this occurred in spite of the fact that scientists realized as far back as the 1950s that the topic was largely taboo and often scoffed at by the larger scientific community.

Once again, what exists behind the curtain of the classified realm is the big wildcard here. With so much research present in the unclassified environment, one can only guess as to just how far the military and their industry partners have actually gone in an effort to obtain the 'Holy Grail' of aerospace engineering. For some, that speculative answer may be not very far at all. For others, it may be quite the contrary. The fact is we just don't know. But at least we do know that the topic, in general, isn't quite as alien as it may seem.

Scientists Actually Did It: They Built a Real Working Tractor Beam

One that manipulates objects and everything.

PUBLISHED: JAN 26, 2023 2:58 PM EST

- Scientists **built a working tractor beam**—the first example of one that pulls objects visible to the naked eye.
- The tests were in highly controlled laboratory experiments.
- A tractor beam like this one could manipulate vehicles and aircraft on **Mars**.

Tractor beams have long been a staple of sci-fi, but you might not know that they've also existed in the real world for some time, albeit at a very small scale. Microscopic tractor beams, better known as optical tweezers, can pull atoms and nanoparticles for use in medicine and research. But we've never actually been able to see this happen.

Now we can.

In a new study **published** in the journal *Optic Express*, Chinese scientists created the first tractor beam strong enough to manipulate *macro*scopic objects. That means you can watch the thing work with the naked eye.

Sure, the initial experiment was done in a highly controlled lab, manipulating a specific type of Graphene composite and under a rarefied gaseous environment with a lower pressure than Earth's atmosphere. But come on! They used a friggin' laser to move an object!

The scientists write:

"With our new approach, the light pulling force has a much larger amplitude. In fact, it is more than three orders of magnitudes larger than the light pressure used to drive a solar sail, which uses the momentum of photons to exert a small pushing force."

In the experiments, a torsional pendulum device presented the laser pulling phenomenon. By controlling the interactions between the light, object, and medium, the new study shows that flexible light manipulation of macroscopical objects is feasible. It also highlights the complexity of laser-matter interactions.

Expect the team, led by Lei Wang, to continuing pushing the possibilities. “Our technique provides a non-contact and long-distance pulling approach, which may be useful for various scientific experiments,” Wang said, **via** *Universe Today*.

Scientists Are Actively Building a Real-Life Tractor Beam. Seriously.

PUBLISHED: JUN 06, 2023

- Scientists are working on bringing a tractor beam from science fiction to reality.
- The researchers are planning to use beams of electrons to create opposite charges and attract object to the beam for manipulation.
- The goal is to find a safe and effective way to pare down the ever-growing field of space junk orbiting our planet.

If you’re familiar with any amount of sci-fi, you’ve probably been made aware of the tractor beam. Often used in fiction to grab rogue objects or opposing **spaceships** and move them around, they usually consist of a nondescript beam of light shooting out from a craft to envelop something and hold it in place.

Insert a hand-wavey explanation of the “science” behind the future-tech here.

But that explanation may soon be less hand-wavey, and the tech may be less future. Because a real-life tractor beam is currently under development at the University of Colorado Boulder, with the goal of eventually helping to clean up **space junk**.

Space debris is a serious issue, and it’s becoming more serious by the day as we continue to launch objects into space. “The problem with space debris is that once you have a collision, you're creating even more space debris,” Julian Hammerl, a Ph.D. student working on the project, said in a **press release**. “You have an increased likelihood of causing another collision, which will create even more debris. There’s a cascade effect.”

The problem with space debris, though, is that it’s very hard to collect and remove for proper disposal. You can’t just send a little **robot** up into space to scoop up our refuse and send it back down—because you can’t *really* just grab space junk. It’s most often moving very fast, and it’s very hard to predict exactly how it’s moving so you can be

ready to catch it. There's unfortunately a good chance that whatever you send to physically grab the junk is going to get hit and become even more junk itself.

So, enter the tractor beam. If you can just shoot a beam at something to grab it, most of that danger gets avoided. The team working on this technology is looking to create an "electron beam," which would basically work like a very strong version of **static electricity**.

"We're creating an attractive or repulsive electrostatic force," Hanspeter Schaub, a researcher and leader of this project, said in a **news release**. "It's similar to the tractor beam you see in *Star Trek*, although not nearly as powerful."

In order to test its tech, the team has been working with a device called Electrostatic Charging Laboratory for Interactions between Plasma and Spacecraft (ECLIPS). It's basically a small chamber that mimics, in miniature, the regions of space around our planet that is most full of space debris.

In that chamber, they can put their idea to work by shooting small blocks representing space debris with beams of electrons. This makes the debris slightly negatively charged and the tractor beam slightly positively charged. And as opposite charged attract, the tractor beam can begin its towing work. The team estimates that it could pull a several-ton **satellite** around 200 miles over two to three months—not fast, but it would be fast enough.

Fifty years ago, tractor beams that move large objects through space made an appearance on the show "Star Trek." About five years ago, we started seeing the technology actually demonstrated in the lab over short distances and in the water. Now, as Star Trek celebrates a half-century of boldly going places, David Grier's lab at New York University is working with NASA to develop a working tractor beam that could one day be used in space.

This tractor beam makes use of some odd properties of light waves to pull objects along a path.

In the above video from NYU, Grier, a physics professor, explains how his team developed the technology by first working off the idea that light waves have an actual force. You can see this in action when you look at a comet, which always has its tail pointing away from the sun thanks to the force of light "blowing" on its dust cloud.

The work first experimented with a method of using these forces exerted by light to hold microscopic objects in one place. The method

was dubbed "optical tweezers." But when one of the researchers' experiments with optical tweezers failed, it led to the discovery that they could also use the forces of light to actually pull tiny objects in one direction, just like a tractor beam.

The beam of light used to create this desired effect doesn't really look anything like what we see in Star Trek. It's more of a twisted beam of light in the shape of a helix, according to Grier.

Grier and his team have been scaling up this concept recently. At first, their tractor beam could only move microscopic objects over microscopic distances, but now those distances have increased from centimeters to meters and they're currently working on a tractor beam that could move objects over several kilometers.

This is the point where real-life tractor beams start to have real-life potential. Indeed, NASA has a slideshow presentation on tractor beams that makes liberal use of Grier's work and discusses how spacecraft or surface rovers could use tractor beams to gather samples of dust and particles for study.

That's still a far cry from the massive tractor beams used by Starfleet to tow entire starships, but as Grier and I have both pointed out during Star Trek's 50th anniversary celebration this month, humans are starting work on developing tractor beams a few hundred years before it happened in the fictional universe created by Gene Roddenberry, so we've got a sizable head start in making science fiction into science fact with this technology in particular.

Legend has it that Isaac Newton had the moment of inspiration that would lead to his theory of gravity when, on a warm afternoon, he saw an apple fall from a tree and wondered why it should fall down instead of up. (Some versions of the story have the apple falling and hitting poor Newton on the head.) He named his new hypothesis after the Latin *gravitas*, for "weight." The tale of Newton's bruised noggin may be apocryphal, but his interest in what makes things move—and especially what makes them *fall*—was very real. Newton had come home to stay when his university closed down due to a bout of bubonic plague, and he was

looking for something to occupy his mind. In 1665, he found it, apple or no apple.
It took Newton, one of the world's greatest mathematical minds and, by all accounts, an irascible jerk, 20 years to articulate his thoughts on gravity to his satisfaction. His biggest problem? The question of whether the Earth's gravitational influence could extend all the way to the Moon.

Two hundred years later, the calculations that took humanity to the Moon were based on Newton's mechanics. But how does gravity work in the first place? What did Newton understand that was such a revolution?

Gravity: The Basics

Can someone just... *explain* gravity to me?

Let's start with a definition. Gravity, or gravitational attraction, is the tendency of mass to gather toward itself, drifting together even across great distances due to curvature in spacetime. This tendency allows the formation of stars, planets, galaxies, and black holes.

Standing on Earth's surface, the planet's mass creates a gravitational force sufficient to accelerate any object downward (toward the core of the planet, or perpendicular to the planet's surface) at 9.8 m/s^2—that is, an *additional* 9.8 meters per second, each second. Everything experiences the same amount of gravity, but if you take a hammer in one hand and a feather in the other and drop them at the same time, the hammer will hit the ground first. Why? Drag (air resistance) opposes acceleration due to gravity. In a vacuum, such as on the Moon, both objects will hit the ground at the same time.

How does gravity work?

Gravity applies an effective force of mutual attraction to things with inertial mass, including physical matter and photons. The force of gravity is transmitted through spacetime at the speed of light, which creates wavefronts we can detect with special equipment like the LIGO gravitational wave detectors.

In classical (or "Newtonian") mechanics, which describes the motion of macroscopic objects (i.e., things larger than an atom, such as planets), gravity is sometimes called a *central force*. A central force is directed towards or away from a point called the *center of force*. Gravity, electrical charge, and magnetism are three examples of central forces. Centers of electromagnetic energy radiating inward or outward are known as poles.

Newton used a mathematical approach to gravity not unlike Coulomb had done with electrostatics, with a field that falls off as the inverse square of the distance between two objects. Looking at it this way, the gravitational force at a point can be expressed as a vector, with magnitude and direction.

How is gravity transmitted?

Christian Huygens, a contemporary of Isaac Newton, discovered that light carries energy. This suggests a force-carrying graviton as an obvious theoretical parallel to a photon. But where photons are the force carrier of the electromagnetic field, relativity frames gravity as an emergent consequence of the way inertial mass warps spacetime. Instead of requiring a force carrier, according to general relativity, what we think of as gravity is more like the idea of "downhill."

Massive or high-energy objects warp the mesh of spacetime, dragging it in toward themselves and creating a gravitational field of influence or "gravity well" from which it can be difficult to escape.

Central Forces

When matter is collected in one place, it forms a *center of mass* from which its inward-pointing field of gravitational influence extends. The force of attraction between two objects falls off as distance increases from the center of mass.

Objects under the influence of a gravitational field will move toward the field's center of *gravity*. Sometimes, as with the Sun and Jupiter, their mutual center of gravity or barycenter lies slightly outside one of the bodies; Jupiter is large enough that it drags the Sun in a little circle, centered slightly outside of the Sun's radius, as Jupiter makes each orbit.

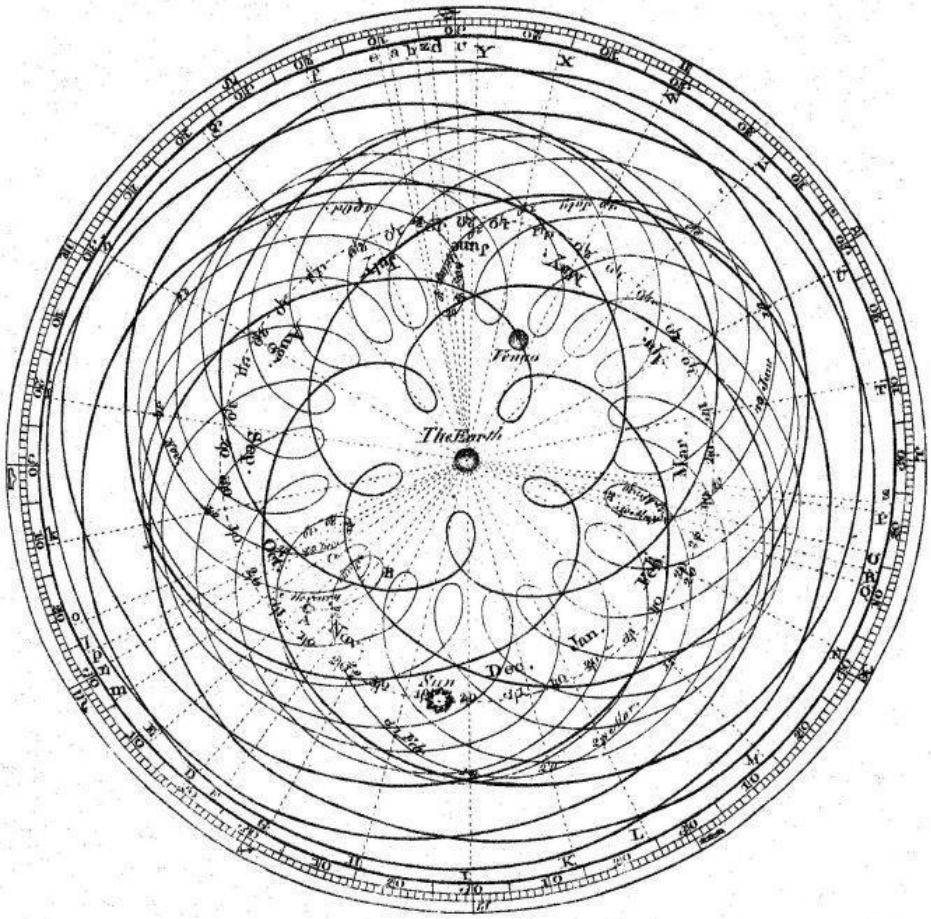
On Earth, we have to contend with our own gravity well when we launch rockets and spacecraft; if a rocket isn't powerful enough to escape its gravity well, it will

fall back to Earth. As matter becomes more and more dense, that effect becomes more pronounced. Black holes create a gravity well so deep that there's a threshold around black holes called an event horizon, a boundary in space marking the point of no return. Nothing inside the event horizon can escape from a black hole. Indeed, it's thought that the only thing that can *ever* escape a black hole's gravity is a frisson of virtual particles called Hawking radiation, thrown off every so often when subatomic symmetries align.

Sacred Geometry

Astronomers in ancient Greece noticed that the planets sometimes seem to move in retrograde across the sky, backward with respect to their normal orbits. This offended some astronomers' sense of *cosmos*, the orderliness of the universe. In a universe perfectly ordered by the hands of their gods, there was little room for irrational numbers or eccentric orbits.

In their attempt to reconcile their geocentric models with their empirical observations, they proposed the idea of epicycles: complex orbits that were neither circular nor elliptical, with planets dancing around the Earth in paths that look like geometric lace.



James Ferguson (1710-1776), based on similar diagrams by Giovanni Cassini (1625-1712) and Dr Roger Long (1680-1770); engraved for the Encyclopaedia by Andrew Bell. - Encyclopaedia Britannica (1st Edition, 1771; facsimile reprint 1971), Volume 1, Fig. 2 of Plate XL facing page 449.© Provided by ExtremeTech

Geocentric models resorted to convoluted orbits to explain the apparent motion of planets through the sky. Credit: Public domain

Geocentrism reigned unchallenged for more than two thousand years. Despite the repeated proposal of a heliocentric solar system over the millennia by scholars as respected as Leonardo da Vinci, heliocentrism wasn't taken seriously until the medieval era. However, the scientific consensus began to change in the 1500s. Nicolaus Copernicus developed a heliocentric model, backing up his argument with astronomical observations—and predictions that would confirm his model as correct or invalidate it. Galileo Galilei, using the newly invented refracting telescope, made and published observations showing that the planet Venus went through phases just like the Moon, and that Jupiter was orbited by its own moons.

Music of the Spheres

Then, Johannes Kepler put forth a solution to the problem of retrograde planets that would have satisfied even the strictest Pythagorean. Even with their orbits taking the "imperfect" shape of an ellipse, Kepler showed that a planet swept out an equal geometric area of its orbit over the same length of time, no matter where in its elliptical orbit it might be, nor how eccentric that ellipse. Kepler was a big believer in *musica universalis*, the music of the spheres; the idea that an inaudible mathematical harmony existed between the orbits of the planets was central to his *Mysterium Cosmographicum*.

Johannes Kepler's nesting Platonic solids, as depicted Credit: Johannes Kepler. From Kepler's "Mysterium Cosmographicum", Tübingen 1596, Tabula III: Orbium planetarum dimensiones, et distantias per quinque regularia corpora geometrica exhibens.
In 1687, Isaac Newton published his opus, *Philosophiæ Naturalis Principia Mathematica* (Latin for *Mathematical Principles of Natural Philosophy*, but many affectionately call it just *Principia* for short), which combined his laws of motion with a new mathematical analysis—calculus!—that could replicate Kepler's empirical observations of the planets and their moons. In *Principia*, Newton proposed a law of universal gravitation that now bears his name. Newton's law of universal gravitation holds that any two bodies, no matter how far they may be separated in space, are attracted by a force proportional to their mass and inversely proportional to the square of the distance between them.

'Spooky Action at a Distance'

Yet the question remained: *How* could one planet affect another at such a great distance? Newton considered action at a distance to be, in his own words, "so great an Absurdity that I believe no Man who has in philosophical Matters a competent Faculty of thinking can ever fall into it." Familiar as he was with electrostatics, Newton's theory of gravitation didn't require what he viewed as an exotic, unnecessary transmission mechanism when the inverse-square law modeled gravitational attraction entirely well enough.

Newton was by no means in the scientific minority on the topic of action at a distance. Albert Einstein operated under some assumptions of aether theory when developing his theory of relativity. Einstein would eventually dismiss the notion of quantum entanglement between two particles as *spukhafte Fernwirkungen* (translated as "spooky action at a distance"). Likewise, Newton and others of his day believed there must be a transmission medium, such as the luminiferous aether, through which electromagnetic or gravitational forces could exert a force on bodies separated in space.

Quantum Gravity

What Einstein knew that Newton didn't is that the universe is permeated not by an aetheric substance made of molecules of some kind but by an invisible warp and weft of field lines along which forces such as gravity are transmitted. No aether is required to produce the effects described in Maxwell's laws of electromagnetism or to produce gravity as we understand it. Today, it looks like the graviton will go the way of the aether.

On the deepest level, our cosmos is governed by four fundamental forces or fundamental interactions: electromagnetism and gravity, whose reach appears unlimited, and the weak and strong nuclear forces, which constrain themselves to the smallest scale, the inner workings of the atom. We call them fundamental forces because when we try to answer how spacetime works under the hood, these four forces appear not to be reducible to simpler interactions.

The human understanding of gravity still has some problems. Chief among them is the difficulty of applying current models to the subatomic scale or to extremely high-energy environments such as black holes or the very early universe.

As technology advances, scientists' understanding of what the laws of physics will permit stays in a state of flux. Once fusion, which must surmount the Coulomb barrier, was an exotic fiction; now, it's an engineering problem. It may be the same with gravity and other phenomena on the quantum scale. Until then, we can all enjoy the view from where we stand—on the shoulders of giants.

Small-drone defense is next in Pentagon's Replicator buying push

The second iteration of the Pentagon's Replicator rapid-fielding initiative will focus on countering small drones, with plans to request funds for the initiative in the fiscal 2026 budget, according to Defense Department leaders.

Defense Secretary Lloyd Austin announced "counter small uncrewed aerial systems," or C-SUAS, as the Replicator 2 focus area in a memo last week to senior Pentagon leaders. His decision follows a monthslong review that considered what capability gaps could be best addressed through the rapid fielding initiative.

"Replicator 2 will tackle the warfighter priority of countering the threat posed by small uncrewed aerial systems to our most critical installations and force concentrations," he said in the memo, which was released publicly on Monday. "My expectation is that Replicator 2 will field meaningfully improved C-sUAS protection to critical assets within 24 months of Congress approving funding."

Championed by Deputy Defense Secretary Kathleen Hicks, Replicator's goal is to create a new pathway for the Pentagon to buy and scale high-need capabilities on faster timelines.

The first test of that pathway, Replicator 1, centers on delivering thousands of low-cost drones by next summer. The department plans to spend a total of $1 billion on the effort in fiscal years 2024 and 2025, with funds drawn from various sources including prior-year appropriations, a reprogramming request, a national security supplemental approved in August, and the Pentagon's yet-to-be approved FY25 budget proposal.

As DOD leaders began deliberating this summer on what to pursue in Replicator 2, they focused on capabilities that would address a near-term operational imperative and would benefit from senior leader backing, Hicks told Defense News in June. According to Austin's memo, the need to protect against growing threats posed by enemy drones fits the bill.

Hostile drones pose a major challenge to the U.S. and its allies and have featured heavily in conflicts in Ukraine and the Middle East. Since last fall, Iran-backed groups have used drones, uncrewed surface vessels and anti-ship ballistic vehicles to launch dozens of attacks on U.S., allied and commercial shipping vessels in the Red Sea. The incidents have disrupted global trade in key waterways and killed three merchant sailors.

According to a June 13 report from the Defense Intelligence Agency, 65 countries and 29 major energy and shipping companies have been affected or have had to alter their routes in response to these aggressions.

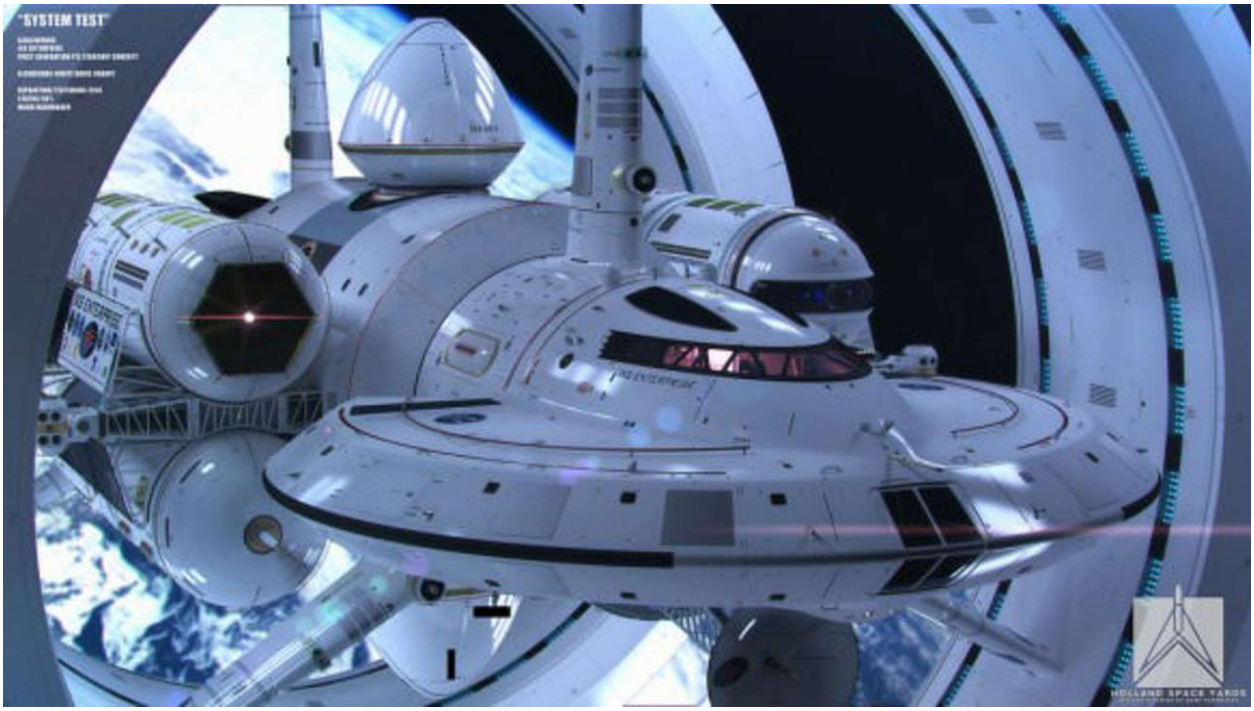
DOD officials have said the department is taking a layered approach to defending against enemy drones, meaning the U.S. will pursue a range of capabilities to disable these systems, from electronic warfare to kinetic weapons. The military services have a number of ongoing programs to develop these systems.

Led by the Defense Innovation Unit, Replicator 2 will leverage those existing efforts to help the services field counter-UAS capabilities more quickly and in larger numbers. According to Austin, DIU will work closely with the military services, the Counter Uncrewed Systems Warfighter Senior Integration Group and Pentagon acquisition chief Bill LaPlante, who serves as DOD's C-sUAS principal staff assistant.

"I am confident the Replicator initiative will complement and advance the significant C-sUAS work already underway in the DOD," Austin said. "The expectation is that Replicator 2 will assist with overcoming challenges we face in

the areas of production capacity, technology innovation, authorities, policies, open system architecture and system integration, and force structure."

In a groundbreaking development that may pave the way for the next era of military space technology, scientists are making significant strides towards realizing a functional warp drive, a concept previously confined to the domain of science fiction.



The idea of warp drives, which the "Star Trek" sci-fi franchise has made a household name, operates on the concept of space-time bending, forming a "warp bubble" to compress space in front of and expand it at the back of a spaceship so that theoretically it could travel at extra-ordinary velocities. In theory, the technology demanded exotic forms of negative energy. Recent research indicates otherwise.

This may soon be possible, as a team of physicists from the University of Alabama in Huntsville, together with the Advanced Propulsion Laboratory at Applied Physics in New York, developed a new model making warp drives possible without negative energy. In their paper published in the journal Classical and Quantum Gravity, the researchers describe a new, advanced blending of traditional and novel gravitational techniques for the creation of a warp bubble that will facilitate the transportation of objects at high, yet still subluminal, speeds.

"This work changes the conversation about warp drives," said Jared Fuchs, the principal author of the paper. The team realized that warp drives could become a reality by producing this first-

of-its-kind model. The new model does away with exotic energy and instead uses a stable matter shell combined with a shift vector distribution, which closely approximates the Alcubierre metric proposed in 1994 by Mexican physicist Miguel Alcubierre.

Such research has immense military implications in the area: if one could travel at close to light speed, this would revolutionize strategic mobility in effecting rapid deployment over vast distances. It would be a huge tactical advantage, as forces could deal on short notice with changing threats and execute operations at unequaled time scales.

CEO of Applied Physics Gianni Martire was quick to point out that, while mankind is nowhere near prepared for interstellar voyages, the research effort brings in an exciting new age of possibilities. Work by the team could be a stepping stone on the long road to efficient interstellar flight, marking the beginning of what Martire calls the "Warp Age."

The researchers caveated their promising results by saying a working warp drive remains very far off from the past horizon. Their current theoretical model needs considerably more validation and refinement. Building such a warp drive engine is well beyond the available technology frontiers in the present, and big strides must be made in solving energy generation and materials science. But the only steps that mattered, though very necessary and important, have been the ones Fuchs and his team have been able to record. They proceeded to fine-tune their models and to work in hand with other scientific fields, and the dream of warp drives now becomes tantalizing, not just for military strategists, but for other scientists across the board. The potential to travel the cosmos at previously impossible speed gives a new frontier to explore and to defend, a future not too distant when these boundaries of space will promise an end to be formidable.

The detailed physics of this revolutionary way of space travel is available for free via the journal Classical and Quantum Gravity. With human civilization now at the brink of entering a new realm of space exploration, such a dream regarding warp drives taking humanity to the stars seems rather close to fulfillment. Related images you might be interested.

WARP DRIVE BREAKTHROUGH COULD ENABLE CONSTANT-VELOCITY SUBLUMINAL TRAVEL, PHYSICS TEAM SAYS

MICAH HANKS·MAY 15, 2024

A novel warp drive concept that can function without any need for hypothesized exotic or negative forms of energy has been unveiled in a groundbreaking new study by leading propulsion researchers.

Dubbed the "Constant-Velocity Subluminal Warp Drive," the concept, developed by physicists with the Advanced Propulsion Laboratory at the New York-based think tank Applied Physics and from the University of Alabama in Huntsville, offers a theoretical new means of propulsion for space travel that conforms to general relativity, allowing it to operate at constant subluminal speeds with no need for unphysical forms of matter outlined in past concepts.

According to their new research, the physicists propose integrating a stable shell of ordinary matter with the shift vector of a warp drive similar to the famous "Alcubierre drive" first proposed decades ago. This would allow a "warp bubble" to be achieved that will allow the movement of objects very rapidly through space within the bounds of light speed.

WARP SPEED AHEAD

In 1994, theoretical physicist Miguel Alcubierre initially proposed a warp drive concept in which faster-than-light travel could be effectively achieved by contracting space in front of a spacecraft and expanding it behind the vehicle, as opposed to propelling the craft through physical space using traditional means of propulsion. Under these circumstances, Alcubierre envisioned that a configurable

energy-density field lower than vacuum could be generated, providing a means of space travel in alignment with Einstein's field equations.

Three years ago, researchers with Applied Physics first reported that a warp drive requiring no exotic matter could be constructed, telling *The Debrief* that their design was constrained by Newtonian physics and that reports claiming it could exceed light speed were inaccurate.

"We show that a class of subluminal, spherically symmetric warp drive spacetimes, can be constructed based on the physical principles known to humanity today," said Gianni Martire, the CEO and co-founder of Applied Physics, in a 2021 email to *The Debrief*.

In April, Applied Physics officially unveiled its Warp Factory analysis tool. In a statement provided to *The Debrief*, Dr. Christopher Helmerich, one of the co-authors of the new paper published in *Classical and Quantum Gravity*, said the toll "serves as a reality check for warp drive designs," allowing researchers to analyze designs "in a comprehensive and automated manner" that allows the identification of unphysical characteristics with greater efficiency.

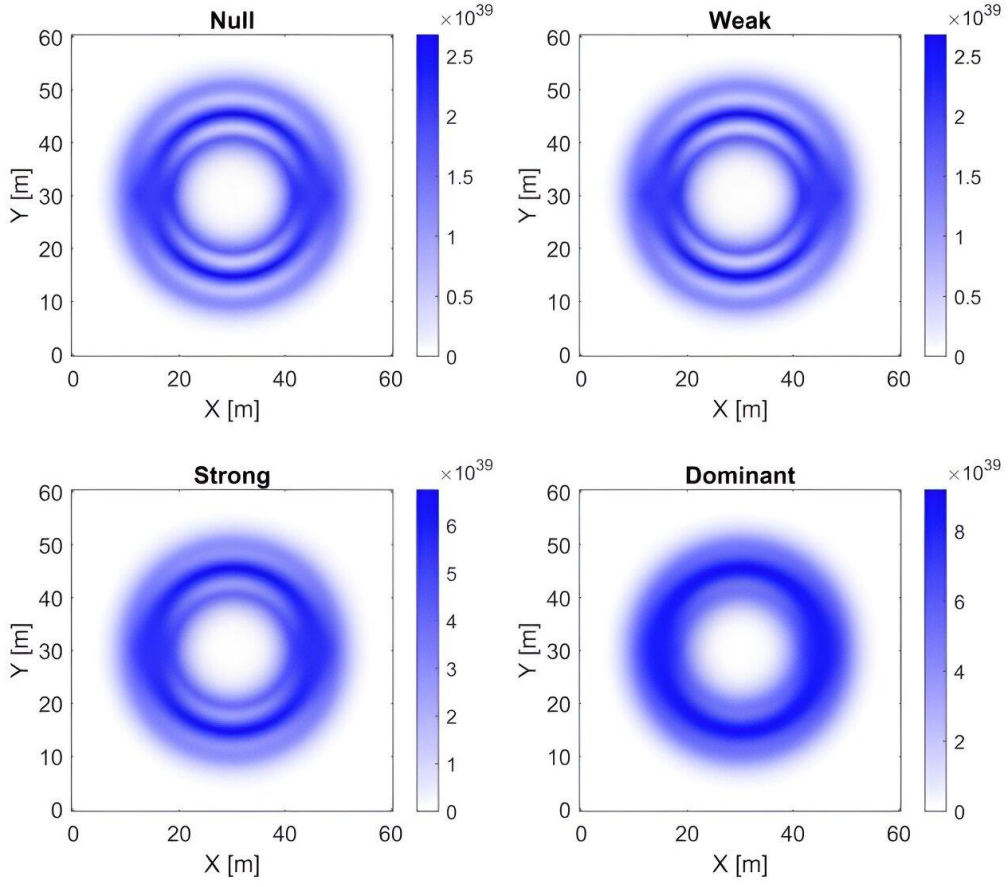
"This means we can steer the development of warp drive technology toward designs that can, hopefully, be built and operated in the future," Helmerich told *The Debrief* in April.

Now, the team says its latest work represents a new milestone in the path toward making warp drive concepts a reality.

"This breakthrough represents the first numerical implementation of physical warp drives, made possible using the Warp Factory analysis tool developed at Applied Physics," reads a statement on the think tank's official website.

ALIGNING WITH THE ALCUBIERRE METRIC

In their new paper, the Applied Physics team presents what they characterize as "the first constant velocity subluminal physical warp drive solution to date that is fully consistent with the geodesic transport properties of the Alcubierre metric." Significantly, the team's theoretical warp drive concept can facilitate the geodesic transport of observers while satisfying several energy conditions outlined in their paper.



Above: Evaluation of energy conditions for the constant velocity Warp Shell: The direction of motion is along the +X axis, with the cross-section along the Z axis aligned at the bubble center. The minimum values observed across all reference frames are displayed. Positive values (blue) and zero values (white) are physically permissible, while negative values (red) indicate a violation. Units are in joules per cubic meter (J/m³) (Credit: Fuchs et al/DOI: 10.1088/1361-6382/ad26aa).

“This solution was constructed from a stable shell of matter with a modified shift vector on its interior,” the team writes, which they say allowed the creation of a warp solution possessing positive ADM mass—a quantity that refers to the concept of mass as seen in faraway regions—noting that the Warp Factory toolkit was employed for analysis and construction of the shell.

“This exciting new result offers an important first step toward understanding what makes physical warp solutions,” the team writes, adding that the new warp drive solution they have produced “shows that a more generic constant velocity warp drive spacetime can be constructed that satisfies the energy conditions.”

Going forward, the team says they plan to explore further possibilities involving their novel solution, optimizing and improving their theoretical framework to ensure that all the physical conditions required are met. They will also focus on “the question of accelerating the drive efficiently without breaking physicality,” which represents a significant factor in current research involving prospective warp drive technologies.

While the concepts outlined in the team’s new paper pave the way toward making travel through space nearing light speed a reality, constructing such an engine is likely something that will only be feasible far in the future, as the present state of technology would not allow for such a device.

For now, the warp drive concept remains a fascinating reality only in the fictional universes of *Star Trek*, although some intriguing observations from over the decades could hint at the possibility that such capabilities might already exist, perhaps within the technological toolkit of other advanced civilizations whose capabilities far exceed those of humans. While such possibilities remain entirely speculative for now, the work being undertaken by Applied Physics is bringing those concepts closer to becoming a reality for humans that, one day, may be capable of carrying future crewed missions to the furthest reaches of the final frontier.

“Although this design requires significant energy, it demonstrates that warp effects can be achieved using conventional matter while adhering to known energy constraints,” the Applied Physics team says of the new warp drive solution on its website.

“Applied Physics continues to make progress as humanity embarks on the Warp Age.”

The team’s new paper by Jared Fuchs et al, entitled “Constant velocity physical warp drive solution,” was published last month in *Classical and Quantum Gravity.* An earlier preprint version of the paper can be read in its entirety on arXiv.org.

TR-3 Black Manta© Image: r/ImaginaryTechnology

The TR-3 Black Manta is a rumored aircraft that allegedly utilizes advanced technology, possibly of extraterrestrial origin. While details are scarce, it is said to be a triangular flying object that has been spotted over the years. The U.S. government has denied its existence, leading to speculation and conspiracy theories.

Whether real or just a figment of imagination, the TR-3 highlights the fascination with secret military projects. The allure of advanced technology and the unknown keeps the legend of the Black Manta alive.

China sets new world record with 800,000 times more magnetic field than Earth's

Chinese scientists have reportedly created the world's strongest resistive magnet, which produced a steady magnetic field of 42.02 Tesla. This magnetic field is more than 800,000 times stronger than Earth's.

Made from coiled metal wires, resistive magnets are commonly used in magnet research facilities worldwide. The achievement is seen as another major breakthrough for the CHMFL (High Magnetic Field Laboratory, Chinese Academy of Sciences), following its 2022 success with the world's most powerful 45.22-tesla hybrid magnet.

According to the institution, after nearly four years of relentless efforts, scientists and engineers refined the magnet's structure, optimized its manufacturing process, and achieved a steady magnetic field of 42.02 tesla with a power supply of 32.3 MW, surpassing the 41.4-tesla record set by the US National High Magnetic Field Laboratory in 2017.

Record-breaking magnet could lead to novel physics discoveries

According to Joachim Wosnitza, a physicist at the Dresden High Magnetic Field Laboratory in Germany, China's record-breaking magnet sets the stage for developing reliable magnets capable of sustaining even stronger magnetic fields. These advancements could pave the way for researchers to uncover unexpected new physics.

High-field magnets are essential tools for exploring the hidden properties of advanced materials like superconductors, which can carry electric current without generating waste heat at very low temperatures. These powerful magnetic fields also provide opportunities to observe entirely new physical phenomena and manipulate states of matter, offering valuable insights into condensed-matter physics.

According to Alexander Eaton, a condensed-matter physicist at the University of Cambridge, high magnetic fields are especially useful for experiments requiring highly sensitive measurements, as they enhance resolution and make detecting subtle phenomena easier.

Each additional tesla greatly improves the precision of these measurements, enabling clearer insights into elusive physical effects.

Guangli Kuang, a high magnetic field specialist at SHMFF (Chinese Academy of Sciences's Steady High Magnetic Field Facility), explained that the team dedicated years to refining the magnet to reach this new record, noting that the achievement was far from easy.

New study highlights advantages of resistive magnets

Resistive magnets, though older technology, can maintain high magnetic fields for longer durations compared to newer hybrid or fully superconducting magnets. They also offer the advantage of quickly ramping up their magnetic fields, making them highly versatile for experiments.

However, their major drawback is the significant power consumption, which makes them costly to operate. For instance, the SHMFF's resistive magnet required 32.3 megawatts of electricity to achieve its record-breaking field, necessitating a strong scientific justification for such resource use.

The challenge of high power consumption is spurring the development of hybrid and fully superconducting magnets that can produce high magnetic fields with less energy. In 2019, NHMFL researchers created a small superconducting magnet that briefly achieved a 45.5-tesla field and are now working on a larger 40-tesla superconducting magnet for experiments. Meanwhile, the SHMFF team is constructing a 55-tesla hybrid magnet.

While these newer magnets are expected to be cheaper to operate than resistive magnets, they also have their own challenges, such as higher construction costs and complex cooling systems.

Research Points to Warp Drives as a Game-Changer for Military Space Travel

Scientists shared a new warp drive concept that doesn't rely on negative energy, a development that could revolutionize space exploration and military capabilities.

This breakthrough, detailed in a study published in the journal Classical and Quantum Gravity, brings humanity one step closer to the realm of science fiction.[1] The implications for military space travel are staggering, potentially reshaping the global security landscape and interstellar warfare.

But what exactly does this mean for the future of space exploration and military operations beyond Earth's atmosphere? Here are the challenges and the exciting possibilities it presents for humanity's future in space.

A New Frontier in Propulsion Physics

Physicists from the University of Alabama in Huntsville and the Advanced Propulsion Laboratory at Applied Physics in New York have introduced a novel warp drive solution that operates at constant, subluminal velocities.

Unlike previous concepts that required theoretical negative energy, this new model works within the constraints of known physics.

The "Constant-Velocity Subluminal Warp Drive" combines a stable shell of ordinary matter with a shift vector distribution similar to the famous Alcubierre metric, creating a warp bubble capable of rapid space travel within the bounds of light speed.

Overcoming Theoretical Hurdles

This development marks a significant leap forward in the field of propulsion physics.

The new concept addresses key challenges plaguing theoretical warp drive designs by satisfying all energy conditions and maintaining a positive ADM mass.

The ability to generate a warp bubble using conventional matter while adhering to known energy constraints opens possibilities for future space missions and military applications.

Revolutionizing Space-Based Operations

The potential military applications of this warp drive technology are vast and could fundamentally alter the nature of space-based operations.

With the ability to travel at high subluminal speeds, military spacecraft could rapidly deploy to distant locations in the solar system, dramatically enhancing response times and strategic capabilities.

Navigating New Frontiers in Space Policy

However, the development of such technology also raises concerns about the militarization of space and the potential for new forms of space-based conflict.

The international community may need to revisit existing space treaties and establish new frameworks to govern the use of warp drive technology in military contexts.

This could lead to a new era of space diplomacy and strategic planning as nations grapple with the implications of this game-changing technology.

Overcoming Energy Requirements

Despite this breakthrough's excitement, significant hurdles remain before warp drive technology becomes a reality.

The energy requirements for the proposed warp drive are immense. The example solution requires a mass equivalent to 2.365 Jupiter masses compressed into a shell with an inner radius of just 0.006 miles.

This presents enormous engineering challenges beyond technological capabilities, necessitating major energy production and manipulation advancements.

Addressing Acceleration & Practical Implementation

Moreover, the study focuses solely on constant velocity travel and does not address the crucial issue of acceleration.

The mechanism for accelerating the warp bubble to useful speeds remains unsolved, with options like momentum transfer requiring further investigation.

These limitations highlight the need for continued research and development in advanced propulsion physics as scientists work to bridge the gap between theoretical models and practical, operational warp drive systems.

Advancing Research & Development

While the concept of a physical warp drive is now more grounded in reality than ever, the journey from theoretical model to practical application will likely be long and arduous.

Researchers at Applied Physics have developed the Warp Factory analysis tool, which allows for a more comprehensive and automated evaluation of warp drive designs.

This tool will be crucial in steering the development of warp drive technology toward designs that can be built and operated in the future.

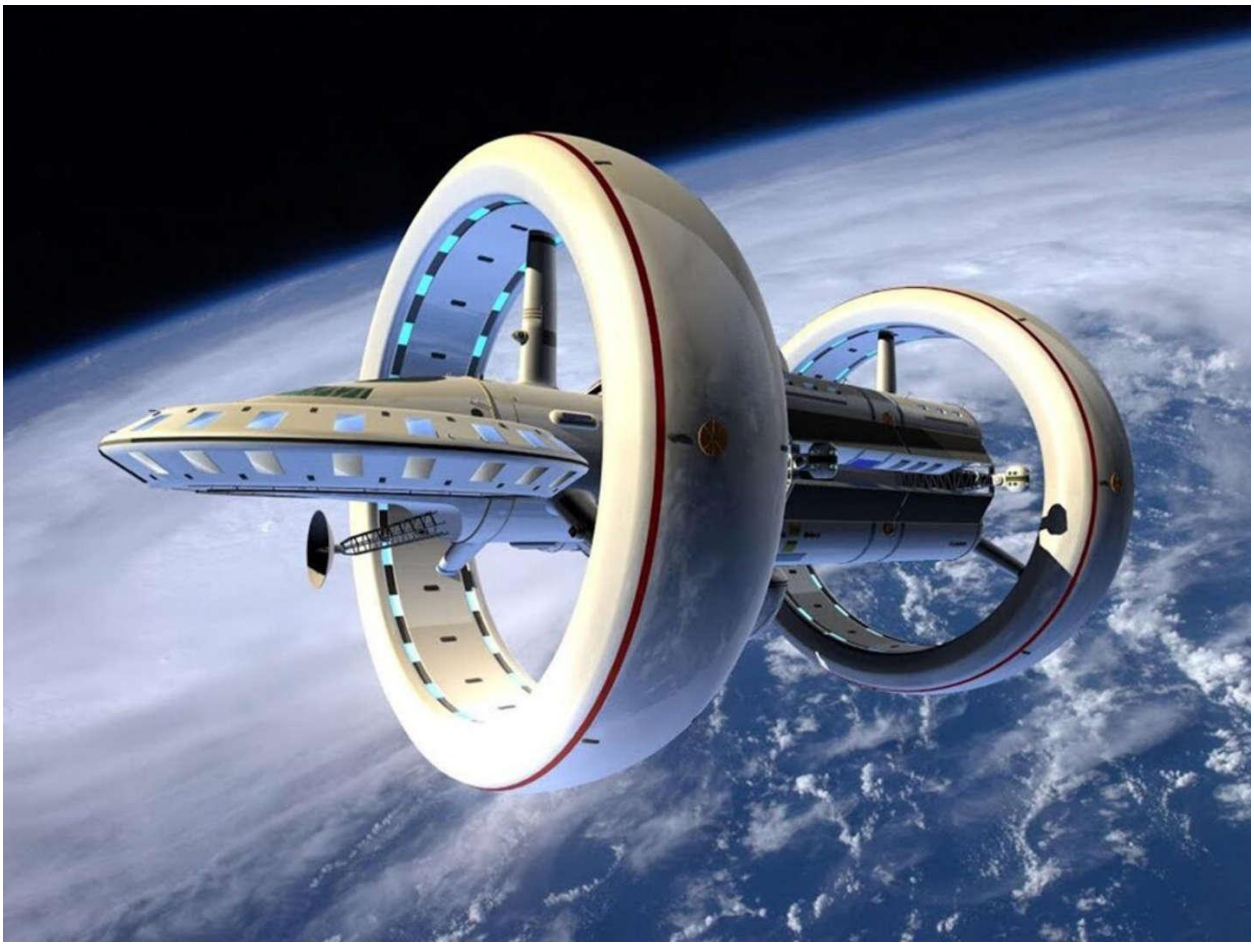
Charting the Course for Future Breakthroughs

The next steps in warp drive research will likely focus on:

- Optimizing the warp bubble design for lower energy requirements
- Developing methods for accelerating the warp bubble
- Exploring potential materials and construction techniques for the warp shell
- Investigating the effects of warp travel on passengers and cargo

As research progresses, collaboration between academic institutions, private companies, and military organizations will be essential to overcome the significant technical challenges and bring warp drive technology from the realm of theory into practical reality.

Warp Drives and Space Travel: Breakthroughs in Advanced Propulsion



In a groundbreaking development that may pave the way for the next era of military space technology, scientists are making significant strides toward realizing a functional warp drive, a concept previously confined to the domain of science fiction.

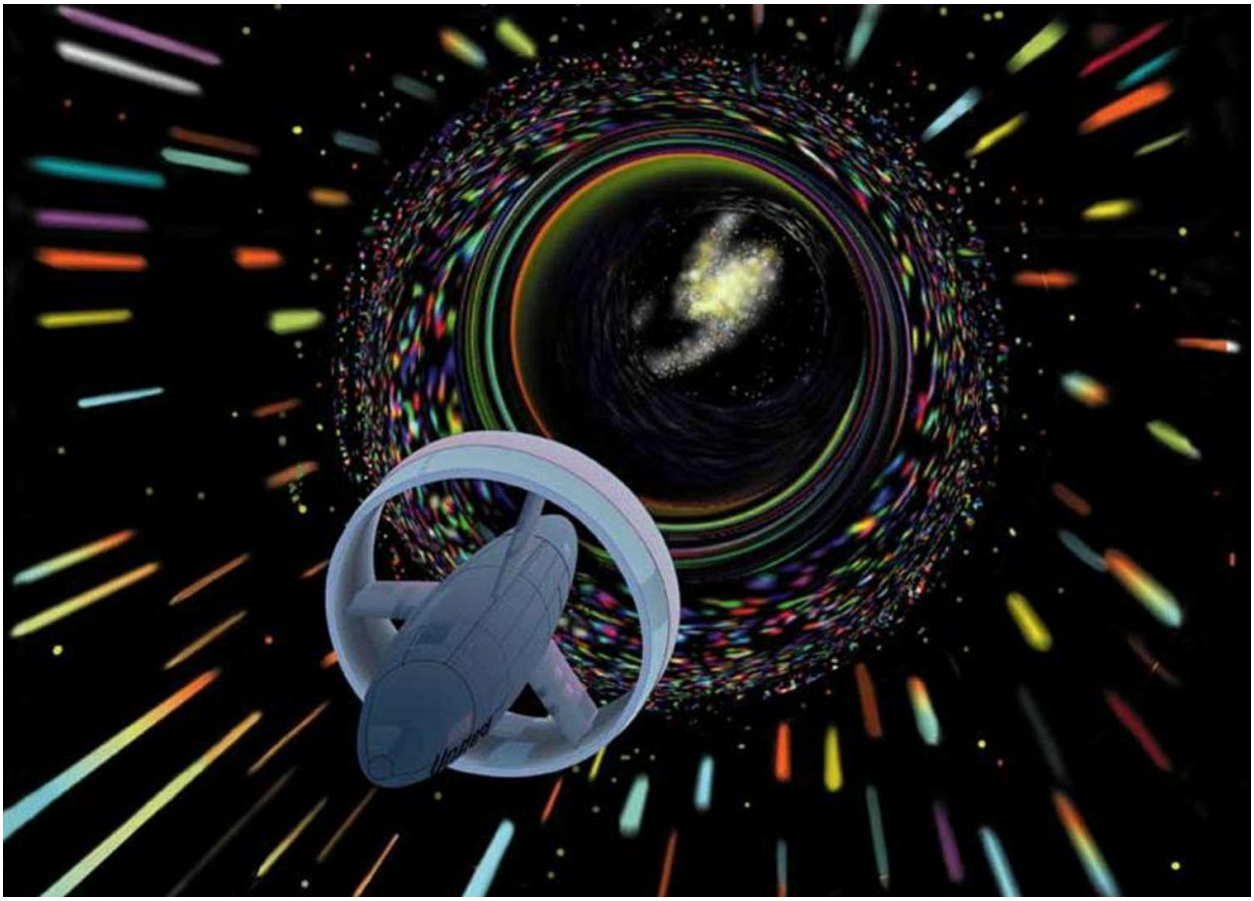
The idea of warp drives, which the "Star Trek" sci-fi franchise has made a household name, operates on the concept of space-time bending, forming a "warp bubble" to compress space in

front of and expand it at the back of a spaceship so that theoretically it could travel at extra-ordinary velocities. In theory, the technology demanded exotic forms of negative energy. Recent research indicates otherwise.

This may soon be possible, as a team of physicists from the University of Alabama in Huntsville, together with the Advanced Propulsion Laboratory at Applied Physics in New York, developed a new model making warp drives possible without negative energy. In their paper published in the journal Classical and Quantum Gravity, the researchers describe a new, advanced blending of traditional and novel gravitational techniques for the creation of a warp bubble that will facilitate the transportation of objects at high, yet still subluminal, speeds.

"This work changes the conversation about warp drives," said Jared Fuchs, the principal author of the paper. The team realized that warp drives could become a reality by producing this first-of-its-kind model. The new model does away with exotic energy and instead uses a stable matter shell combined with a shift vector distribution, which closely approximates the Alcubierre metric proposed in 1994 by Mexican physicist Miguel Alcubierre.

Such research has immense military implications in the area: if one could travel at close to light speed, this would revolutionize strategic mobility in effecting rapid deployment over vast distances. It would be a huge tactical advantage, as forces could deal on short notice with changing threats and execute operations at unequaled time scales.



CEO of Applied Physics Gianni Martire was quick to point out that, while mankind is nowhere near prepared for interstellar voyages, the research effort brings in an exciting new age of possibilities. Work by the team could be a stepping stone on the long road to efficient interstellar flight, marking the beginning of what Martire calls the "Warp Age."

The researchers caveated their promising results by saying a working warp drive remains very far off from the past horizon. Their current theoretical model needs considerably more validation and refinement. Building such a warp drive engine is well beyond the available technology frontiers in the present, and big strides must be made in solving energy generation and materials science.

But the only steps that mattered, though very necessary and important, have been the ones Fuchs and his team have been able to record. They proceeded to fine-tune their models and to work in hand with other scientific fields, and the dream of warp drives now becomes tantalizing, not just for military strategists, but for other scientists across the board. The potential to travel the cosmos at previously impossible speed gives a new frontier to explore and to defend, a future not too distant when these boundaries of space will promise an end to be formidable.

The detailed physics of this revolutionary way of space travel is available for free via the journal Classical and Quantum Gravity. With human civilization now at the brink of entering a new realm of space exploration, such a dream regarding warp drives taking humanity to the stars seems rather close to fulfillment. Related images you may be interested in:

This image from the NASA/ESA Hubble Space Telescope shows Sh 2-106, or S106 for short. This is a compact star forming region in the constellation Cygnus (The Swan). A newly-formed star called S106 IR is shrouded in dust at the centre of the image, and is responsible for the surrounding gas cloud's hourglass-like shape and the turbulence visible within. Light from glowing hydrogen is coloured blue in this image.

An Engineer Says He's Found a Way to Overcome Earth's Gravity

This new propulsion system could rewrite the rules of spaceflight—not to mention completely defy conventional physics.

- Discovering a machine that could somehow produce thrust without releasing propellant would be a game-changer for human space travel. There's just one problem—such a device would defy the laws of physics.
- This limitation has not stopped people from investigating the possibility, and the latest addition to the propellant-less club is an electrostatic design developed by a former NASA engineer.
- While the company behind the drive, Exodus Propulsion Technologies, says that the drive can achieve a thrust to counteract Earth's gravity, such a claim still needs independent verification and a healthy dose of skepticism.

In 2001, British Electrical Engineer Roger Shawyer first introduced the "impossible drive," known as the EmDrive. It was called "**impossible**" because its creator purported that the drive was reactionless, meaning no propellant required—in other words, it defied the known laws of physics (specifically, the conservation of momentum).

As with anything that appears to thumb its nose at Newton and Einstein, scientists raised more than a few eyebrows, and two decades of testing eventually boiled down to an inevitable (and somewhat predictable) conclusion in 2021: the **EmDrive was bunk**. But that's the nature of the scientific method—take a seemingly impossible idea, put it through rigorous testing, and hopefully get to an unassailable conclusion (or new discoveries that lead in other directions). But the not-based-in-**physics** dream of a propellant-less machine didn't die with the EmDrive. Now, a new challenger approaches, and this one has a former NASA scientist backing it up.

While at NASA, Charles Buhler helped establish the **Electrostatics and Surface Physics** Laboratory at Kennedy Space Center in Florida—a *very* important lab that basically ensures rockets don't explode. Now, as co-founder of the **space** company Exodus Propulsion Technologies, Buhler told the website ***The Debrief*** that they've created a drive powered by a "New Force" outside our current known laws of physics, giving the propellant-less drive enough boost to overcome gravity.

"The most important message to convey to the public is that a major discovery occurred," Buhler told *The Debrief*. "This discovery of a New Force is fundamental in that electric fields alone can generate a sustainable force onto an object and allow center-of-mass translation of said object without expelling **mass**."

Buhler stressed that this work is unaffiliated with NASA, and that he recently presented his findings at the **Alternative Propulsion Energy Conference** (APEC), which is a club of engineers and enthusiasts eager to find ways to overcome the limitations of **gravity** and physics—and not always with the most scientifically sound methods.

In an interview with APEC's co-founder Tim Ventura, Buhler **explained** how his background in electrostatics led to the discovery. He says his team—made up of people from **NASA**, Blue Origin, and the Air Force—investigated propellant-less drives for decades before arriving at electrostatics. For years, their devices produced negligible thrust, but saw increases with each new iteration. This culminated in 2023, when this "New Force"-powered drive generated enough thrust to overcome Earth's gravity.

"Essentially, what we've discovered is that systems that contain an asymmetry in either electrostatic **pressure** or some kind of electrostatic divergent field can give a system of a center of mass a non-zero force component," Buhler told *The Debrief*. "So, what that basically means is that there's some underlying physics that can essentially place force on an object should those two constraints be met."

Obviously Buhler's claims are pretty "woah, if true," but the history of propellant-less drives is filled with seemingly positive results that are eventually dashed upon the rocks of scientific reality. For the EmDrive, hopes for the device skyrocketed after NASA's Eagleworks team, which is dedicated to investigating new forms of **propulsion** (i.e. warp drives), **claimed to measure thrust from the "impossible" drive in 2016**. However, subsequent studies—including an exhaustive (no pun intended) **one at the Dresden University of Technology**—found zero thrust.

Before any alternative propulsion enthusiasts should start popping corks, rigorous, third-party **research** will have to verify the results again and again. While it's not impossible that Buhler et. al stumbled across some unknown quirk of physics, it's an extremely unlikely outcome.

For now, let's call it an "improbable **engine**."

NASA veteran’s propellant-less propulsion drive defies laws of physics

NASA expert Dr. Charles Buhler believes he and his team have discovered a “new force”.

Updated: Apr 22, 2024

Dr. Charles Buhler, a seasoned NASA engineer and co-founder of Exodus Propulsion Technologies, claims his company’s propellantless propulsion drive defies the laws of physics.

The NASA veteran states the propulsion drive is capable of generating enough thrust to counteract Earth’s gravity without expelling mass.

It’s a bold claim, and this may end up being filed alongside similar controversial concepts like the propellant-free EmDrive.

However, Buhler’s history as NASA’s subject matter expert on electrostatics has forced people to take note.

New claims of propellant-free space travel

Buhler and his team set out to explore propellantless propulsion concepts more than two decades ago. Their propulsion drive is based on a novel approach that takes advantage of asymmetry in electrostatic pressure to propel the drive forward.

The team presented their drive concept at a recent Alternative Propulsion Energy Conference (APEC). There, Buhler detailed his team’s progress over the years.

From 2016 to 2020, for example, the team’s best devices were producing a little over one hundred thousandth of a gravity. Ultimately, though, they set out to achieve “unity,” Buhler told The Debrief in a recent interview. Unity refers to the moment the drive produces enough thrust to lift itself in Earth’s gravity.

As with similar projects like the EmDrive, Buhler and his team have worked exhaustively to eliminate any alternative explanation for the tiny, though measurable, force they were seeing in experiments.

In 2023, Buhler said the propellantless drive finally reached one full Earth gravity. He and his team claim that their propulsion system has demonstrated the ability to exert a force

equivalent to Earth's gravity without emitting mass via propellant. Essentially, they believe they have discovered a new force that was previously unknown.

"This discovery of a New Force is fundamental in that electric fields alone can generate a sustainable force onto an object and allow center-of-mass translation of said object without expelling mass," Buhler told The Debrief.

"There are rules that include conservation of energy, but if done correctly, one can generate forces unlike anything humankind has done before," he added.

"It will be this force that we will use to propel objects for the next 1,000 years… until the next thing comes."

Are Exodus Propulsion Technologies the real deal?

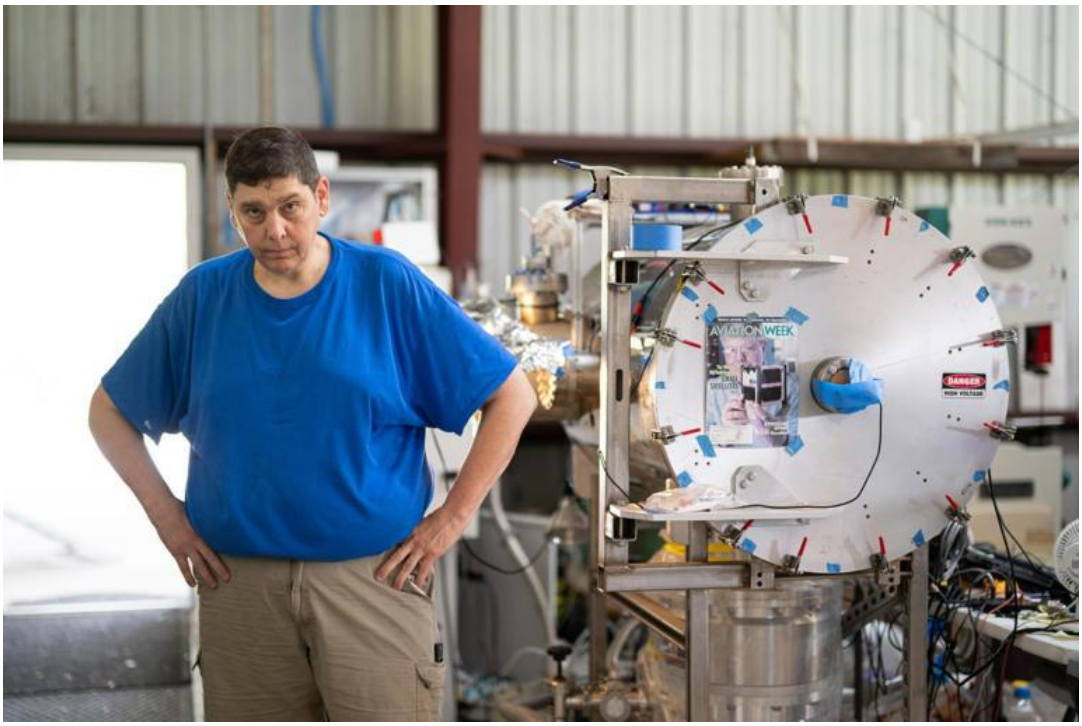
If Buhler and his team's claims are true, their propulsion experiments would undoubtedly constitute a massive breakthrough. A propellant-free system would massively drive down costs, enable far-reaching missions, and revolutionize spaceflight. So why has the news broken with such little fanfare?

NASA engineer developed a propellant-less rocket that defies conventional laws of physics

In a recent revelation, Dr. Charles Buhler, a seasoned NASA engineer and co-founder of Exodus Propulsion Technologies, unveiled a groundbreaking achievement: their propellantless propulsion drive has demonstrated the capability to counteract Earth's gravity, defying conventional laws of physics.

With a wealth of experience from NASA's most iconic missions under his belt, including the Space Shuttle and the International Space Station (ISS), Dr. Buhler and his team perceive this discovery as a monumental breakthrough set to redefine the landscape of space travel for centuries to come.

Dr. Buhler emphasized the significance of their finding, stating, "The most important message to convey to the public is that a major discovery occurred."



Dr. Charles Buhler, a seasoned NASA engineer and co-founder of Exodus Propulsion Technologies. (CREDIT: Exodus Propulsion Technologies)© The Brighter Side of News

Their innovation, harnessing electric fields to generate sustainable thrust without expelling mass, represents a paradigm shift in propulsion physics. Buhler envisions this newfound force propelling objects into space for the next millennium, heralding a new era in exploration.

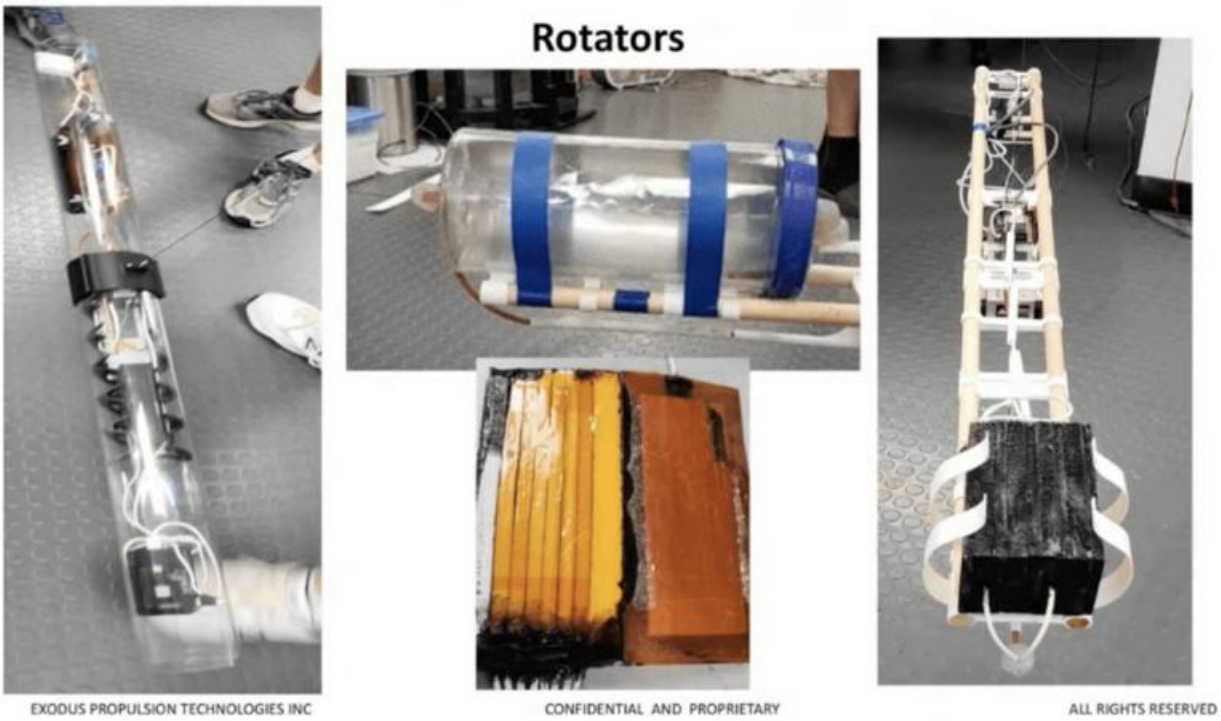
Unveiling their discovery at the Alternative Propulsion Energy Conference (APEC), Dr. Buhler shared insights into their journey. Despite initial skepticism, their pursuit led them to electrostatics, a field in which Dr. Buhler is an eminent authority.

Collaborating with a diverse team from prestigious institutions and industries, their collective expertise culminated in a breakthrough that defied conventional expectations.

Over a span of decades, the team meticulously conducted experiments, culminating in their propellantless propulsion drive.

Through iterative refinement and rigorous testing, they achieved thrust measurements exceeding previous limits. Notably, their latest iteration exhibited a remarkable feat: generating thrust equivalent to one Earth gravity, a milestone in their quest.

Detailing their methodology, Dr. Buhler explained the significance of their tests conducted in a custom-made vacuum chamber simulating deep space conditions. These experiments validated their propulsion drive's efficacy, eliminating alternative explanations and solidifying their patent.



Their innovation, harnessing electric fields to generate sustainable thrust without expelling mass, represents a paradigm shift in propulsion physics. (CREDIT: Exodus Propulsion Technologies)© The Brighter Side of News

Despite their pioneering success, Dr. Buhler acknowledged the existence of competing concepts like the EM Drive and Quantum Drive. While these initiatives showcase potential, Exodus Propulsion Technologies' breakthrough offers a unique perspective.

Dr. Buhler welcomes collaboration with interested parties, offering their expertise to advance propulsion technologies mutually.

Notably, their experiments unveiled intriguing phenomena, including sustained thrust without continuous electrical input. Such anomalies prompt further inquiry and underscore the complexity of the underlying physics. Seeking funding for space demonstrations, Dr. Buhler envisions expanding their understanding and inspiring scientific exploration.

https://youtu.be/WhsKMWOYuYo

Reflecting on the broader implications, Dr. Buhler emphasized the role of science in dissecting their discovery's implications.

While their experiments provide empirical evidence, understanding the underlying principles remains a collective endeavor. He remains optimistic that their findings could illuminate profound scientific inquiries, challenging conventional understanding.

Dr. Buhler's revelation marks a pivotal moment in space exploration, unlocking new possibilities for propulsion technologies.

A few of the hundreds of tests the team ran on their propellantless propulsion drive between 2016 and 2023. (CREDIT: Exodus Propulsion Technologies, Buhler, et al.)© The Brighter Side of News

As scientists delve deeper into the mysteries of their discovery, the horizon of human exploration expands, propelled by ingenuity and curiosity.

Scientists discover new, 3rd form of magnetism that may be the 'missing link' in the quest for superconductivity

Researchers have obtained the first conclusive evidence of an elusive third class of magnetism, called altermagnetism. Their findings, published Dec. 11 in the journal Nature, could revolutionize the design of new high-speed magnetic memory devices and provide the missing puzzle piece in the development of better superconducting materials.

"We have previously had two well-established types of magnetism," study author Oliver Amin, a postdoctoral researcher at the University of Nottingham in the U.K., told Live Science. "Ferromagnetism, where the magnetic moments, which you can picture like small compass arrows on the atomic scale, all point in the same direction. And antiferromagnetism, where the neighboring magnetic moments point in opposite directions — you can picture that more like a chessboard of alternating white and black tiles."

Electron spins within an electrical current must point in one of two directions and can align with or against these magnetic moments to store or carry information, forming the basis of magnetic memory devices.

A new form of magnetism

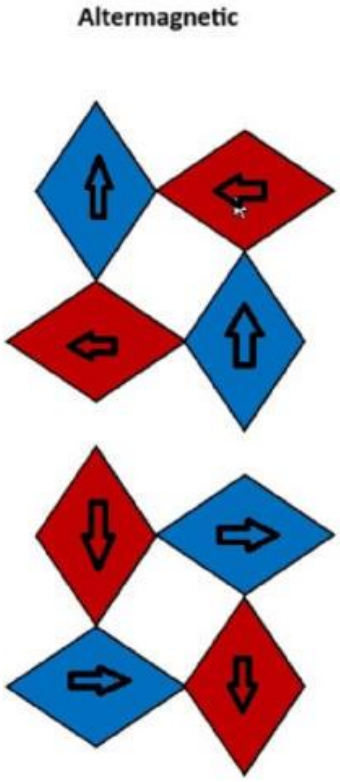
Altermagnetic materials, first theorized in 2022, have a structure that sits somewhere in between. Each individual magnetic moment points in the opposite direction as its neighbor, as in an antiferromagnetic material. But each unit is slightly twisted relative to this adjacent magnetic atom, resulting in some ferromagnetic-like properties.

Altermagnets, therefore, combine the best properties of both ferromagnetic and antiferromagnetic materials. "The benefit of ferromagnets is that we have an easy way of reading and writing memory using these up or down domains," study co-author Alfred Dal Din, a doctoral student also at the University of Nottingham, told Live Science. "But because these materials have a net magnetism, that information is also easy to lose by wiping a magnet over it."

Conversely, antiferromagnetic materials are much more challenging to manipulate for information storage. Because they have a net zero magnetism, however, information in these materials is much more secure and faster to carry. "Altermagnets have the speed and resilience of an antiferromagnet, but they also have this important property of ferromagnets called time reversal symmetry breaking," Dal Din said.

This mind-bending property looks at the symmetry of objects moving forward and backward in time. "For example, gas particles fly around, randomly colliding and filling up the space," Amin said. "If you rewind time, that behavior looks no different.""

This means the symmetry is conserved. However, because electrons possess both a quantum spin and a magnetic moment, reversing time — and, therefore, the direction of travel — flips the spin, meaning the symmetry is broken. "If you look at those two electron systems — one where time is progressing normally and one where you're in rewind — they look different, so the symmetry is broken," Amin explained. "This allows certain electrical phenomena to exist."



A diagram showing how magnetic moments are oriented in altermagnetic materials. (Image credit: Oliver Amin)

Finding ‘the missing link’ of superconductivity

The team — led by Peter Wadley, a professor of physics at the University of Nottingham — used a technique called photoemission electron microscopy to image the structure and magnetic properties of manganese telluride, a material formerly believed to be antiferromagnetic.

"Different aspects of the magnetism become illuminated depending on the polarization of the X-rays we choose," Amin said. Circularly polarized light revealed the different magnetic domains created by the time reversal symmetry breaking, while horizontally or vertically polarized X-rays allowed the team to measure the direction of the magnetic moments throughout the material. By combining the results of both experiments, the researchers created the first-ever map of the different magnetic domains and structures within an altermagnetic material.

With this proof of concept in place, the team fabricated a series of altermagnetic devices by manipulating the internal magnetic structures through a controlled thermal cycling technique.

"We were able to form these exotic vortex textures in both hexagonal and triangular devices," Amin said. "These vortices are gaining more and more attention within spintronics as potential carriers of information, so this was a nice first example of how to create a practical device."

The study authors said the power to both image and control this new form of magnetism could revolutionize the design of next-generation memory devices, with increased operational speeds and enhanced resilience and ease of use.

"Altermagnetism will also help with the development of superconductivity," Dal Din said. "For a long time, there's been a hole in the symmetries between these two areas, and this class of magnetic material that has remained elusive up until now turns out to be this missing link in the puzzle."

- **Daily Movement**: Magnetic north traces an elliptical path of about 75 miles (120 kilometers) daily, making its position a moving target for **navigation systems**.

The latest WMM update confirms that the pole's drift toward Russia will continue, though at a slower pace. However, scientists remain cautious. "It could change its rate, or even speed up again," says Brown. "We will continue to monitor the field and assess the performance of the WMM."

The Future of Earth's Magnetic Field: What Lies Ahead?

Earth's **magnetic field** has undergone dramatic changes in the past, including complete **polarity reversals** where magnetic north and south poles flip. These reversals, which occur roughly once every million years, can take thousands of years to complete and have significant implications for life on Earth.

The Military Has Been Researching "Anti-Gravity" For Nearly 70 Years

It sounds like science fiction, but the military began working to overcome and harness gravity in the 1950s. From what we can tell, it never stopped.

BYBRETT TINGLEYDEC 1, 2019 6:04 AM

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The Martin Company's Early Foray Into Anti-Gravity

short speech given at the roundtable

Invariants of General Relativity and the Classification of Spaces Geometry of Gravitation and Electromagnetism Conformal Invariance in Physics

aviation correspondent

The front page of the November 20, 1955 issue of the New York Herald Tribune., *New York Herald Tribune*

Lawrence Bell of Bell Aircraft with Lt. Col Frank J. Everest, Maj. Charles Yeager, and Maj. Arthur Murray. According to Talbert's articles, Bell believed that is was possible "to cancel out gravity instead of fighting it.", *New York Herald Tribune*

found online here

Space-Ship Marvel

To the N. Y. Herald Tribune:

"Space-Ship Marvel Seen If Gravity Is Outwitted," is the headline on Mr. Ansel Talbert's article.

Fascinating, and to think that this "marvel" is not the creature of a literary imagination but the hopeful speculation of hard-headed scientists!

But the most interesting thing about this is that the explanation of how the "marvel" might operate is precisely how many scientists explained the flying saucers might work, even to the undreamed-of acceleration in seconds to a thousand miles an hour.

Is it not ironic that this scientific guess-projection into the future comes only a few weeks after the Air Force solemnly tells us there ain't no such animal? Perhaps the men of another planet are several centuries ahead of us in keeping gravity

An op-ed sent to the New York Herald Tribune in response to Talbert's series., *New York Herald Tribune*

The Aerospace Research Laboratories At Wright Patterson Air Force Base

Goldberg's Curriculum Vitae

Conservation Laws in General Relativity Measurement of Distance in General Relativity Einstein Spaces with Four-parameter Holonomy Group

Some Extensions of Liapunov's Second Method Gravitational Field of a Spinning Mass as an Example of Algebraically Special Metrics

GRAVITATIONAL FIELD OF A SPINNING MASS AS AN EXAMPLE OF ALGEBRAICALLY SPECIAL METRICS

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(Received 26 July 1963)

Goldberg and Sachs[1] have proved that the algebraically special solutions of Einstein's empty-space field equations are characterized by the existence of a geodesic and shear-free ray congruence, k_μ. Among these spaces are the plane-fronted waves and the Robinson-Trautman metrics[2] for which the congruence has nonvanishing divergence, but is hypersurface orthogonal.

In this note we shall present the class of solutions for which the congruence is diverging, and is not necessarily hypersurface orthogonal. The only previously known example of the general case is the Newman, Unti, and Tamburino metrics,[3] which is of Petrov Type D, and possesses a four-dimensional group of isometries.

If we introduce a complex null tetrad (t^* is the complex conjugate of t), with

$$ds^2 = 2tt^* + 2mk,$$

then the coordinate system may be chosen so that

$$t = P(r + i\Delta)d\zeta,$$

$$k = du + 2\,\mathrm{Re}(\Omega d\zeta),$$

$$m = dr - 2\,\mathrm{Re}\{[(r - i\Delta)\dot{\Omega} + iD\Delta]d\zeta\} + \left\{r\dot{P}/P + \mathrm{Re}[P^{-2}D(D^*\ln P + \dot{\Omega}^*)] + \frac{m_1 r - m_2\Delta}{r^2 + \Delta^2}\right\}k; \qquad (1)$$

where ζ is a complex coordinate, a dot denotes differentiation with respect to u, and the operator D is defined by

$$D = \partial/\partial\zeta - \Omega\partial/\partial u.$$

P is real, whereas Ω and m (which is defined to be $m_1 + im_2$) are complex. They are all independent of the coordinate r. Δ is defined by

$$\Delta = \mathrm{Im}(P^{-2}D^*\Omega).$$

There are two natural choices that can be made for the coordinate system. Either (A) P can be chosen to be unity, in which case Ω is complex, or (B) Ω can be taken pure imaginary, with P different from unity. In case (A), the field equations are

$$(m - D^*D^*D\Omega) = |\partial_u D\Omega|^2, \qquad (2)$$

$$\mathrm{Im}(m - D^*D^*D\Omega) = 0, \qquad (3)$$

$$D^*m = 3m\dot{\Omega}. \qquad (4)$$

The second coordinate system is probably better, but it gives more complicated field equations.

It will be observed that if m is zero then the field equations are integrable. These spaces correspond to the Type-III and null spaces with

disputed by others

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AIR FORCE ROCKET PROPULSION LABORATORY
DIRECTOR OF LABORATORIES
AIR FORCE SYSTEMS COMMAND
UNITED STATES AIR FORCE
EDWARDS, CALIFORNIA

27

c. Force Between Buried Spheres: The forces between charged bodies are extreme at close distances. For the spheres buried in the earth (see Figure II-32), the total force is 3.95-million pounds. Clearly, these spheres need substantial support.

d. Surface Tension: When the spheres are charged, the charges act to repel each other. This repulsion manifests itself as a surface tension which must be supported by the conductor and dielectric. From Jeans (Ref. II-39), the surface tension is:

$$T = (10 \times 10^5)\,\sigma^2 \text{ newtons/m}^2$$

or:

$$T = (28.8\,\sigma)^2 \text{ lbf/in.}^2$$

Where σ is the surface charge density in coulombs per square meter.

For the 10-meter-diameter spheres, $\sigma = 0.885$ coulomb/m^2. This gives a surface tension of 6.5×10^2 lbs/in^2. The yield strength of most materials is in the order of 10^4 psi, so the surface tension effect should not permanently distort the spheres.

e. Lift Force: The repulsion force, due to the four spheres pushing on the fifth sphere, will raise the free sphere to a point where the ratio of force to weight is one. This point occurs at an altitude just under 10^6 meters or 1000 km. This is about 620 miles. The exact solution for the height requires a trial and error solution of the equation:

$$h^2 = \frac{\left[(5 \times 10^3) + h^2\right]^3}{1.83 \times 10^{16}}$$

These results show that a sphere can be continuously supported by an electrostatic field at a height of 620 miles with little loss in energy.

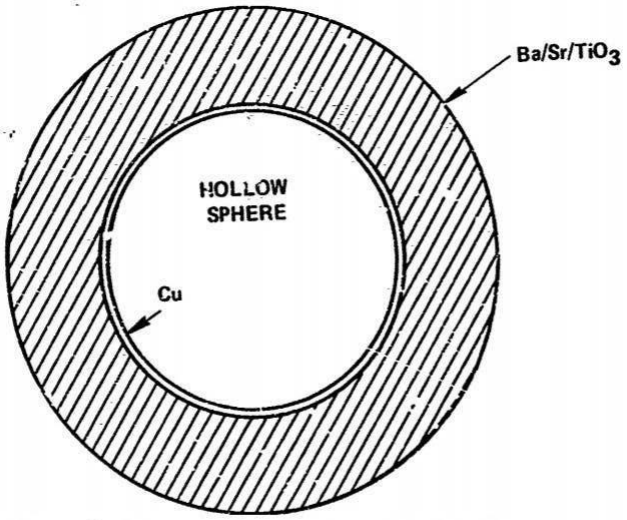

Figure II-33. Electrostatic Sphere Cross Section

II-105

USAF

same document

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21st Century Propulsion Concept

Electric Propulsion Study

2025 and 2050 Military Aerospace Vehicles

The conceptual "2050 vehicle" featuring hypothetical inertial mass reduction technology which is theorized to extract energy from the quantum vacuum., *American Institute of Physics*

compact fusion reactors

next-generation hypothetical vehicles

exploring similar concepts

Civilian Research Into Gravitation, Electromagnetism, And Propulsion

Breakthrough Propulsion Physics (BPP) Program

paper

concept of negative mass

gravitational radiation

NASA's project identified three major barriers

proceedings of which

we know about Salvatore Cezar Pais

anti-gravity 'UFO'

patents

PhD dissertation

hybrid aerospace-underwater craft high energy electromagnetic field generator

Haisch, Rueda, and Puthoff, 1998 Rueda and Haisch, 1998 Haisch and Rueda, 1999 Woodward, Mahood, and March 2001

Podkletnov and Nieminen, 1992 Li et al, 1997 Podkletnov and Modanese, 2001

The Connection between Inertial Forces and the Vector Potential

Wingless Electromagnetic Air Vehicle (WEAV)

Air Force Office of Scientific Research

Direct Experimental Evidence of Electromagnetic Inertia Manipulation Thrusting

altering the mass of small test samples

Electric Propulsion Study
Movement and Maneuver in Deep Space

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Exhibit R-2A, RDT&E Project Justification: PB 2015 Navy		Date: March 2014
Appropriation/Budget Activity 1319 / 1	**R-1 Program Element (Number/Name)** PE 0601152N / *In-House Lab Independent Res*	**Project (Number/Name)** 0000 / *In-House Lab Independent Res*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2013	FY 2014	FY 2015
- Completed research for Control and Dispersion of Electromagnetic Energy Using Metamaterials, where the dispersion and control of electromagnetic (EM) waves in the microwave (RF) region, using fabricated metamaterial structures, were demonstrated. Six metamaterial structures were modeled using in-house programs, DOD supercomputer resources, and High Frequency Structure Simulation (HFSS) software, and fabricated use photolithography, vapor deposition, and chemical and reactive ion etching. Scattering parameters (transmittance and reflectance), were acquired using a Network Analyzer coupled to a free space analysis setup. - Completed research for Polyurea Silicate Composites. The objective of this research is to identify the structural transitions and interactions of the polyurea and nanoparticle that underlie the enhanced mechanical mechanisms for the protective response of polyurea nanocomposites. The approach is to use small angle and wide angle x-ray scattering (SAXS and WAXS) simultaneously with tensile and recovered impact tests to obtain a fundamental understanding of the polyurea nanoparticle effect at the molecular level. The strain rate material responses, both elastic and plastic, would be incorporated into a constitutive equation needed for modeling and for hydrocode simulations for further calculations of optimized geometries and layer thicknesses. - Initiated fundamental research on high strength nanostructures/nanomaterials. - Initiated research for new concepts, configurations, and applications for metamaterials. - Initiated research for high temperature alloys for engine applications. - Initiated research for low-cost, high-strength material repair. - Initiated ILIR projects that are intended to be approximately three years in length. Projects selected for FY 2013 will focus on supporting Naval Materials by Design and Intelligent Naval Sensors, Innovative Naval Prototype initiatives in Electromagnetic Gun and Sea Basing, and National Naval Responsibility initiatives in Undersea Weaponry and Naval Engineering. ***FY 2014 Plans:*** Efforts in this R2 project have been continued in FY 2014 in the new ILIR Program. ***FY 2015 Plans:*** N/A			

Department of Defense

Scratching The Surface While Not Knowing What Lies Beneath It

[told Popular Science]

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