The Super Power IssueThe Antigravity Underground

Clive Thompson Aug 1, 2003 12:00 PM

The fantastic floating device called a lifter has no moving parts, no onboard fuel, and no shortage of wide-eyed admirers. Even inside NASA.

It's time for liftoff, so I pull on my thick, elbow-length rubber gloves and put the fire extinguisher within reach.

This is probably overkill, but I'm a little jumpy. I'm not accustomed to unleashing massive amounts of voltage in my cramped apartment. I do one last check of my DC transformer, which I bought online from a guy who specializes in energy systems that are illegal in several states. He put a sticker on this one: DANGER: ANTIGRAVITY IN DRIVER.

So this is it – my antigravity craft. The device itself is perched on a plastic filing cabinet in my living room. It's an equilateral triangle, 8 inches per side, composed of thin sticks of balsa wood. There's a ring of copper wire from RadioShack strung around the top and a strip of Reynolds Wrap held down

with Krazy Glue around the bottom.

When I throw the switch, 20,000 volts will course through this bundle of sticks and foil – and it will levitate. It has no moving parts, no rotors, and no wings. But it will, I've been told, lift itself into the air.

Hence the name. This thing is called a lifter and is the peculiar obsession of a grassroots movement of antigravity fans. Hobbyists swiped the concept from the long-lost work of Thomas Townsend Brown, a fabled electrogravitics inventor of the early 20th century. They began trading designs online, and by last year a lifter subculture was in full swing, with basement scientists hotly debating "field to field gravity effects" and competing to build ever huger, more bloated devices. In January, one French tinkerer assembled a lifter strong enough to fly a mouse – named Orville, after the Wright brother – making it the first documented passenger of a UFO.

Sure, it's kooky. Except that scientists and entrepreneurs are beginning to explore the phenomenon. Last summer, NASA was granted a patent on lifter technology and began investigating it as a way to propel satellites. Several companies announced they, too, were racing to bring lifters to market – with an aim of perhaps minting those Buck Rogers hovercars we've been promised for so long. "This is bigger than cold fusion!" one businessman told me jokingly.

Conspiracy theorists have always insisted that antigravity was being developed "in the black" by covert government commissions and military units. *It's the secret engine in the B-2 bombers, man! They're testing them at Area 51!* What makes lifters different is that they're no secret at all. Fans post home videos of themselves grinning as their devices hover above their kitchen tables. Last spring, three Detroit high school students won the city's

science fair by floating a giant lifter, and the teachers sent out an exuberant press release ("BEAM ME UP SCOTTY," they gushed). With stuff like this, who needs black ops? This is antigravity for the masses.

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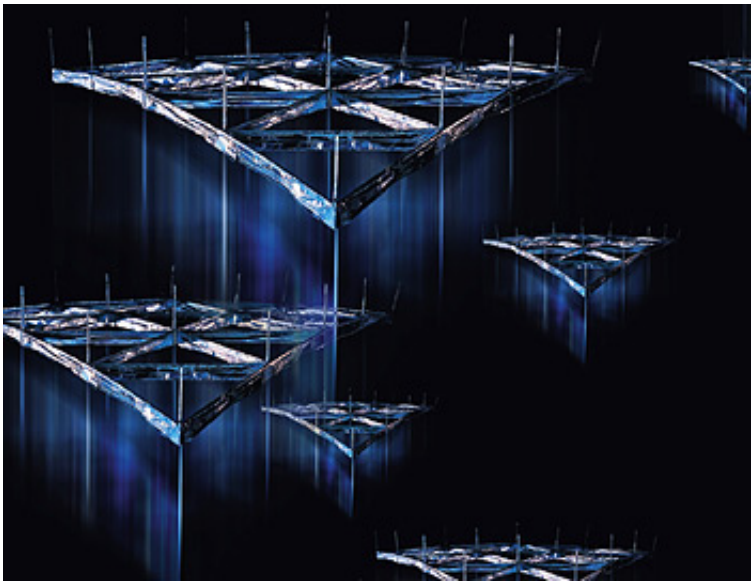

Mike Lorrig

There is, however, one screamingly obvious question: What's keeping these things in the air? Antigravity research has coughed up more bogus mumbo-jumbo than just about any other area of science. Are lifters – as debunkers claim – a mere physical hack, a trick of pushing air fast enough to float a toy? Or could this actually be evidence of Einstein's dream, the missing link between gravity and electricity? "They look like toys, these lifters," observes Alexander Szames, a French aerospace writer. "But in 1871, they tested the first airplane, and it was no more than a toy. And people laughed at it, too."

There's only one way to understand this, I realize.

So here I am. I clear my living room. I shove my metal desk as far away as possible to prevent minibolts of lightning. I stuff my cats in the hall closet so they don't somehow get electrocuted.

Then I reach down and turn on the juice.

Lifters go back to the 1920s, with the work of inventor Thomas Townsend Brown. Born into a wealthy Ohio construction family, he was a lackluster student who loved to mess with electricity. While at Denison University under the direction of mentor Paul Biefeld, Brown began experimenting with capacitors – electronic components that can store and release a charge. Brown noticed something odd. When he pumped a high voltage through a capacitor, it would produce a tiny propulsive force in one direction. He'd strap a capacitor to the end of a lever, turn on the current, and it would jump to one side, like the arm on a metronome. He dubbed it the Biefeld-Brown effect.

Brown was better at tinkering than theorizing, so he never developed a rigorous scientific explanation for why this happened. He had plenty of wide-eyed hypotheses, though: In "How I Control Gravity," a 1929 article for *Science and Invention*, he claimed that his capacitors generated mysterious fields that interacted with Earth's pull. Brown envisioned a giddy, Jules Verne future where his devices would drive the world: "Multi-impulse gravitators weighing hundreds of tons may propel the ocean liners of the future," he wrote. "Perhaps even the fantastic 'space cars' and the promised visit to Mars may be the final outcome. Who can tell?"

While working for the US Navy in the '30s – officially on electromagnetic mine detection – Brown continued building ever larger examples of his capacitors. His experiments culminated in a 1952 demonstration famous in antigravity lore: In front of an audience of scientists and military officials, Brown hauled out two 2-foot-wide metal disks affixed to the end of 10-foot-long rotor arms. When he pumped 50,000 volts through the apparatus with 50 watts of power, the disks spun at 16 rpm – proof of concept.

After that, interest in Brown's work slowly waned. The Pentagon never pursued the technology, and investors weren't interested. Worse, Brown's scientific credibility crumbled when, obsessed with UFOs and their means of propulsion, he founded the National Investigations Committee on Aerial Phenomena to hunt for little green men. In 1979, a book on the mythical Philadelphia Experiment – in which the Navy allegedly teleported a warship – cited Brown's participation, cementing his reputation as a crackpot. "I think that's when the mainstream physics guys started saying, OK, this stuff is crazy," says Andrew Bolland, a friend of the Brown family who runs a Web site devoted to Brown's work. For the next few decades, hardly anyone remembered Brown had ever existed.

Until the late '90s, when Brown's work was revived by Jeff Cameron, a NASA subcontractor in Huntsville, Alabama. He'd noticed similar twitching movement in capacitors and, recalling a mention of the Biefeld-Brown effect in a college physics class, hunted down some of Brown's patents. Cameron wanted something that would fly, to dramatically illustrate the force. He chose balsa wood for lightness and a three-sided shape for sturdiness. When he fired high voltage through it, it jumped into the air, and the lifter was born. In June 2001, Cameron posted pictures of his setup online.

Which is how Tim Ventura heard about it – and turned lifters into a global phenomenon.

"I think that being slightly nuts is part of this whole subculture," Ventura says.

He sits at his workbench amid a pile of electronic parts, squinting at a burnt fuse. We're in his garage near Seattle, the world headquarters of the lifter movement. Ventura – a squat 27-year-old computer engineer who favors cowboy boots – runs AmericanAntigravity.com, a Web site devoted to

collecting flight videos and theorizing about lifters. While unemployed last summer, he built "probably more lifters than anyone on the planet" and wrote a step-by-step guide to constructing the toys (see "How to Build Your Own Lifter" on preceding page). More than a million fans have flocked to his site, and hundreds have contacted him to report their own successful flights. News crews from the Discovery Channel to Nippon TV have traveled here to film Ventura's lab, making him the public face of antigravity – the Linus Torvalds, as it were, of lifters.

On the wall hangs his masterpiece, a 4-foot-wide monster, capable of lifting almost a pound of cargo. To fly it for me, he's readying his power supply: four 2-foot-tall plastic cones that kick out a blistering 120,000 volts. The air in his garage is sweet with an after-the-thunderstorm smell. "My wife almost never comes down here when I'm doing this stuff," Ventura says. "When I first started building these things, the current would plaster your T-shirt to your chest if you got too close. And the bigger arcs of lightning kind of freak her out."

Ventura is built like a high school linebacker, with thick arms and a crew cut. The room is littered with junk, electrical components, and books. I find a text called *Science Is ... : A Source Book of Fascinating Facts, Projects, and Activities*, a copy of Tacitus' *The Annals of Imperial Rome*, Milan Kundera's *Identity*, and a tome called *Area 51: The Grail*.

Ventura had been hooked on electrogravitics for years. At age 16 he sent away for a hoverboard kit advertised in *Popular Mechanics*. It didn't work; neither did anything else he ordered from the back of a magazine or designed himself. "I built so many different prototypes that never did anything. They'd sit there and sputter, and nothing else. Or you'd get a tiny little result – you'd kind of see it wiggle or wobble," he says. He pulls out a faded Mr. Coffee box jammed with records of his previous experiments:

letters he wrote to the kit company HoverTech, arguing over the nature of gravity; sprawling electrical-system diagrams; some schematics he drafted for a rail gun. By the time he saw online images of Cameron's lifter early last year, Ventura was jaded: "I built my first one thinking it probably wouldn't work." But it did.

We haul the power supply and his enormous lifter out to his backyard deck, his dog right behind us. I bend down to inspect the contraption. It's awfully simple in its construction. There's a thin, 50-gauge exposed wire strung along the top of the craft. That's where Ventura attaches another wire to feed the lifter DC juice from the power supply. The bottom is encircled by a long skirt of tinfoil, which hooks up to the ground wire. The top wire and foil skirt are separated from each other by a 2-inch gap. Six-foot pieces of string tied to each point at the base will hold it down so it doesn't fly up or accidentally spin and cross the wires running to the power supply, shorting out the system.

"We're ready now," he says. "Stand back." He throws the switch.The lifter begins hissing like an angry snake. The noise comes from two places: the current arcing through the air and the thin wires ringing the top of the craft, which vibrate like guitar strings. For a moment, it doesn't look like anything's going to happen, and Ventura frowns slightly. But he eases the power up, from 30,000 to 40,000 volts, and there's a fusillade of snapping and popping as tiny lightning bolts shoot between the top wire and the foil skirt. The current jumps across the gap, flowing down the lifter through empty space.

One corner eases a few inches off the ground. Another corner lifts up. Then the whole thing abruptly jumps 2 feet off the ground, wobbling side to side drunkenly. Ventura pushes the voltage higher, and it leaps up again, stabilizing 6 feet off the ground, the long tethers straining to hold it down.

"Awesome!" he exclaims. "Awesome!"

And it is strangely awesome. As I watch this enormous structure floating placidly above his deck like a shiny tinfoil ghost, I understand why so many people have become so enamored of these toys: They inspire a goofy mad-scientist feeling. I felt it myself, when I first turned on my own tiny lifter and watched it successfully levitate. No matter how skeptical you are, how understandably laughable you find the idea of antigravity – for a split second you abandon all logic and think, Wow, there's a freakin' UFO hovering 3 feet from me.

Mind you, the lifter's bizarro pedigree ensures that it attracts mostly those from the far fringes of science. While we're flying his huge lifter, two of Ventura's friends drop by to watch – Bill, a bearded, ponytailed computer engineer who runs the local Weird Science club, and Doug, a hyperkinetic man dressed almost entirely in Comdex schwag. For the next two hours while the lifter flies, we wind up discussing: a) whether high-voltage experiments can "jellify" metal at room temperature; b) how the military might be using radio waves to manipulate the emotions of enemy nationals; c) an alleged experiment where a scientist accidentally made himself wink out of existence for 15 minutes, in front of his wife; and d) whether the quantum forking of alternate universes could be harnessed to help with gallstone surgery. (Bill: "If you concentrate on the gallstones, they get fixed in existence, and it's harder for them to wink out. It makes them easier to operate on." Doug: "Wow!")

In this context, Ventura seems like a reasonably skeptical guy. "I wouldn't necessarily say I believe any particular theory about why this thing works," he admits. He begins snapping pictures, and Doug and I pose beside the lifter.

Just then, a tether breaks – and the lifter swings sideways, whistling menacingly as it heads directly toward our chests. Doug yelps and leaps back; I dive for the deck, grabbing the tether to bring it under control. As I tape it back in place, I realize that I'm now squatting directly beneath an unstable device that is sizzling with 45,000 volts.

"That was close!" Doug says. "It was like it could tell I was there!"

What makes lifters fly?

The simplest answer comes from antigravity debunkers. When I call university physicists to ask how these things work, they bark with laughter at the idea that it's antigravity.

The propulsive force, they say, has a simpler explanation: ion wind.

When the current enters the wires ringing the top of the lifter, electrons race off to ionize the surrounding air. The ions are attracted to the foil skirt and race down, smacking into neutral molecules and generating a downward-moving breeze. At one point, I take my lifter to Rainer Weiss, a hyperactive, gray-haired gravity expert at MIT. He's working on the groundbreaking LIGO project to detect gravitational waves – when he's not dealing with journalists who plunk tinfoil UFOs down on his desk. He shakes his head and sighs.

"There is nothing mysterious about this at all," he says. He scribbles furiously across two sheets of paper, calculating the current flowing through the device, the number of ions it would create, and their total potential kinetic thrust. It's about 7 millinewtons, he concludes, and scoops up my lifter. "Do you know how much this weighs? Let's take a guess – it's a couple of grams." That's probably just light enough to get it airborne. As far as he's concerned, my lifter is nothing more than a hovercraft. Case closed.

Lifter enthusiasts admit the ion winds exist. Thomas Townsend Brown actually described his invention as an ion-flow generator. (And those famous Ionic Breeze air purifiers sold at the Sharper Image? They're based on Brown's expired patents, though Brown himself never made a penny from them and died broke in 1985.) When I put my hand beneath Ventura's massive lifters, the wind is palpable. Moreover, boasters acknowledge that lifters don't inherently push away from Earth, which is the normal definition of antigravity. They're directional, like fans; they push in whatever direction you point them – up, sideways, down.

But true believers say ion wind isn't the whole story. That's because in several alleged cases, lifter-style capacitors have flown in a vacuum. Since no air was present, they must – antigravity proponents argue – be harnessing a mysterious new force.

Hector Serrano claims he's seen it. By day, Serrano works at Orlando Airport, fixing airplanes. But he's also been an electrogravitics aficionado ever since, as a child, he saw a samizdat video of Brown's 1952 flying-saucer experiment. "I can pretty much see the faces of the people in the video to this day, that's how much it stuck out in my mind," he recalls.

Three years ago, working with Purdue aeronautics professor John Rusek, Serrano tested a lifter-style capacitor in a vacuum. They attached it to a pendulum, turned on the current – and watched, amazed, as it shifted out of place. "We were like, OK, there you go – there's still some kind of force effect," Serrano says. "There's just no way you can get around the fact that you're pushing against nothing." Both are trying to commercialize the technology, envisioning it as a means for next-generation propulsion.

But the two never prepared a peer-reviewed paper on their informal experiment, so it's impossible to prove it worked as they claim. Over time, I

discover that none of these much-vaunted flights in a vacuum are properly documented. In fact, the only written report documents a vacuum test that failed: R. L. Talley, a researcher who tested a Biefeld-Brown-style capacitor in 1990 for the Air Force, found no thrust in a vacuum. But that study wasn't peer-reviewed either.

To follow up on these far-out claims, I go to NASA. It turns out that a scientist there named Jonathan Campbell has a lifter-style capacitor. He was even granted a patent in 2001.

"It had been theorized that thrust generation from this phenomenon was feasible, but no working prototypes had been developed, until now," boasts the NASA press release. The patent set off an uproar in the lifter community, with hobbyists penning bitter denunciations of Campbell. Most lifter builders, it seems, regard their invention as a classic open source project – antigravity for the public good, jet packs for all!

What matters to me is that Campbell promises to do an all-important vacuum test. It's a delicate affair, he notes. Anyone can pump air out of a bell jar, he tells me, but creating a true "deep vacuum" costs tens of thousands of dollars. He'll let me know when he's ready to run the test. Excellent. This is what I need: an actual, rigorous scientific experiment by a credible institution.

Yet NASA was uneasy about letting me see Campbell's work, stalling for six months. Finally, I wrangle an appointment.

When I pull up at NASA, the PR handler – a nervous man in a brown suit named Steve Roy – checks my trunk for bombs. He escorts me into a meeting room, where seven others, including several scientists and more PR managers, are sitting. Apparently, I'll be conducting this interview in front of a crowd. I'm further informed that I can't have any copies of the materials

they'll show me. "Security," Roy shrugs. I feel like I'm in a Tom Clancy novel. Obviously, there's no secret antigravity program being conducted at NASA – but judging from their paranoid behavior here, you'd be forgiven for thinking that they'd reverse engineered the stuff from a UFO that crashed in the back lot.

Campbell is a polite, gray-haired Southern gentleman in a white shirt and red tie. He tells me he was hired by NASA to work on electrical propulsion systems, investigating early prototypes of ion engines. "We worked with mercury, before mercury was considered hazardous to your health," he recalls. "But we liked it because you got heavy ions."

In 2001, he saw Cameron's lifter design. Campbell wondered whether it could form the basis for a new engine. He says he didn't rip off anyone's work; on the contrary, Campbell claims, he relied mainly on Brown's publicly available patents. As Campbell tells it, he took out the patent not to profit off lifters but to ensure future public funding – and thus, public access. "We've had all sorts of flak," he drawls.

Still, his immediate goal was to answer the scientific questions. He knew that electrical-thrust systems have promise. "According to old-fashioned physics," he says, "there's a lot of force when you start dealing with high voltages." If the lifter idea worked in a vacuum, it would be a serious breakthrough.

In the corner of Campbell's lab is a thick stainless steel base about 3 feet square, over which stands a 3-foot-tall glass bell jar. NASA's lifter sits beneath the glass. It's slightly different from the usual design. Campbell wanted his device to rotate, not float, so that it would be easier to measure the thrust. He created two capacitors that are tubular, like tiny jet engines – with the hot wire on one end, a gap, and a metal tube for the ground. Each

capacitor is mounted on the end of a rotor, driving it like a pinwheel. Last fall, they tested the contraption in regular air – shooting it with 27,000 volts at 20 microamps. Bingo: It generated 3 millipounds of force, and the rotors spun at 60 rpm.

Then, in December, they finished tweaking their vacuum. They were able to get the pressure inside the bell jar down to the equivalent of low-Earth orbit – 10-7 torrs, to be precise. They put the device inside and hit the juice.

Nothing happened.

It wouldn't budge an inch. They jammed the voltage up to 50,000 volts, and still nothing. They repeated the tests several times but didn't dare use higher voltage. "We had lightning coming out the back of it," says Andy Finchum, Campbell's assistant, pointing to a set of plastic guards he set up after nearly frying himself. "You could start hearing the hiss at those voltages, and that's when you don't want to get close!" He hands me a thick gray pressure gauge. "These are $1,500 apiece, and we toasted one."

To check if it was an equipment error, they brought the bell jar back to sea-level pressure – and the rotor started spinning again. The device itself wasn't malfunctioning.

Campbell folds his arms and declares antigravity dead.

"There's no performance in a vacuum," he concludes. I ask him about the more bug-eyed theories of lifter fanatics. Some claim that lifters create electrical fields that push against space-time; a few think the devices harness the hypothetical zero point energy field. Could there be a new type of physics here? "We don't expect to find one," Campbell says dryly. "And if you come across something, don't tell me about it – go straight to Oslo and the Nobel Committee."

Still, Campbell maintains that lifter-style thrusters have several advantages over existing propulsion systems. They have no moving parts, no fuel on board, and can receive their energy remotely. He spins scenarios and actually seems to be getting excited again himself. "It's possible that we might be able to use this for something like a Martian glider," Campbell says. "It lends itself to beamed-power type applications – where you have a power platform in Martian orbit beam the energy down to the glider in the planet's atmosphere." He says he's already tweaking his current design, aiming to make it more efficient: "We're talking maybe even a pound of thrust out of one of these little devices the size of my thumb. We've got some promise here!"

I call Ventura to tell him NASA's results. Lifters won't fly in a vacuum; there are no alt.physics to be found. For a second he seems depressed, but he rebounds an instant later. "Well, that's cool they're still thinking of using it for propulsion in air!" he says brightly. "Truthfully, I've also been getting more interested in using it as an air vehicle rather than something for space. Really." He's still trying to build stronger lifters and has ordered a new power supply that will deliver 12 times the wattage of his old one – "practically a lethal level," he enthuses. He's getting thousands of visitors each week to his site, and a TV news crew is talking about flying him to Area 51 for a piece they're shooting.

All of which explains why he seems so unfazed. Real scientists can easily shoot down the antigravity claims of lifters – but they can't stop the hard-core believers from flying them. I'm beginning to realize that as long as any teenager can cobble one of these things together with materials lying around the house, lifters will be the cockroaches of antigravity, impossible for skeptics to eradicate.

I pull mine out of my storage box. After hauling it from city to city for nine

months, it's a battered wreck – one balsa strut is cracked, the foil is ripped, and the top wire is saggy all the way around. *There's no way in hell this thing still works*, I figure. But I plug it in, clear a space on the floor, and turn it on. It takes off like a charm.