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Taking a Whack at Making a Car

By [MATT RICHTEL](#)

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ZOOM-ZOOM A speedy two-passenger three-wheeler that Howard Levine, left, and Ian Bruce hope is a car of the future.

IAN A. BRUCE presses an Italian-made alligator-skin boot onto the accelerator of his three-wheel thrill machine and careens around a corner. The agile metal box tilts precariously to one side, leaving Mr. Bruce nearly horizontal to the ground.

"The experience is like driving a jet fighter," he shouts over the engine. "It's truly a new kind of vehicle."

The machine, which has one wheel in front and two in back, is a hybrid of a motorcycle and a car, and it underscores a trend: vehicles of the future are as unorthodox as the entrepreneurs who are trying to create them.

A generation of digital-era Henry Fords, unabashed and brimming with confidence, has emerged. Born of Silicon Valley and the dot-com culture, they are trying to apply to carmaking the same entrepreneurial spirit that built the information superhighway.

Most of the inventors are not carmakers by background or training. But they are cocksure, backed by millions of dollars in venture capital and cloaked in the righteousness of environmentalism. To their critics, they are flying at high speed around a blind curve, destined to become reality-check crash-test dummies.

Cars on the market or in development include the \$100,000 all-electric Tesla Roadster, the \$190,000 Wrightspeed production super car, an electric pickup truck called the Phoenix, the low-cost diminutive Th!nk car and the Bangalore-made Reva.

Then there is Mr. Bruce's Venture Vehicle, which is meant to cut costs and fuel consumption with its smaller weight and size. The car relies on technology licensed from a Dutch company that allows the vehicle to turn sharply without toppling over, giving it airplanelike physics that help keep the contents of the vehicle, human and otherwise, safe.

The company was started by Mr. Bruce, 50, a former graphics designer who once made brochures for major carmakers, and Howard Levine, a Los Angeles lawyer turned dot-com entrepreneur. The financial backers include NGEN Partners, a Silicon Valley venture capital firm that has put \$6 million into the company, even though NGEN has no background in the auto industry.

"I know nothing about cars," said Robert Koch, a partner there. But, he said, he has experience in battery technology, which he thinks is an essential component of future vehicles.

"Once you have the battery and the propulsion system, building a car is not that complicated," Mr. Koch said.

Over the last century, there has been no shortage of ideas, business plans, sketches and prototypes of new cars. And hundreds of millions of dollars have been lost in developing them.

But the latest generation of entrepreneurs argues that conditions are particularly rife for overthrowing — or at least expanding — the caropoly controlled by Detroit and Japanese auto giants. The newcomers say that the giants are no longer innovative. Consumers, meanwhile, are ravenous for hybrid or electric alternatives, and advances in technology and manufacturing are eliminating the capital-intensive obstacles that have prevented smaller companies from getting into the game.

Still, skeptics shout louder than a jet engine.

David Cole, chairman of the Center for Automotive Research, an industry-financed research group in Ann Arbor, Mich., said there was little chance that a start-up could succeed in creating a car for the mass market. The entrepreneurs' optimism, he said, reflects ignorance of manufacturing costs, regulatory hurdles and intricate technical challenges involving heating, ventilation and safety.

He said the entrepreneurs had trivialized the large sums of money and labor that traditional carmakers have invested in alternatives, nearly all of which have failed. And he said the upstarts' expertise did not qualify them to build cars.

Drawing an analogy, Mr. Cole said: "I know about cars. Does that mean I can do a better job than the medical industry at creating an artificial heart?"

"Even a sophisticated high-tech person has no clue," about the challenges in breaking into the auto business, he added. "They think the whole world is like doing a microchip, and it's not."

Even some of the new entrepreneurs question their ability to produce innovative cars. Ian Wright, 51, the mind behind the Wrightspeed supercar, which he expects to accelerate from 0 to 60 miles an hour in under 2.5 seconds — said he thought that many of the start-ups were misreading consumers by trying to build small, low-cost, high-mileage urban-centric vehicles.

What Americans want, he said, are size and power.

The start-ups are "almost universally trying to replace economy cars, and that's a complete waste of time," he said, arguing that less than 1 percent of the fuel burned in the United States is done by cars that get at least 35 miles a gallon. He added, "If you're really trying to compete with [Toyota](#) at making cheap cars, the problem is, they're the best at creating cheap cars."

By contrast, Mr. Wright, who spent most of his career as an electrical engineer designing Internet technology, ultimately envisions building technology to create cars that are both high mileage (50 miles a gallon) and powerful (1,000 horsepower). His Wrightspeed supercar, which he said was two years from production, will prove the capacity of the technology he is developing.

The smaller upstarts have actually made inroads. The all-electric Reva, based in India, has sold around 2,200 cars since 2001, 1,000 of which are on the streets of London, said Annie Hazlehurst, a venture capitalist with Draper Fisher Jurvetson, which in 2006 led a \$20 million round of financing for the company.

The Reva, which costs \$9,000, has a range up to 80 kilometers (about 50 miles) per battery charge.

At the other end of the spectrum, Draper Fisher invested in 2005 in Tesla Motors, which makes an all-electric sports car that it hopes to sell for around \$100,000.

Like its backers, Tesla's management team was forged in Silicon Valley; the chief executive, Michael Marks, was previously the top executive at Flextronics, an electronics manufacturing services company. Tesla's co-founder and president of technology, Martin Eberhard, had helped start NuvoMedia, an e-books company.

Tesla has had its struggles. It originally said it would have cars for sale by mid-2007. But it recently said that it was delaying production — reportedly because of problems with the battery technology — until the first quarter of 2008, when it will sell its first 50 cars. The company said it would have 600 more cars ready by the end of next year.

Another electric car already on the market is the boxy \$39,000 Th!nk City, made by a Norwegian company called Th!nk Global, with backing from RockPort Capital Partners. William James, a managing general partner at RockPort, based in Boston, said that the new generation of Th!nks were expected to be available in Europe in the first half of 2008, and in limited quantities in the United States in the second half of next year.

Part of expanding the car's appeal, Mr. James said, could involve a novel business model that would charge \$20,000 a car, but then lease the battery for about \$200 a month "It's cheaper than buying gas," he said. "The business model is pretty compelling."

Mr. James said that the economics of carmaking are becoming more favorable for start-ups. For example, it is possible to create assembly plants for \$5 million, compared with \$500 million for traditional plants, he said, because the new plants are working with premade parts and putting them together. Furthering the lure, he said, is that many cities and countries are taking steps to encourage the use of hybrid-electric vehicles, including subsidizing their purchase or penalizing the use of gasoline-powered cars.

Which brings us back to the Venture Vehicle. (The company's founders, Mr. Bruce and Mr. Levine, say they are working on a catchier name.) Driving the vehicle is intense, fun and, depending on your capacity for speed and being periodically horizontal, exhilarating.

The prototype is somewhat crude, however, but the founders envision combining the maneuverability of a motorcycle with the safety of a car. (They said that the Venture Vehicle would not fall under current federal guidelines regulating cars, including mandates for expensive safety tests, but they planned to conduct the tests anyway.)

They foresee two versions, a gas-electric hybrid for \$20,000, getting 100 miles a gallon, and an all-electric for \$25,000 that will have a range of 120 miles.

Their target is automotive enthusiasts, early adopters, environmentally conscious consumers, as well as commuters, 90 percent of whom they say travel as single passengers.

They plan to put the vehicles on the market by the second quarter of 2009.

"There's nothing wrong with four wheels, but three has its advantages," said Mr. Levine, 47, the chief executive of Venture Vehicles. "Specifically, three wheels are lighter and more agile. One of the greatest impediments to fuel efficiency is weight."

Mr. Bruce originated the idea for the vehicle in 2005, when he was searching online for alternative-vehicle technologies and came across the phrase "tilt control technology."

"Then, 'bang,'" he said, recognizing that he had stumbled onto something he thought was cool.

He and Mr. Levine traveled to Dordrecht, south of Rotterdam, where they signed a licensing agreement with Carver Engineering for a down payment of less than six figures, future payments, equity in the company and, eventually, royalty fees. In return, they obtained the North American and South American rights to sell the hybrid, electric and biofuel versions of a tilt-based car.

They have since signed contracts with some of the biggest names in the auto business, including California Motors, which specializes in propulsion systems; Swift Engineering, which builds suspensions and drivetrains; and the American subsidiary of a major European automaker (whom they have declined to name publicly) to design the car.

Among their eight employees are a former sales and marketing vice president at [Chrysler](#) and [Mazda](#), and a former manager at a [General Motors](#) plant. But they concede that they themselves are not exactly seasoned car people.

"We're not two gearheads," Mr. Levine said. "We're not two mechanics in a garage with a dream. We're two entrepreneurs who saw an opportunity and came up with a business model."