

UNPARALLELED POWER

WHEN ENGINES ARE SO STRONG THEY CAN EVEN MAKE A HMMWV MOVE QUICKLY, YOU KNOW **GALE BANKS** IS BEHIND THEM

► BY TORREY KIM \ PHOTOS COURTESY OF BANKS POWER

H E'S AN ENGINE MASTERMIND.

Gale Banks knows how to give any engine more power. Which probably explains why the military called on him when it decided to upgrade its HMMWVs to make them safer, more powerful and quieter to help our Armed Forces continue their tactical missions.

To get some insight from the man behind the engine, we sat down with Banks, president of Banks Power, who shared how his unique combination of skills and background made him the perfect fit for the military's latest project.

Firepower: You sold your first engine at the age of 16.

How were you capable of that, and how did it translate into a career?

Banks: After World War II, my father was stationed at an air base in Japan where he was in charge of every vehicle, generator and engine on the ground there, so after the war, he had a lot of knowledge that he brought out of the Army, which was great for me as a child to learn from him. He later became a Los Angeles police officer, but he continued to spur my fascination with all things mechanical.

In 1954, when I was 12, my mother asked me to fix a blown head gasket on her '31 Model A Ford. She never got the car back. I did a lot of work on it over the next two

years, taking it from 40 to 105 horsepower.

By the time I was 16, I had built a radio-controlled, two-HP electric tractor to pull a lawnmower that would mow my parents' lawn while I sat on the porch and controlled it. That was my science fair project—and I won—and that same year, 1958, I built and sold a V-8 engine and put it in a 1932 Plymouth—the whole thing was \$1,100 and that was the initial funding to get my business started. I kept building engines and selling parts and pieces, which funded my college education! So when I graduated college I was already selling engines and parts to the public at a speed shop I set up in San Gabriel, California.

Firepower: What were the biggest sellers at that point?

Banks: In the late '60s, I started building turbocharged marine engines. By the mid '70s those twin turbo 454s became the power option worldwide for the boating fraternity. The guys who built bigger boats in the Mediterranean used as many as three engines per boat. These were 850-hp engines, but when the oil embargo started, the entire automotive and marine industry and all the armed services started looking at fuel efficiency, and that's how my initial interest in working with diesel came about.

Firepower: How did you get involved with turbocharging?

Banks: In 1976, the National Highway Traffic Safety Administration wanted to build a full-sized crashworthy automobile, "a safety car." The company that won the contract to build the car contacted us to do the propulsion system for it, and that was really key to where I am today. We did the powertrain, which was a Banks turbocharged Volvo engine and a Lancia Beta front drive, with advanced lubrication and engine pieces, but the main thing was our turbocharging.

The turbocharger's concept essentially takes waste energy from the engine's exhaust and makes it into something positive (hence the name "turbocharger"—it's the turbine driving the supercharger). I figured out how turbocharging worked and have been using it as a performance tool for the past 45 years! It also helps improve fuel efficiency while allowing the vehicle to retain performance in civilian vehicles, in the military, in aircraft with reciprocating engines, in locomotives and in heavy-duty trucking.

Working with my team, we created the powertrain for the research vehicle, and it had to meet proposed 1985 fuel and emissions standards when finished in 1978, and we managed to pull that off in a full-sized car. It was the first electronic fuel-injected, oxygen-sensing, turbocharged engine in the world.

Firepower: How did you get involved with the Armed Forces?

Banks: The first engine I sold to the Navy was for a boat in 1976. The Navy and the Department of Defense eventually transferred over from gasoline to diesel. Currently, if an engine runs domestically, it runs normal diesel fuel, but if it's running in a tactical environment, our engines must use JP-8 jet fuel.

We use racing to find the limits of every engine we develop so we can determine the points where the engines begin to fail. Before computers could test these things, we could figure out things like how hot the customer would be able to run the coolant or what maximum engine speed could be achieved. Here's the cool part, we usually set records in our test vehicles and currently hold the record for the world's fastest diesel pickup at 222 mph!

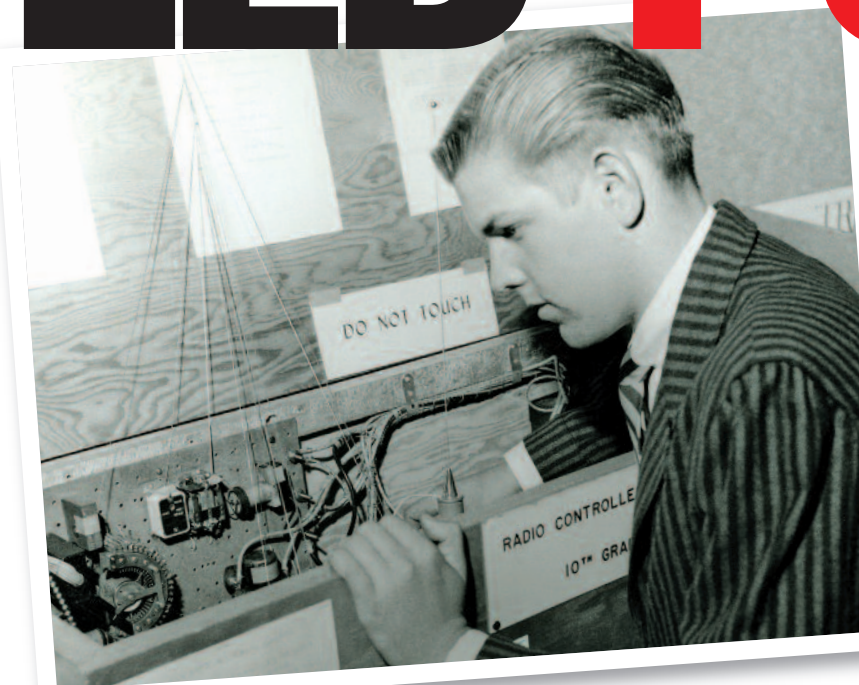
For More Information

To discover more about Banks Power, visit www.bankspower.com.

Do The Math

163,000
The number of HMMWVs in the Army alone

250,000
The total number of HMMWVs currently running and being used by the Armed Forces



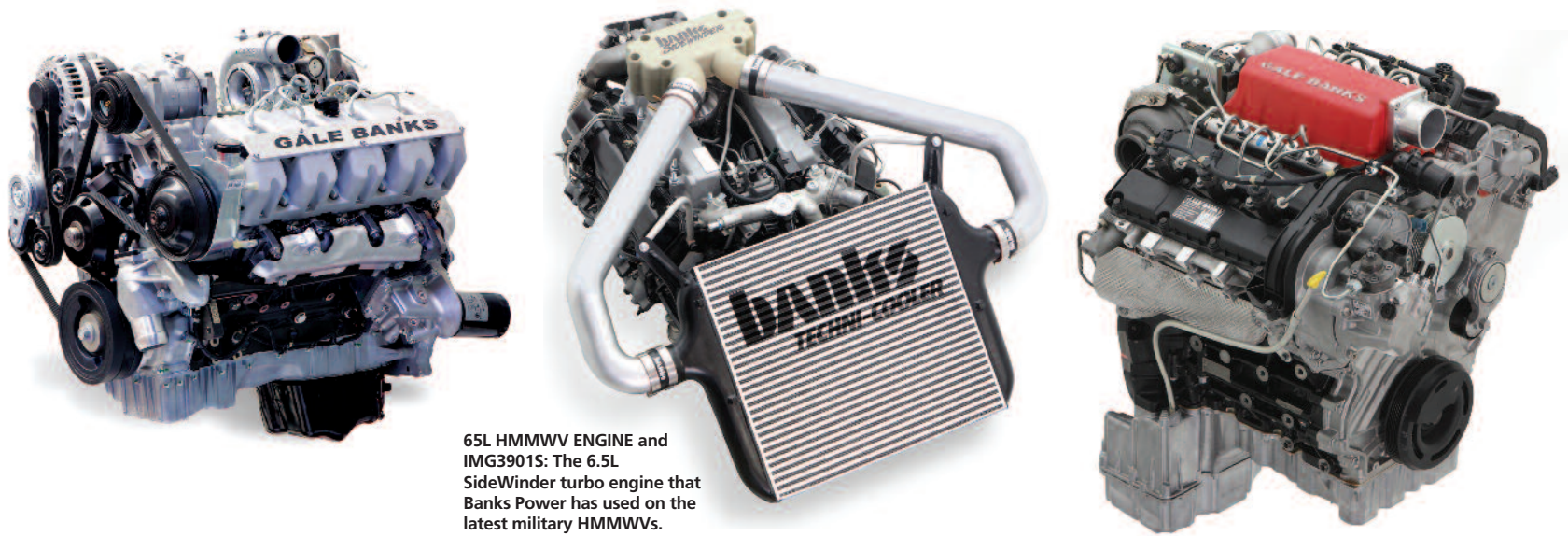
10th GRADE SCIENCE FAIR: Banks with his winning science fair project—a radio-controlled tractor that allowed him to mow the lawn remotely while sitting on his parents' front porch. Banks designed and built the project at the age of 16.



SUPER TURBO ENGINE: Gale Banks made his name making super turbo engines like this one, which can give any boat or vehicle unmatched power.



HMMWV DYNO: Banks Power tests the specs on a HMMWV that the company is working to improve to make it quieter, more powerful, and more durable.



65L HMMWV ENGINE and IMG3901S: The 6.5L SideWinder turbo engine that Banks Power has used on the latest military HMMWVs.

“WE ALSO WANT TO ASSIST WITH WHAT THE MILITARY CALLS “E&E” (ESCAPE AND EVADE). TO DO THAT, WE MAKE THEM ACCELERATE QUICKER FROM A STANDSTILL.”
– GALE BANKS, PRESIDENT OF BANKS POWER

What is Pikes Peak?

Banks has been testing his engines on Pikes Peak for years. The legendary site “is the most dangerous thing I’ve ever done,” he says. “If you go over the side—where there’s no guard rail—and you survive it, somebody’s watching over you.” Pikes Peak is a mountain that’s 14,100 feet above sea level and rises 8,400 feet above the city of Colorado Springs, Colorado.

In addition, NATO has defined a military engine test that’s severe beyond anything done in the automotive or trucking industry. The NATO test requires 400 hours with the engine running at full power output. That may not sound like much, but the engine in any normal car would be hard-pressed to run 30-40 hours like that. We’re developing the next step in diesel technology for military use—lightweight, high-speed, highly efficient Gale Banks diesel engines, and so far we’ve been able to master that test.

In 2001, we worked on a new marine engine for military use. Now we’re working on a lighter-weight V-8 that’s supercharged and turbocharged to replace the original.

Firepower: What can you tell us about the HMMWV that you’ve been improving for the military?

Banks: Because of the high altitudes in Afghanistan, we had to develop a high-altitude

turbo system for the HMMWVs. When you up-armor a HMMWV, it doubles its weight. Then you’ve got the high-altitude issues on top of that and the stock turbo just doesn’t work too well. So I tested our SideWinder turbo chargers for the HMMWVs on a race car at Pikes Peak ... it seems diametrically opposed since HMMWVs are slow, but turbochargers don’t know what they’re bolted to! Developing the high-altitude control electronics at Pikes Peak gave us as close as we could get to sea-level power output at 14,000 feet. Remember, there’s not a lot of oxygen up there.

At Banks, we’re working on a lot of new military vehicle programs, and we’re supplying engines to almost every program. We make V-6 and V-8 diesel engines for military use that are efficient, lightweight and powerful; they represent the future in military propulsion. As to the older vehicles, there are 163,000 HMMWVs in the Army alone, and if you count the other services, my best guess is that there could be 250,000 or more of

them currently running and being used by the Armed Forces. The HMMWV is going to be around for probably another 15 to 20 years, so they’re studying how to make these vehicles current to continue their lives.

HMMWVs have gotten so heavy that they need better power and suspension and better brakes. We’re putting together a kit now where we cover using the standard HMMWV engine, a modern turbocharging system, and a modern exhaust breaking system that we designed and it’s been proven in test by those who will use them. We’re equipping vehicles with those items and a computer-controlled suspension system and a six-speed transmission upgrade so that’s the least expensive way to extend a HMMWV’s life and improve its efficiency and performance. Beyond that is a completely new suspension system done by a major truck suspension firm using our V-8 diesel.

If you take a \$200,000 HMMWV and up-armor it and kit it out and put the turret on which is often titanium, by the time you put deployable

communications gear in it, you’re looking at close to a half-million bucks. So if, for less than \$100,000 you can extend its life while making it safer and better, that’s good.

In addition, the Armed Forces are trying to make the bottom of the HMMWV not as flat so it will deflect IED blasts. My son, Andrew, was a combat medic in the second campaign in Iraq, and he told me that up-armored HMMWVs were great—unless an IED exploded beneath them. In that case, the underside wouldn’t take it and the outside armor would contain the explosion inside the vehicle. Not good for those guys!

We also want to assist with what the military calls “E&E” (escape and evade). To do that, we make them accelerate quicker from a standstill. We run a test that’s 0 to 50 meter acceleration — enough to get you started out of the field of fire. We designed the turbo and engine to respond quickly.

We’re working on a lot of technologies that have to do with entering the fray and getting to the fight. For example, in the military today, even when you can’t see a vehicle, you can often hear it, so we want to make them as quiet as possible. Plus, old diesel trucks have a visual signature; if you’re over a rise from someone who can’t see or hear you, they can still see the smoke signature. With our clean diesel tuning, we can reduce the smoke signature greatly, increase its range, and we

make its performance what it should be.

Our computer science guys are developing an electronic system that assesses the vehicle’s health. If the vehicle isn’t healthy, it notifies the appropriate people. I’m not talking about diagnostic assessments, I’m talking about prognosticating—predicting the future, saying, “This thing is good to go” or ‘This vehicle has an impending failure.” This is huge right now, especially if your vehicle is deployed halfway around the world. As of this date, we’re pursuing this technology on our own.

Firepower: The Armed Forces must be grateful to have you helping modernize their systems.

Banks: For my 70th birthday, a great friend gave me a SIG Sauer P226 with the anchor and Banks Power engraved on the slide. I’m going to fire the hell out of it. I don’t care how collectible it is!



“ ... FOR LESS THAN \$100,000 YOU CAN EXTEND ITS LIFE WHILE MAKING IT SAFER AND BETTER.”
– GALE BANKS, PRESIDENT OF BANKS POWER