TRIBUNE SPECIAL REPORT

THE TANKING OF AN AMERICAN DREAM

Second of a three-part series

Tribune photo by Scott Strazzante

EPA engineer Charles Gray test-drives one of his versions of Supercar in the agency's parking lot in Ann Arbor, Mich.

Battered from all sides, Supercar sputters along

Early versions of the fuel-efficient auto demonstrate ingenuity and progress, but the project is threatened by turf wars and unexpected competition

By Sam Roe
Tribune staff reporter

The garage door to the research facility creaked, groaned and lifted slowly, and two scientists in dark blue lab coats pushed a small black car to the center of the room.

They positioned the front wheels atop the two steel cylinders of a dynamometer, locked the back tires in place and clamped a 12-foot hose to the tailpipe.

Standing off to the side was the car's inventor, Charles Gray.

"We're going to make history today," he confidently told his colleagues.

The scientists slipped on their safety glasses and started the car's engine. Over the next 50 minutes its front wheels spun in place, starting, stopping, slowing and accelerating, as if on a treadmill.

When the test was over and the engine shut off, an engineer started crunching the computer data. Twenty-four hours later, he grinned widely as he handed the results to Gray: The car had achieved 60 miles per gallon.

It was a major breakthrough for Gray, who had dreamed of building a highly fuel-efficient car ever since he was a teenager tinkering with engines in the back hills of Arkansas. And it was a clear sign of progress for the nation's historic Supercar project, a multibillion-dollar research effort by the federal government and the U.S. auto industry to produce an 80-mile-per-gallon car.

But there were troubling signs as well. This experimental vehicle, built by Gray and his staff at the U.S. Environmental Protection Agency in Michigan, looked more like a mobile missile launcher than an automobile.

One 6-foot, torpedo-shaped nitrogen gas tank lay lengthwise in the middle of the car, and three smaller ones stood upright in the back seat. Two motors were wedged up front and one was crammed in the back. On both ends were a jumble of hoses and dozens of black, red and green wires.

America's 10-year Supercar project was nearly half over, and the effort was progressing much like this car: It was a marvel, but it also was a mess.

Never before had the U.S. government and the auto industry

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The series

SUNDAY
PART 1:
STARTING UP
The concept for an 80-mile-per-gallon car is born.

▶ MONDAY
PART 2:
SHIFTING INTO GEAR
After a slow start, engineers make impressive headway.

TUESDAY
PART 3:
HITTING THE BRAKES
70 miles per gallon—and then a dead stop.

SUPERCAR: All sides were unable to get on same page

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embarked on such a huge research venture—and it showed.

The Supercar project was supposed to marshal all available resources, but it didn't. It was supposed to be a model of cooperation, but it wasn't.

"The hope had been that it would bring out the best and the brightest everywhere, but the reality was it brought out a lot of turf battles and fundamental differences," says Katherine Gold, an EPA official who worked on Supercar.

Launched with great fanfare by the Clinton administration in 1993, Supercar was supposed to address a variety of problems: rising oil imports, increased global warming concerns and a stagnating auto industry.

The White House and the Big Three automakers were going to set aside their differences and pool their research to build a family-size car with triple the standard fuel economy without sacrificing safety, comfort and price.

Bringing all sides together had been an excruciatingly difficult task, but that was nothing compared to actually having to design and build Supercar. And at least at the outset, no one had an inkling that an automaker in Japan would once again threaten to beat the Americans at their own game.

Igniting a partnership

The American automobile, in many ways, is already a technical triumph. It consists of 10,000 parts from dozens of industries, and the finished product runs on a fuel one-third the cost of Evian bottled water.

Yet the basic power source of this remarkable invention—the internal combustion engine—has varied little since the days of Henry Ford. Cars still run by burning a mixture of fuel and air inside a combustion chamber.

Supercar was setting out to perhaps change all that.

In theory, all ideas would be considered. But in reality, the Supercar scientists came to the project with years of experience about what might work and what might not.

They knew that Supercar probably would not be an electric car. Despite decades of research, batteries still were not powerful enough to run cars without frequent recharging.

They knew the car would have to be aerodynamic, but not too much so. The ideal shape—a jellybean with a fishlike tail—would be difficult to market.

And they knew the car likely would be a hybrid, or a vehicle with two sources of power. But what kinds? And at what cost?

These were the sorts of issues that some of the top scientists from industry and government faced when they first sat down together in the fall of 1993.

And the first thing they did was what leaders have grudgingly done for years when beginning a major undertaking: They formed committees.

Five senior government officials and industry executives would oversee Supercar, and two headquarters were chosen. Government officials would work out of the Commerce Department, in a large room overlooking the White House; industry officials would share an office in Southfield, Mich., in a glass tower 2 miles from Detroit.

They agreed to the goals and deadlines spelled out by the White House and the Big Three chief executive officers in the Supercar accord. Though not legally binding, the agreement was clear: By 1998, U.S. and industry officials would select the most promising technologies; by 2000, the Big Three would build at least one concept car; and by 2004, the automakers would unveil a production prototype, or a vehicle designed to be mass-produced and sold.

Finally, the effort would have a formal name: the Partnership for a New Generation of Vehicles, or PNGV.

Most people found the name a mouthful. So many just called it "Supercar."

Maverick sets out

Supercar had perhaps no greater champion than Gray, the quirky, passionate scientist at the EPA.

Known for his inventive mind, Arkansas drawl and purple dress shirts, Gray seldom was at a loss for words or short of ideas. He built his own home using recycled telephone poles, and when he visited Alaska, he returned with several buckets of mud because he was experimenting with a way to extract gold dust.

But fuel economy was his lifelong passion, and as director of advanced technology at the EPA's testing and research lab in Ann Arbor, Mich., he was perhaps the U.S. government's top expert on the topic.

He came up with the idea for an 80-mile-per-gallon Supercar in the first place, then spent months helping the White House sell the plan to the automakers.

But shortly after the effort was launched, Gray decided that he wouldn't simply conduct research for the program. He would build his own Supercar—and do it largely in secret.

Gray made that decision for a variety of reasons, some high-minded, some self-serving. He was convinced that some of his fellow Supercar leaders did not think it was possible to build an 80-mile-per-gallon car. Gray wanted to prove them wrong.

He also increasingly feared that the Japanese might steal an idea he had been toying with for an ultra-fuel-efficient automobile. With patents and royalties at stake for himself and his agency, why risk talking?

So Gray set out on his own, turning not to the new technologies of space probes and stealth bombers but to an old technology of farm machinery.

His Supercar idea was based on the science of hydraulics, the study of how energy is created by applying pressure to liquids. Some engineers derisively referred to hydraulics as "tractor technology" because it was used to power farm combines, bulldozers and cranes.

But Gray thought he might be able to apply it to cars with dramatic results.

He theorized that when a driver hit the brakes, the force of the car slowing down could be captured by small pumps near the tires. The pumps could then push fluid into a large steel tank containing nitrogen gas. When the driver hit the gas pedal, the compressed nitrogen could be released, shooting the fluid out with such force that it could be used to help power the car.

A normal engine still would be needed to do most of the work, but Gray figured that by capturing 80 percent of the braking energy, the motor could be small and fuel-efficient.

The auto industry had explored this idea in the 1980s but abandoned it because the system proved too bulky. Gray found that he could shrink the large steel tanks somewhat if he removed the long piston inside and replaced it with a sausage-shaped rubber bladder that did the same job.

But Gray soon realized that energy in the form of heat was escaping from the rubber bladder. If only something could be put inside the bladder to retain the heat without adding any weight.

EPA engineer Jim Bryson found a supply store in nearby Kalamazoo that could cut up small pieces of seat-cushion foam for the scientists. He ordered 85,000 pea-size cubes at 2 cents apiece, or $1,700.

When the large box of foam arrived, EPA staffers told an engineering intern from the nearby University of Michigan to climb up on a metal storage rack. Over the next two weeks, the intern used a funnel and a thin metal rod to poke the pieces of foam down a nozzle hole at the end of the nitrogen tank and into the rubber bladder.

When Gray thought enough foam was inside the bladder, he tested his theory. Sure enough, the foam reduced the energy loss by 50 percent.

Finally, the bulky tanks could be reduced to a more manageable size.

Toyota is rebuffed

Even though Supercar was billed as an equal partnership between government and industry, the automakers were the ones officially in charge of building the vehicle, and they would be calling most of the shots.

Detroit essentially would decide what it would look like and how it would be powered. The government's role would be as researcher and adviser, opening up its weapons and energy labs and sharing any useful scientific work.

Each company assigned five to 20 engineers to Supercar. As the effort progressed, more were added. Several technical teams, consisting of both Big Three and government engineers, started meeting weekly in the Detroit area to address the scientific roadblocks.

One team studied how to make batteries more powerful. Another looked at the long-range potential of hydrogen fuel cells. Another focused on gas turbines—similar to the huge engines on the wings of commercial jets.

At first, the Big Three considered combining resources to build a single Supercar. But a year into the program, the automakers, with the blessing of their government partners, decided that each company would build its own car.

Fiercely competitive with each other, the companies simply did not want to share their most promising technologies and design strategies. "You just don't give those insights away," says Ron York, former Supercar director at GM.

The Supercar team had an impressive roster of players in Washington, Detroit and Ann Arbor, but missing was the group that pioneered fuel-efficient cars: the Japanese automakers.

Shortly after the Supercar project was launched in 1993, Toyota Motor Corp., Japan's biggest automaker, asked the U.S. government if it could join the effort. The United States said no, that Supercar was a project only for GM, Ford and Chrysler. A major goal, the government said, was to improve the competitiveness of the U.S. auto industry. Toyota was one of the companies Supercar was trying to beat.

Some Toyota officials today downplay that rejection, saying Supercar in no way affected company decisions. But others at Toyota say that being excluded clearly motivated the automaker.

"There was a real good chance they could succeed and put us at a competitive disadvantage," recalls Michael Love, a Toyota regulatory affairs manager.

About the same time the Supercar project was announced, Toyota started designing its own ultra-efficient car, company officials say. The goal was not as bold as the 80-mile-per-gallon Supercar, but it still was ambitious: 55 miles per gallon, or twice the mileage of the average car.

Work was conducted under strict secrecy at Toyota's Higashi-Fuji Technical Center, a sprawling research complex at the base of Mt. Fuji in Japan. Twenty-hour days were not uncommon for engineers there.

Early in the Supercar project, the White House's Office of Science and Technology Policy wanted to know the status of Japanese research into high-mileage cars. Associate Director Lionel Johns turned to the one agency he felt could provide a detailed answer: the CIA.

Johns says he did not want CIA agents to spy on the Japanese auto industry, but rather to use their language and technical skills to review publicly available Japanese scientific journals.

The CIA subsequently briefed

PLEASE SEE FOLLOWING PAGE

SPECIAL REPORT: THE TANKING OF AN AMERICAN DREAM

Gray's Supercar: A new take on an old technology

While the Big Three automakers were developing diesel-electric Supercars, Charles Gray and his staff at the U.S. Environmental Protection Agency were focusing on a technology long used in farm machinery: hydraulic power. Working with his own innovations and cast-off parts, Gray set out to build an 80-mile-per-gallon automobile.

Stretching a gallon of gas

Gray aimed to get 80 miles per gallon by using stored energy and, at times, running the car with the engine off. The 22-m.p.g. figure is based on city driving.

Powering with hydraulics

Hydraulic fluid flows between two high-pressure tanks and one low-pressure tank called accumulators. Pump motors convert the pressure from the fluid into energy that the car can use. The engine does not turn on until the tanks run out of energy.

Storing energy

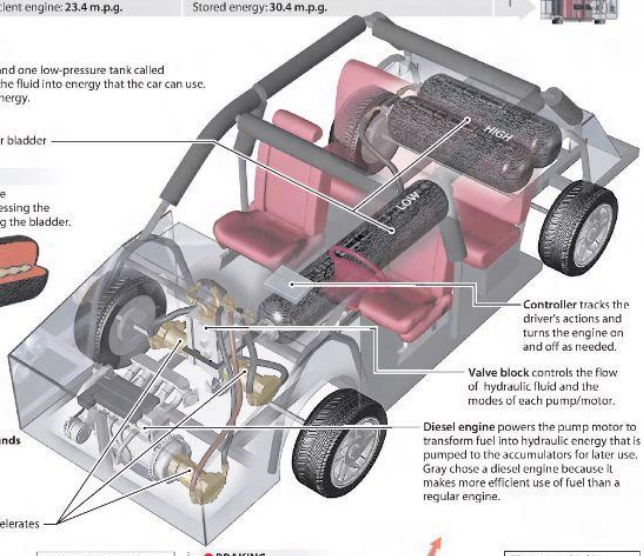
Three accumulators contain hydraulic fluid and a rubber bladder filled with nitrogen gas.

ACCELERATING
Nitrogen gas expands the bladder and fluid is shot out at high pressure to power the car.

BRAKING
Fluid is returned to the accumulators, compressing the nitrogen and shrinking the bladder.

EVOLUTION OF THE ACCUMULATORS

Gray's earlier designs proved impractical because of the immense weight of the accumulators. The latest version uses tanks made of lightweight carbon composite.



Converting energy

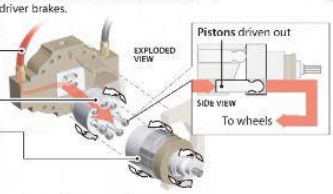
Three pump/motors act as a motor when the driver accelerates and as a pump when the driver brakes.

ACCELERATING

High-pressure fluid flows into the pump.

Pistons are pushed out.

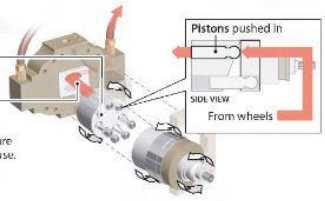
This spins the drive shaft, creating mechanical energy that the car can use to turn the wheels.



BRAKING

Energy from the wheels pushes the pistons in.

This converts the energy into fluid pressure and pumps it back to the high-pressure accumulators for later use.



Comparing the cycles of operation

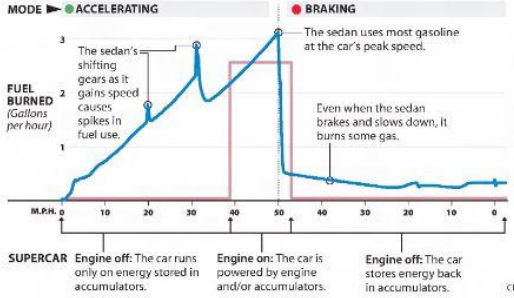
FAMILY SEDAN

Most cars derive all their driving power from gasoline.

1. When the driver accelerates, fuel is sent to the engine, burned and converted into energy that the car uses.
2. The engine turns a transmission, which sends energy to the drive shaft.
3. The drive shaft transfers the power to the axle.
4. The axle connects the drive shaft to the wheels, propelling the car.

FUEL USE

This engine map illustrates the use of fuel for both kinds of cars during a 70-second cycle in which the car accelerates from 0 m.p.g. to 50 m.p.g., then immediately decelerates to a stop.



THE BIG THREE HYBRIDS

DaimlerChrysler, Ford Motor Co., and General Motors took a different approach with their versions of the Supercar. All three used diesel-electric hybrid systems.

1. An electric motor starts the car and powers it during low-speed driving.
2. The engine turns on when extra power is needed for higher speed.
3. The electric motor and battery capture braking energy and reuse it to power accessories and provide a boost during hard acceleration.

Sources: Charles Gray, Jeff Alson, Tony Tesoriero and James Bryson of the U.S. Environmental Protection Agency, Advanced Technology Division; howstuffworks.com

Chicago Tribune / Haeyoun Park and Phil Gelb

Knight Ridder/Tribune photo by Chuck Kennedy

The powerful Rep. John Dingell (D-Mich.) was reluctant to help Supercar officials secure additional funding for the project. "I'm supposed to be a skeptic," he said.

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a small group of Supercar officials at least twice, but project leaders came away disappointed.

"We kind of looked at each other like, 'If you read the newspaper you would have learned the same thing,' " recalls Rob Chapman, a former Commerce Department official who attended one briefing.

None of the CIA information, Supercar officials say, suggested that the Japanese were building an ultra-efficient car.

Getting cold shoulder

At first glance, Mary Good was not a likely choice to be the government's Supercar chief. The auto industry was largely a man's world, and Good was a grandmother with gray hair and large glasses.

But she also was a respected chemist and a veteran research executive who was known for being tough and direct.

When she was tapped by the White House in 1993 to be the Commerce Department's technology undersecretary and, consequently, the Supercar chief, one of her first jobs was try to secure more federal money for the effort.

And there she had a problem: Because Supercar was created by the White House and not Congress, the project had no champions on Capitol Hill who could leverage more funding.

Furthermore, the project did not have its own budget. Instead, existing research programs at seven federal agencies were supposed to be shifted to Supercar. Many of those projects were approved by Congress with strict rules attached, and Supercar could not easily claim them as its own. That left Good to try to win more money for programs already in place and important to Supercar.

So she marched up to Capitol Hill, running up against one of the last people she wanted to see: John Dingell, the surly Michigan congressman and the chairman of the House Energy and Commerce Committee, which controlled a significant portion of Supercar's potential funding.

Dingell was skeptical at best of Supercar. He was concerned that the project might be a back-door attempt by the government to get Detroit to prove it could build more efficient cars so regulators could argue for tougher fuel-economy rules—a point he made perfectly clear when Good came to his office.

She argued that Supercar would help, not hurt, the automakers and that the Big Three needed advanced technologies to complete against the Japanese. But she felt Dingell wasn't listening. "His approach to fixing things is to attack you," she recalls.

Dingell saw it differently: "What am I supposed to do when bureaucrats come up to talk to me? Am I supposed to make nice or am I supposed to make them earn their salary? I'm supposed to be a skeptic. I'm not supposed to be running around buying Brooklyn bridges or goldbricks on the behalf of the taxpayers."

Good usually left Capitol Hill discouraged after her meetings with Dingell, but Dingell felt Supercar got enough.

The government ended up investing about $170 million in research projects toward Supercar each year; the Big Three reported investing a similar amount, with their share rising as the actual building of Supercar progressed.

To help her negotiate the funding headaches and Washington bureaucracy, Good hired Chapman, a former colleague at AlliedSignal Inc. who had helped oversee government contracts for the auto parts and aerospace giant.

Chapman began calling officials at NASA and the Defense Department, two agencies that the White House had promised would provide key technologies for Supercar, such as lightweight materials, but which were contributing virtually nothing.

NASA repeatedly told Chapman it could not justify to Congress spending money on a commercial car. The Defense Department, he recalls, said its research was secret—a claim that Chapman, a former Pentagon official himself, scoffed at.

"The secrecy was just a phony excuse for just not collaborating," he says.

Scrounging in junkyard

By 1997, four years into the Supercar project, Gray was convinced that he finally had overcome the technical obstacles to his hydraulics plan. Now he was ready to start building his Supercar.

He wanted it to resemble the popular Ford Taurus, but he didn't want Ford to know what he was up to. So he had his staff scrounge around for the necessary parts.

Technician Joe Hurley began calling and visiting local junkyards, looking for Taurus seats and a dashboard. He tracked down four blue seats ($600) and a blue dashboard ($250) at Fox Auto Parts, 15 miles out of town. For brakes, he went to a local Ford dealership and for shocks, Murray's Discount Auto Store.

Tribune photo by Scott Strazzante

Confrontations with Rep. Dingell often left Supercar chief Mary Good dejected. "His approach to fixing things is to attack you."

Occasionally, Gray's supervisors called from Washington. They had been hearing promising news about other auto technologies but nothing about Gray's hydraulic concept.

"Are we going to be embarrassed?" they asked. "Are you sure you're going in the right direction?"

Gray told them he was sure. And when he placed his finished car on the dynamometer and it registered 60 miles per gallon, he felt he had compelling proof that he was heading in the right direction.

It finally was time to show off his work. He eagerly called a select group of Supercar industry and government officials and invited them to the EPA. More than a dozen took him up on the offer.

Before he showed them his work, he requested that they not reveal what they saw to outsiders. The guests slowly walked around the car, leaning in here and there. They were impressed by the gas mileage but troubled by the car's bulk, particularly the nitrogen gas tanks in the back seat.

"This is just a test platform," Gray told them.

They also said the diesel engine took up the entire trunk space.

"We can package the engine in the front," Gray responded.

And they thought the car was noisy and that it visibly shook when turned on and off.

"We can fix that," Gray said.

Refusing to share

In its first few years, Supercar was touted repeatedly as a model of cooperation that was making solid progress.

Chrysler CEO Robert Eaton called it a "sterling example" of government and industry collaboration. Vice President Al Gore, in a ceremony in which he gave medals to a handful of Supercar engineers, indicated the program was ahead of schedule.

But in truth, the project was neither ahead of schedule nor a standard of cooperation.

Turf wars were breaking out, with Gray building his own car and the Big Three pursuing theirs. Energy Department officials thought they could run the program better than the Commerce Department, and Commerce officials thought Energy officials weren't fully sharing information.

Moreover, project leaders repeatedly were ignoring recommendations by a panel of independent experts from the National Research Council, an arm of the National Academy of Sciences. The panel reviewed Supercar's progress and made recommendations in annual reports.

For example, Supercar officials took more than two years to conduct a study that the review panel thought should have been done immediately. Called a "systems analysis," the study was to help scientists determine what kinds of changes would be needed to make a family sedan achieve 80 miles per gallon.

But the Big Three argued against the study, saying each company already had such analyses, according to government Supercar officials. Yet the automakers refused to share the results with their government partners, saying they were company secrets.

"We kept saying, 'It doesn't matter whether you think that is proprietary or not; it's got to be done,' " recalls Craig Marks, a member of the review panel.

Eventually, an outside company was hired to do the work. But by then, more than two years had passed.

And soon, at the end of 1997, it was decision time: Project leaders had to pick the most promising technologies for Supercar. It was the first formal deadline in the program and perhaps the biggest decision of the effort.

Despite all the talk about hydrogen fuel cells, ultracapacitors and other space-age technologies, project leaders concluded that the most promising technology for an 80-mile-per-gallon car was a diesel engine.

Though diesels were about 30 percent more fuel-efficient than gasoline engines, they also were notoriously loud, smelly and a major contributor to smog.

But given the time constraints, a diesel hybrid—a half-diesel, half-electric car—was the best shot to achieve the mileage goal, Supercar officials decided.

The diesel decision was largely the automakers' call. They were the ones officially building Supercar, and they told their government partners that diesels were their choice. Though some government officials worried about the emissions, they acquiesced.

Commerce's Good had to convince Gore that diesels were a proper choice and that scientists would make them cleaner. "This is not your grandfather's diesel," she recalls telling him.

But Supercar officials were low-key about the diesel decision. They decided not to hold a big news conference or celebration as they had with previous Supercar milestones.

Instead, they sent out press releases to a handful of media outlets. They did not use the word "diesel" in their announcement, but rather broader terminology, such as "hybrid-electric vehicle drive."

The low-key strategy worked. The diesel decision received virtually no media coverage.

Competition from Tokyo

While Supercar officials in Washington worried about their public-relations predicament, an even more serious problem was unfolding on the other side of the globe.

At the 1997 Tokyo Motor Show, the world's carmakers rolled out their latest models, with U.S. manufacturers showing off sport-utility vehicles and sports cars.

But Japanese carmaker Toyota stole the spotlight by unveiling the car it had been working on since the American Supercar effort began: the Prius, a highly fuel-efficient gas-electric hybrid. At low speeds, it ran on batteries; as it accelerated, a gasoline engine took over while simultaneously recharging the batteries. It did not need to be plugged in at the end of the day like electric cars.

Many engineers in the Supercar project were stunned.

The Prius was not just another dreamy concept car. It was a four-door sedan, about the size of a Corolla, that was ready for production. That made Toyota the first automaker to bring a hybrid car to the mass market.

The company said it would start selling the Prius in two months—the same time world leaders would be gathering in nearby Kyoto to discuss how to solve global warming.

Supercar officials began to wonder if the Japanese automakers would clobber their American counterparts with their fuel-efficient cars like they did during the oil shocks in the 1970s.

"It was like, 'Oh, no! Here they go again,' " recalls Chapman, the former Commerce Department official.

The U.S. automakers were impressed by the Prius' technology, but they downplayed the vehicle's significance. They said Supercar would be larger and achieve far better mileage—80 miles per gallon compared with the Prius' 52.

Plus, they felt the Japanese car did not have the power Americans demanded. GM's Ron York test-drove one on the Michigan highways and walked away unimpressed. "I had an uncomfortable feeling I was going to become a hood ornament on a Mack truck," he recalls.

Still, it was clear: The Japanese had accomplished, to a large degree, what the Americans still were trying to do.

A new sense of urgency

At Argonne National Laboratory, near the Chicago suburb of Lemont, Supercar engineers began dissecting the Prius to see what they could learn. At one point, they pulled back the carpet on the front passenger side and found a curious metal panel.

Engineer Michael Duoba immediately called supervisor Rob Larsen. "You've got to come down here and look at this," he said.

Under the panel was a laptop-size computer connected to six smaller computers throughout the car. The engineers had never seen anything like it—a central brain regulating both the electric and gasoline motors. It was a design, they thought, that could be valuable to Supercar.

News of the Prius seemed to rouse the government and industry Supercar engineers. They started to become more cooperative, focused and receptive to advice from the project's outside review panel.

In fact, more progress was made in the following year than in any previous year, the reviewers concluded in their annual report. The Big Three stepped up work on their concept Supercars, and advances were made in cleaning up diesels.

At the EPA lab in Michigan, Charles Gray was also making headway.

He improved his car by removing excess wires and hoses and further shrinking the nitrogen gas tanks, now neatly tucked in the trunk instead of standing upright in the backseat area. His car's main power source was a diesel engine, as Gray, like the Big Three, thought that was the best bet to reach 80 miles per gallon.

Gray started pitching his invention to each of the Big Three automakers in hopes that one might sign a contract with the EPA to possibly commercialize his work. Industry officials remained skeptical of his car and wanted a test drive.

The EPA did not have a test track, so officials from each of the Big Three drove the dune buggy-like car around the EPA's parking lot. Up and down they motored, slamming on the brakes, flooring the accelerator, wheeling around corners. After one industry group left, EPA engineers installed a brake pedal on the passenger side so they could slow down aggressive drivers.

Another time, a GM official hit the brakes and gas in such quick succession that the drive shaft—the metal rod connecting the front wheels to the gearbox—snapped in half, and the car had to be pushed back inside.

But that was a good sign. That meant Gray's car had some power.

White House advisers also were impressed. After they drove the car in the summer of 1999, they informed President Bill Clinton of the progress in a weekly briefing. Clinton underlined portions of the briefing and wrote "Great!" in the margin.

With 2000 approaching, it appeared that the Supercar project might actually have a chance to succeed.

Tribune photo by Scott Strazzante

Japan's Toyota was the first automaker to bring a hybrid car, the Prius, to the mass market.

ON THE INTERNET

A special presentation featuring interactive graphics, video, photo galleries and additional features exclusive to the Internet.

- Find out the fuel efficiency of your car with a searchable database.
- How the Supercar engine compares to a typical sedan.
- Learn about some of the project's personalities and their roles behind Supercar.
- Share your thoughts about the Supercar project in a message board.

chicagotribune.com/supercar