

Mechatrends

THE POLARIS SLINGSHOT THREE-WHEELED SUPERCAR



New classes of vehicle don't come along all that often, which is why the Polaris Slingshot stands out among this year's launches. The three-wheeled moto roadster draws from the company's experience with both off-road ATVs and on-road motorcycles to create something unique: a high-performance two-seater that starts at \$20,000 and corners like a Ferrari.

The project began simply enough. Polaris wanted to attract thrill-seeking drivers who have no access to off-road trails (i.e., city dwellers). But actually building the Slingshot proved complex. The engineers had to develop a well-balanced machine.

Department Of Mechanical Engineering

with a lightweight chassis and a single-wheel rear-drive system. Even then, the launch didn't go smoothly. The company recalled the first 1,800 vehicles in January to replace faulty ball bearings in the steering rack.

Legally, the Slingshot is deemed a motorcycle (operators need a motorcycle license). But for anyone behind the wheel, it's clear that it is much, much more.

HOW IT WORKS



1. Engine

A 2.4-liter General Motors Ecotec engine delivers 174 horsepower, a tremendous amount for a vehicle that weighs just 1,700 pounds. That power is transferred to the 20-inch rear wheel by a carbon-fiber-reinforced belt, and drivers control the transmission with a five-speed manual gearbox—an increasingly rare perk in cars.

2. Chassis

The vehicle's low, wide stance—it's 77.6 inches across—helps maintain a low center of gravity. The stiff high-strength-steel frame further enhances stability. The effect is so thorough that after a few miles drivers will forget that they're not on four wheels.

3. Wheels

The low-profile performance tires minimize sway and maximize grip. Weight distribution is identical on all three wheels, which is a challenge for a vehicle that lacks the conventional rear mass of a four-wheel car. Too light a rear-end and you could spin out on fast corners. To further reduce that risk, designers equipped each wheel with antilock brakes, traction control, and electronic stability control.

4. Cockpit

Because the cockpit is open, Polaris has weatherized it with motorcycle-grade materials. The company also combined the best features of a car and motorcycle: a media center with a backup camera, a

Bluetooth-enabled sound system, and, best of all, twin front seats.

5. Suspension

With so much power, the Slingshot needs a suspension that can handle turns without giving passengers a racecar-like beating. Gas-filled shocks, forged aluminum, double-wishbone suspension up front, and a hollow, cast-aluminum swing arm in the rear ensure it rides comfortably. An anti-roll bar, which links the wheels to the chassis, keeps the car flat in the corners, so there's minimal roll.

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A PLANE THAT FOLDS INTO A CAR



AeroMobil is a flying car that perfectly makes use of existing infrastructure created for automobiles and planes, and opens doors to real door-to-door travel. As a car it fits into any standard parking space, uses regular gasoline, and can be used in road traffic just like any other car.

As a plane it can use any airport in the world, but can also take off and land using any grass strip or paved surface just a few hundred meters long.

The AeroMobil 3.0 is predominantly built from advanced composite material. That includes its body shell, wings, and wheels. It also contains all the main features that are likely to be incorporated into the final product, such as avionics equipment, autopilot and an advanced parachute deployment system.

AeroMobil 3.0 also implements a number of other advanced technologies, such as a variable angle of attack of the wings that significantly shortens the take-off requirements, and sturdy suspension that enables it to take-off and land even at relatively rough terrain.



How It Works

1. The adjustable wing can optimize its angle of attack for taking off or cruising. This allows for reduced speed and distance during takeoff.
2. Light materials, including a carbon-composite body over a steel airframe and six-pound carbon wheels, keep weight low.
3. The prototype's 100-horsepower four-cylinder Rotax 912 engine runs on conventional gasoline, so drivers can fuel up at existing gas stations. (Production models may have a different engine.)
4. A robust suspension will enhance on-road performance and enable takeoff and landing on relatively rough terrain.
5. Avionics from Garmin will include a two-axis autopilot to control pitch and roll. In case of emergency, the vehicle will have a ballistic parachute safety system.

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