

2008 BRP Spyder Roadster

WE'VE ALL HEARD the term "Paradigm Shift" but what does it mean exactly? A paradigm is the way things have been done; the usual, expected, conventional way. Paradigm shifts can take several forms. "Continuation" could be considered improvements that increase or maintain satisfaction with the existing paradigm. "Evolution," for instance the laptop computer, is a change to existing technology that brings in new customers. "Disruption" is a change so significant that the old paradigm becomes more or less obsolete; for instance from taped music or movies to CDs and DVDs. "Invention" is biggest, the creation of a new paradigm that addresses latent needs in a new way, opening new markets that never existed before.

The initials BRP stand for Bombardier Recreational Products, a company that's used to shifting paradigms. Founded by J.-Armand Bombardier, a French-Canadian, its first product was the Ski-Doo snowmobile, introduced back in 1960. The original paradigm for travel over snow was by dogsled. The motorized sled revolutionized (shifted the paradigm) for snow travel and led to an enormous recreational market as well as fulfilling the original need.

The paradigm for personal watercraft was the one-man, stand-up Jet Ski until 1991, when the Sea-Doo sit-down watercraft was introduced, "democratizing" the market, converting it from a sport for the highly skilled athlete into a form that almost anyone could enjoy. This created an explosion in market growth and the sit-down PWC now accounts for 90% of the market, which is now led by BRP.

In the ATV market, BRP is focused on the enthusiast side rather than the farm/utility market, and has been responsible for many technological advances: the first two-seat machine, the first with independent rear suspension, the first with larger displacement engines, etc., earning its Can-Am ATVs an enviable reputation for engineering.

Privately held by the Bombardier family, the company's rapid growth allowed it to acquire the Austrian firm Rotax in the early 1970s, to supply engines not only for its own products, but of course to manufacture powerplants for go-karts, ultralights and for motorcycle makers such as Aprilia and BMW (its family of 650cc singles). In 2001 Bombardier also acquired the assets of Outboard Marine Corporation (the US manufacturer of Evinrude and Johnson outboard motors) to support

its personal watercraft production and introduced the advanced E-TEC outboard engine.

In 2003 the company's recreational products segment was sold to several entities. Members of the Bombardier family held on to 35% while 50% was sold to Bain Capital, an investment equity group, and 15% was sold to the Caisse de depot et Placement de Québec. At that

time, it was renamed BRP. Last year, the company generated \$2.5 billion (Canadian) in worldwide sales, employed 6500 people, and had 5000 dealers in 80 countries. Although the last Can-Am off-road motorcycle may be a distant memory to American riders, the company is clearly second to none in innovation and its new three-wheeled Spyder roadster may well be a paradigm shift in motorsports, an invention that creates a market where none existed before, with implications for motorcycling as we now know it.

Conceived at a company design conference back in 1996, the Spyder attempted to answer several questions: "What is the next Big Thing? How can we leverage our power sport expertise? How can we create an alternative to the motorcycle?"

BRP had already covered recreational products for snow, water and off-road. A street-legal product would add depth to the product line. Although ATVs can be licensed for the street in some European countries and in various states in the US, the new product focus was narrowed to a machine with three wheels or less (less restrictive regulation than four wheels) in a straddle-type configuration.

The "Y" architecture, with two front wheels, was chosen as the best arrangement, and the official go-ahead for production development was given five years ago.

It's not terribly surprising that the Spyder looks very much like the company's latest REV snowmobile in profile, with wheels in place of skis and track. Based on a fairly simple perimeter chassis that wraps above and below the motor, it uses a motorcycle-style swingarm arrangement for the rear suspension and employs



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double A-arms to locate the front wheels, assisted by an anti-roll bar. Suspension is preload adjustable all around. The suspension travel is given as 5.67" front and 5.71" at the rear. Wheels are automobile-style spoked alloys: 14" x 5" fronts and a 15" x 7" rear. The tires are specially constructed by Kenda to match the Spyder's needs: two 165/65R14 fronts and a 225/50R15 rear.

Disc brakes at each wheel use the same Uniform Expanding Rotor design as Harley-Davidson (from the same supplier) in a 260mm (10.2") diameter. The front calipers are four-piston, double-action units, and the rear is a single-piston caliper.

Powered by a variant of the Rotax 990 V-twin, similar to those used by Aprilia, the motors use a 60° V-angle, a bore and stroke of 97mm x 68mm for 998cc, 10.8:1 compression, DOHC, four valves per cylinder, a unique five-speed with reverse gearbox, and a multiplate wet clutch with vacuum power-assist. They are detuned from the Aprilia spec to produce power characteristics in harmony with the machine's greater weight (approximately 750 lbs. wet) and intended use: 106 hp @ 8500 rpm, with 77 lb./ft. of torque @ 6250. However, the fuel injection continues to use the large 57mm throttle body size shared with the Aprilias, and the exhaust is a two-into-one with a right side mounted silencer that contains a catalytic convertor.

The machine is much larger than a motorcycle: Overall length 105"; height 45.1"; width 59.3" wheelbase 68"; and front track 51.5". The seat height is given as 29.0", and the fuel capacity is rated at 7.13 gallons. The nose contains a 44-liter storage compartment rated at 30 lbs.

Although a machine that leans into turns might have been the first choice of motorcyclists, the Spyder platform remains perpendicular to the road surface, trading dynamic lean angles for reassuring stability. As a relatively narrow vehicle that will have a fairly high center of gravity with the rider on board, we were initially concerned about its stability. However, Bombardier has enlisted Bosch to help create a foolproof set of electronic aids to produce manageable handling that's friendly and accessible to novice pilots. A sophisticated Vehicle Stability System (or VSS) includes ABS (anti-lock braking), TCS (Traction Control System), SCS (Stability Control System) and DPS (Dynamic Power Steering), which communicate with each other via the latest CANbus wiring. In addition, what's called DESS (Digitally Encoded Security System) provides a "smart key" to prevent theft.

Here's how it works: Using a yaw sensor, as well as inputs for speeds at each wheel, steering angle and torque, the brakes are individually controlled to mitigate tendencies for rollover, spin-out, and even rear wheel spin above 30 mph (burn-outs are still possible, therefore). Steering assist varies with speed, so that the greatest boost occurs at low speeds and high steering angles.

Riding It

The handlebar controls have conventional motorcycle-style switches and a clutch lever on the left. (In the future, a second model with thumb shifting and an automatic clutch will eliminate the clutch lever.) However, the braking is all done by the foot lever. Incidentally, the machines we rode were all classed as P-3 prototypes and had not passed NHTSA inspection, so this may change. Several of us would have preferred a hand brake for its greater sensitivity, if given the choice.

Ergonomically, the machines are very wide between the legs, not unlike snowmobiles, and the footpegs are rearward and quite close to the seat, for a feeling like a swollen sportbike; not the relaxed riding position you might expect from a machine meant to welcome non-riders. The brake lever was very high, and awkward to cover while riding, something that will undoubtedly be fixed prior to production.

Although a number of motorcycle journalists present had negative preconceptions of the concept, I tried to keep an open mind and figured that if the machine were truly fun to ride, it would be a success. It certainly had a look that was appealing—very dramatic and modern.

We were given a few laps around a parking lot course before we were allowed to ride on the street, with a pair of police motorcycle officers for an escort (probably because of the prototype classification). Acceleration from a stop was brisk enough, and wheelspin was possible by using extra revs and a sudden clutch release.

Cornering behavior would be the test, in my mind. Would it handle? Driven relatively gently, the machine handled easily enough, although the power assist to



the steering and clutch was not particularly noticeable, and significant effort remained. Because the machine cannot lean, countersteering isn't applicable, and steering into the turn was the only way to steer. Ridden with verve, the steering has a noticeably non-linear feel, as the front tire slip angles increase to maximum and then grip strongly, "like an ATV on the street" was the description I heard more than once. The tire pressures are deliberately low, so as to give adequate warning as they approach maximum grip—just 15 psi both front and rear. While it may give the understeering response the engineers found desirable, it doesn't handle with the response of a sportscar by any stretch of the imagination. I would have liked to experiment with higher tire pressures and perhaps more spring preload.

Our ride on public roads was limited to pretty coastal roads and average speeds in the 30-45 mph range, with just a couple of chances to reach speeds of 65 or better. The engine pulls smoothly from about 2500 rpm and begins to accelerate strongly from around 4000 rpm.

The footpegs would have been a lot more comfortable positioned perhaps seven or eight inches further forward, and there appears to be room to do that, but the current position was chosen because it facilitates weight shifting, I was told.

Unlike a motorcycle, the average person could deal with the machine's handling almost immediately. But, as a rider, you're very aware of the undulations in

the road surface—something a motorcyclist can virtually ignore—which cause the Spyder to be tilted this way and that as it rolls down the road. Also, remember that it is a triple-track vehicle, rather than a single-track like a bike, or a two-track, like a car, providing an additional line of road irregularities to your path. Road surface camber, which is another factor that a motorcyclist can ignore, at least when keeping some cornering speed in reserve, also has a strong effect on the Spyder. And within an hour of riding it on the road, you begin to carefully take road camber into account, as it has such a bearing on your potential cornering speeds.

Throughout the riding, I played with swerving, to get a sense of its evasive maneuvering ability, and gradually learned how to use body English to mitigate its non-linear steering behavior. The stability control was well sorted, and the few instances such as wet pavement, where I could deliberately test it, showed that it worked as intended, and its higher speed stability was better than I would have expected.

Although we were told that in side by side testing, a motorcycle could not keep up with the Spyder on a winding road, I don't believe it. If I had to judge its cornering G-force, I'd guess .75 or less, below a sportscar's or a motorcycle's.

While its easy operation may suggest stability and peace of mind versus a motorcycle, it clearly has its own control issues and its own unique learning curve if one hopes to get the maximum from its performance capabilities.

To be priced at \$14,999 when it goes on sale next fall in selected states in the US, its companion push-button shift model will sell for \$16,499—both very attractive prices given its development costs and high tech stability systems. Its "wow factor" alone will certainly justify many sales.

Whether it fulfills BRP's ambitious goals would seem to be largely a matter of marketing, and we have to wonder if piquing the market's interest so long before its delivery date isn't counterproductive (like Pontiac's Solstice sports car).

We were told that the company hopes to give 40,000 trials (test rides) before Sept. 15, so that 2500 units can be pre-sold when production begins at the BRP plant in Valcourt, Quebec.

Will it harm motorcycling as we know it? Would it harm motorcycling if those riders who are driving motorcycle accident statistics so much higher switched to machines like the Spyder?

—Dave Searle