

PRESS RELEASE NuVinci 2011 – Harmony

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## First Automatic CVP Shifting System for Bicycles - a New Era of Cycling Experience Begins with NuVinci® Harmony™

### - Fallbrook Introduces First Intelligent Bicycle Drivetrain -

(San Diego, California/Aalsmeer, Netherlands – August 9, 2011) – Fallbrook Technologies Inc. introduces the first continuously variable shifting system offering the option to seamlessly shift automatically or manually. The *NuVinci Harmony* intelligent drivetrain is an innovative and intuitive shifting system that leverages the unique benefits of the *NuVinci N360™* to create a riding experience second to none. The new *Harmony* system is designed specifically for the fast growing and advancing e-Bike market.

### CVT technology and auto-shifting - Redefining the bicycle drivetrain

Leonardo da Vinci conceptualized it in 1490, Gottlieb Daimler and Karl Benz filed the first patent for it 400 years later, and Dutch car manufacturer DAF built the first affordable car with an automatic transmission based on it: The continuously variable transmission (CVT), which shifts through an infinite number of effective gear ratios between maximum and minimum settings. Fallbrook's CVP, or continuously variable planetary, is an improved type of CVT.

At the heart of *NuVinci Harmony* lies the incredibly smooth-shifting bicycle drivetrain – *NuVinci N360*. The award-winning *NuVinci CVP* has revolutionized drivetrain technology with a new class of highly adaptable and scalable CVTs. Fallbrook Technologies was the first company to introduce a commercial bicycle CVT in 2007, and in 2010 presented a lighter, smaller, better shifting and more affordable model, the *NuVinci N360 CVP*.



**NuVinci N360 CVP drivetrain**

A new era starts now as riders experience the next evolution in shifting that is truly automatic, without any limiting or jarring gear steps. This revolutionary system is rightfully named "*Harmony*."

### Simple and automatic operation for seamless e-Bike shifting only *Harmony* can deliver

What are the main advantages of the new *Harmony* system?

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|--------|---|
| Smart  | The weather-sealed system monitors pedal cadence and bicycle speed, then auto-adjusts the drive ratio to maintain the rider's preferred cadence.                                |
| Simple | The primary connector quickly and easily disconnects for rear wheel removal easier than any other manual cable shifting system.   |
| Smooth | The <i>Harmony</i> system is compatible with 12–48 volt e-Bike systems, and all shifting mechanics and logic reside inside the compact <i>Harmony</i> hub interface at the CVP. |

“When designing the *Harmony* system, it was clear that we wanted to bring a new level of performance to bicycle shifting, while keeping it simple and intuitive. E-Bike manufacturers now have the ability to offer customers exactly what they want — a smooth and organic interaction between rider and bicycle that works automatically and seamlessly with the *NuVinci N360* drivetrain,” said Alan M. Nordin, President, Bicycle Division for Fallbrook Technologies Inc.



**Harmony Hub Interface**

**Two controller versions optimize the ride – and increase comfort, safety and fun**

There is nothing like the sensation delivered by the *Harmony* Intelligent Drivetrain. Riders can choose between two controller options; Base and Advanced.

**Base Controller**



For riders who do not like shifting or for those who just prefer simplicity, the *Harmony* Base Controller (Base Controller) intelligently manages the ride by automatically maintaining the pedaling cadence the rider chooses. With its three-button automatic-only shifting, things are kept very simple: press a button and enjoy the ride! The cadence settings (typically slow – medium – fast) can be preset by the e-Bike manufacturer according to the bike and gearing specification. With the Base Controller option, the rider need never think about shifting again!

**Advanced Controller**

The *Harmony* Advanced Controller (Advanced Controller) offers both fully automatic and manual shifting options in one drivetrain. In “Automatic” mode, *Harmony* automatically and continuously adjusts the drive ratio to maintain the rider’s preferred cadence. The Advanced Controller allows the rider to select and fine-tune their cadence set-point by twisting the shifter, where the blue LED “RPM” display indicates the setting. *Harmony* will automatically and seamlessly maintain whatever cadence the rider selects. For manual operation, simply press the Advanced Controller “mode” button and the display will switch to an orange “hill” indicator. In this mode, the rider is able to directly control the *NuVinci* CVP ratio manually. Like the *NuVinci N360* controller display, the larger the orange “hill” pictured on the smoothly changing display, the easier the ratio for climbing.



**Auto mode, select cadence**



**Manual mode, select ratio**

“While the Base Controller provides an easy path to automatic shifting, the Advanced Controller provides riders the most flexibility and control of the *Harmony* Intelligent Drivetrain,” said Chris Vasiliotis, *NuVinci* product manager. “Some cyclists will want to shift



on their own, while others will prefer not to think about shifting at all. *Harmony's* Advanced Rider Controller satisfies all types of riders.”

“The interest from OEM's is growing daily as they understand that when *NuVinci N360* is combined with the auto-shift capabilities of *Harmony*, not only can shift performance be improved, but also vehicle range, durability, and overall ride quality,” said Jack Brandsen, Fallbrook’s Director of Sales and Business Development, Europe.

Certain brands such as Panther, Union and Simpel already have *Harmony* equipped e-Bike models under development for the 2012 model year. “The simple and easy e-Bike ride experience created by *Harmony* also improves battery and motor performance.” said Kai Wippermann, Head of Marketing & Product Management at Pantherwerke. And, Philip Douglas, CEO, Founder of Simpel.ch noted: “After riding *Harmony* for a few hundred kilometers, I have to say that it's a bit like a surprisingly affordable upgrade to business class travel.”

### **Shifting has never been easier**

It has never been easier to shift seamlessly through the 360° ratio range of the system’s award-winning *NuVinci N360 CVP*. The *Harmony* intelligent drivetrain is easily programmable by any e-Bike manufacturer, and offers a choice of cadence ranges as well as the option to provide seamless shifting. *Harmony* works with any electric front hub motor system as well as systems that are frame-mounted.

### **General Features and Specifications**

- Compatible with 12 – 48VDC e-Bike systems
- 360° ratio range: 0.5 underdrive to 1.8 overdrive
- *Harmony* Hub Interface weight: less than 250g
- Weather-sealed system with quick-release primary connector
- Advanced Controller: dual mode, variable twist grip, ½ turn full rotation
- Base Controller: 3-button, preset auto-only modes
- Availability: at dealers early 2012
- Warranty: two years
- Manufactured in Taiwan
- Price: Expect to see *Harmony* on e-Bikes with retail pricing starting at the 2,000 Euro range

### **NuVinci® N360™ CVP drivetrain**

The NuVinci® N360™ CVP drivetrain provides an unparalleled riding and shifting experience allowing the rider to optimize the human-bicycle experience without the limitations of indexed gearing. It was also honored with a 2010 iFDesign / EUROBIKE award and is now offered by more than 40 international brands, including Accell Group (Batavus, Hercules), Breezer, Dahon, Dutch Bicycle Group (Union), Derby-Raleigh, Gepida, Hermann Hartje (Victoria), Merida/Centurion, PantherWerke, Robax, Simpel, Stevens and many more.

### **About Fallbrook Technologies Inc.**

Fallbrook’s NuVinci® continuously variable planetary (CVP) technology improves the performance and efficiency of machines that use a transmission, including bicycles, electric vehicles, automobiles, agricultural equipment, wind turbines and others. The *NuVinci* technology offers companies the flexibility to design and produce next-generation products that are better tailored to their unique business, market and competitive requirements. An example of a next generation product is a *NuVinci* CVP that controls the speed of automotive



accessory drives (including air conditioning compressors, alternators, and superchargers) independently of engine speed, thereby improving fuel economy or increasing performance or both.

Fallbrook has built an extensive portfolio of over 400 patents and patent applications worldwide. The company intends to continue its research and development activities to enhance the performance and capabilities of *NuVinci* technology.

For more information, visit: [www.fallbrooktech.com](http://www.fallbrooktech.com).

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