SPACEPOINT®

SpacePoint Fusion

Demonstration Kit Quick Guide

PNI
SENSOR CORPORATION

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1 Introduction

The SpacePoint® Fusion module and SpacePoint Demo Program's purpose is to demonstrate the intuitive and precise control of PNI's SpacePoint 9-axis motion-tracking technology. This advanced technology is intended for implementation in console or PC gaming applications and in TV or set-top-box remote controls. While controllers are being made more intuitive by adding gyros and accelerometers, if left uncorrected these sensors will drift, resulting in inaccurate pointing. SpacePoint 9-axis sensor technology fuses the outputs from PNI's geomagnetic sensor with a 3-axis gyroscope and 3-axis accelerometer, to provide accurate motion tracking with no gyro drift. SpacePoint enables effortless, on-screen content navigation and extended game play without requiring calibration, and without the need for additional input devices such as a camera or sensor bar. Additionally, SpacePoint performs differently than other motion-tracking technologies by compensating for the magnetic anomalies that sidetrack existing motion tracking algorithms.

The SpacePoint Fusion module incorporates a USB/HID interface, so no external drivers or batteries are required, and the SpacePoint Demo Program incorporates 4 internal programs that demonstrate the advanced tracking capabilities of SpacePoint technology. We think you'll be impressed.

2 Getting Started

Before starting:

- Ensure the SpacePoint Fusion module is part number 13035. The SpacePoint Demo Program will not operate properly with legacy part numbers 12905, 13008, or 13010.

- Install the SpacePoint Demo Program on your computer. "Extract" all the files from the "SpacePoint Demo.zip" file. This will put a folder called "SpacePoint Demo" on your computer, and this folder will include the executable program, "SpacePointDemo.exe", and the folder "SpacePointDemo_Data". These two items must remain located within the same directory on your computer's hard drive. The SpacePoint Demo Program is built on a Unity platform and will run on Windows XP, Windows Vista, and Windows7 computers.

- Ensure Microsoft's .NET Framework and Visual C++ Redistributable are installed on your computer. If you are uncertain if they are installed, go to the "Control Panel", then "Add or Remove Programs". You should see "Microsoft Visual C++ Redistributable – x86" and either "Microsoft .NET Framework 3.5" or "Microsoft .NET Framework 4 Client Profile" in the list of currently installed programs. If either is missing, they can be downloaded at Microsoft's website: http://www.microsoft.com/downloads/en/default.aspx. In the event the SpacePoint Demo Program does not work properly, uninstall all versions of Microsoft .NET Framework and reinstall it.

- While not necessary, a dedicated graphics accelerator card is recommended as some of the SpacePoint Demo Program screens are rather graphics intensive. Also, closing out of all other applications is recommended, as is using a single-monitor computer system. Since this program is intended to demonstrate the possibilities enabled by PNI's SpacePoint technology, no guarantees are made regarding the ability to operate on any or all computer configurations.

To use the SpacePoint Fusion demonstration module:

1) **Plug the SpacePoint Fusion into your computer's USB port.** Once the module is connected, its blue and green LEDs will light up.

If this is the first time plugging in a SpacePoint demonstration module, Windows automatically will launch the "Found New Hardware" wizard, then indicate it has found the module and install the device. If the LEDs do not come on or Windows otherwise does not seem to recognize the device, check the Device Manager, under Universal Serial Bus Controller – USB Composite Device. The SpacePoint demonstration module should be identified with "Location 0 (SpacePoint)", and under the Details tab it should indicate "VID_20FF&PID_0100". Alternatively you can check under Game Controllers on the Control Panel, where it should be recognized as a "7 axis 2 button device". Here, under Properties, you should observe changes in the 7 axis states as the device is moved, although these 7 states are not correlated to their description.

2) **Launch the SpacePoint Demo program.** Double-click on the "SpacePointDemo.exe" icon to launch the program. It is important to ensure the Fusion module is fully at rest for 3 seconds when launching the program, as the gyros initialize during this time. The "SpacePoint Demo Configuration" window will appear.   Set the desired screen resolution and graphics quality. Note the graphics quality options are established by the Unity engine and will depend on your computer's configuration.   PNI generally recommends "Fastest" graphics quality, but the user can experiment with other settings. If you want the program to run full-screen, deselect the "Windowed" box. Click the "Play!" button or press the <Enter> key.

3) **Select the desired program.** The SpacePoint Demo Program actually contains four distinct programs, each demonstrating different SpacePoint benefits.   To select a program using your computer's mouse, move your computer's cursor over the program name and click. Alternatively, you can use the Fusion module to select a program by moving the Fusion's bullseye cursor over the desired program name until it illuminates, then shaking it up-and-down to select.
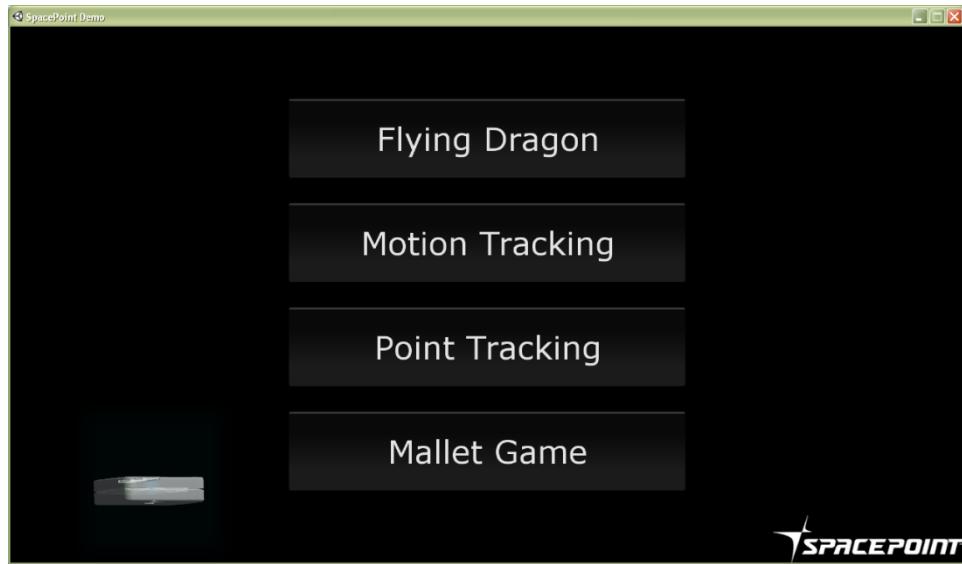
Menu screen

Once a program has been selected, you can use the "m" key to cycle to the other programs.

Primary uses of each of the programs:

a. **Flying Messenger** lets you demonstrate the unparalleled intuitive and immersive feel possible for game play applications.

b. **Motion Tracking** lets you demonstrate how SpacePoint's motion tracking stays accurate and is shielded from magnetic interference.

c. **Point Tracking** lets you demonstrate how SpacePoint technology can be used for TV remote control navigation or other applications that used motion-tracking for cursor control.

d. **Mallet Game** highlights the ability of SpacePoint technology to maintain accurate tracking over a long duration without requiring interruptions for calibration, even when movements are harsh and sudden.

2.1   Flying Dragon

The Flying Dragon is a game in which the player controls the flight of a dragon to pick up her lost eggs and bring them safely back to her lair. This program is intended to showcase the key benefits of PNI's SpacePoint 9-axis sensor fusion, as it provides an intuitive and completely immersive feel for game play with no latency or drift. SpacePoint technology

provides for an extended game play experience without needing calibration, and without the need for additional input devices such as a camera or sensor bar.

Flying Dragon screen

Flying the Dragon: To turn, you either can rotate the module in the horizontal plane or you can roll the module around its X axis, similar to banking an airplane. To go faster, move the module up and down to emulate flapping of the dragon's wings.

Finding eggs and bringing them safely back to the nest: Follow the purple arrow at the top of the screen to find the eggs that have been taken from the nest. When an egg is located, fly the dragon down so it can grab the egg with its claws. To deliver the egg, follow the arrow to the top of the nearby peak. Slowly fly to the nest and the egg automatically will release. The number of successfully recovered eggs is shown by the number in upper right of the screen.

2.2   Motion Tracking

The SpacePoint Demo Program also provides a 3-D rendering of the demonstration module. This demonstrates how SpacePoint's motion tracking stays accurate and is shielded from magnetic interference.
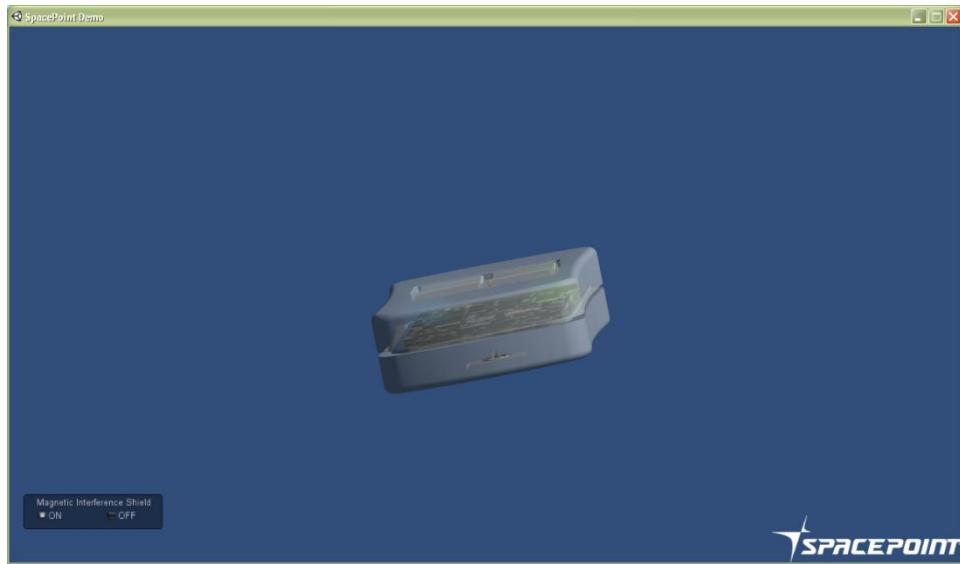
Motion Tracking screen

Initialization: While pointing the SpacePoint Fusion module at the center of the screen, press "P". This starts the Motion tracking screen and establishes the relationship between the orientation of the Fusion module and the cursor position.

Magnetic Interference Shield: This option box allows the user to easily experience how motion tracking works with and without SpacePoint's magnetic interference shield. SpacePoint technology incorporates the magnetic interference shield to ensure motion tracking remains accurate even in the presence of magnetic anomalies. Disable this feature by selecting the Magnetic Interference Shield "OFF" button.   With the magnetic interference shield disabled the module can drift or lose its orientation when magnetic interference is introduced, such as a metal desk, battery, or cell phone. To re-enable the magnetic interference shield, select the "ON" button.

Note: This option is available for demonstration in the Motion Tracking screen only.

2.3   Point Tracking

The point tracking screen demonstrates how SpacePoint technology can be used to render cursor position based on the movements of motion-tracking device that incorporates SpacePoint technology.
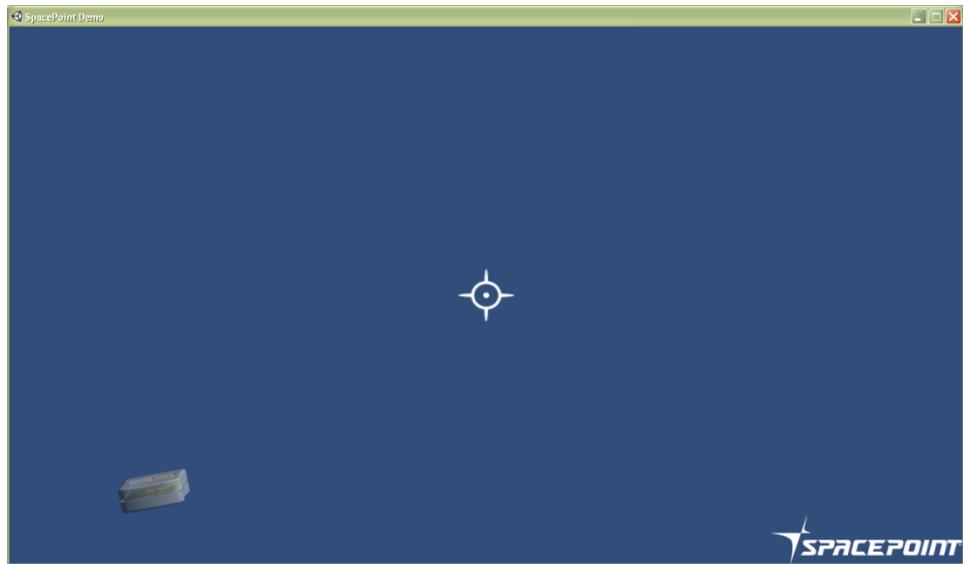
Point Tracking screen

Initialization: While pointing the Fusion module at the center of the screen, press "P" or click the right button on the module. This starts the Point Tracking screen and establishes the relationship between the orientation of the SpacePoint module and the cursor position.

The cursor will now track the orientation of the SpacePoint module. Point the module to the left or right, and the cursor will move to the left or right. This will happen with low latency and high precision. If the Fusion is pointed so the cursor goes off screen, SpacePoint technology continues tracking the absolute orientation of the module so when you later point the Fusion at the center of the screen, the cursor returns to the center of the screen.

2.4   Mallet Game

In the Mallet Game a player controls a mallet to hit as many robots as possible. This game highlights the ability of SpacePoint technology to maintain accurate tracking over a long duration without requiring interruptions for calibration, even when movements are harsh and sudden. The types of movements required to hit the robots normally would create errors with typical controllers that utilize accelerometers and gyroscopes. The addition of the reference magnetic sensor compensates for gyro drift to result in game play that is uninterrupted and withstands rapid and harsh movement.

Mallet Game screen

To play the game, simply use the Fusion module to control the mallet to hit a robot before it disappears. The number in the upper right corner of the screen indicates the number of robots successfully hit during the game. The number in the upper middle of the screen indicates the amount of time remaining in the game.

3 Exiting the Program & Summary of Commands

To exit the program, press the "x" key. When you do this, a file titled "state.csv" will be saved in the same directory as the program. This file contains information that helps the SpacePoint Fusion quickly initialize itself when you restart the program. This file is not required for the SpacePoint Demo Program to work.

Summary of Commands:

"M" to toggle between the screens

"P" to set screen orientation and cursor position

"X" to exit program

Magnetic Interference Shield ON/OFF: use this in "ON" mode to demonstrate the performance of the PNI algorithm engine which compensates for magnetic interference, and "OFF" to show performance in the presence of magnetic interference without these advanced algorithms.

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4 Copyright & Warranty Information

Revised October 2012: for the most recent version visit our website at www.pnicorp.com

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