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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY. DOCKET NO	TOT CLAIMS	IND CLAIMS
61/292,558	01/06/2010		110	MR3871-156/P		

CONFIRMATION NO. 1981

4586
ROSENBERG, KLEIN & LEE
3458 ELLICOTT CENTER DRIVE-SUITE 101
ELLICOTT CITY, MD 21043

FILING RECEIPT



OC000000039770348

Date Mailed: 01/26/2010

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The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 61/292,558**

Projected Publication Date: None, application is not eligible for pre-grant publication

Non-Publication Request: No

Early Publication Request: No

**** SMALL ENTITY ****

Title

3D POINTING DEVICES AND METHODS OF THE SAME

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page 1 of 3

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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	MR3871-156/P
		Application Number	
Title of Invention	3D POINTING DEVICES AND METHODS OF THE SAME		
The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76. This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.			

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	ZHOU		YE		
Residence Information (Select One) ☒ US Residency ☐ Non US Residency ☐ Active US Military Service					
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Citizenship under 37 CFR 1.41(b)ⁱ		TW			
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Residence Information (Select One) ☐ US Residency ☒ Non US Residency ☐ Active US Military Service					
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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	MR3871-156/P	
		Application Number		
Title of Invention	3D POINTING DEVICES AND METHODS OF THE SAME			
Citizenship under 37 CFR 1.41(b) i		TW		
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Customer Number	04586		
Email Address	rkl@rkllpatlaw.com	Add Email	Remove Email

Application Information:

Title of the Invention	3D POINTING DEVICES AND METHODS OF THE SAME		
Attorney Docket Number	MR3871-156/P	Small Entity Status Claimed	☒
Application Type	Provisional		
Subject Matter			
Suggested Class (if any)		Sub Class (if any)	
Suggested Technology Center (if any)			
Total Number of Drawing Sheets (if any)	8	Suggested Figure for Publication (if any)	

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)
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Application Data Sheet 37 CFR 1.76		Attorney Docket Number	MR3871-156/P
		Application Number	
Title of Invention	3D POINTING DEVICES AND METHODS OF THE SAME		
Customer Number	04586		

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Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
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--

Application Data Sheet 37 CFR 1.76		Attorney Docket Number	MR3871-156/P		
		Application Number			
Title of Invention	3D POINTING DEVICES AND METHODS OF THE SAME				
Signature	/MORTON J. ROSENBERG/			Date (YYYY-MM-DD)	2010-01-06
First Name	MORTON	Last Name	ROSENBERG	Registration Number	26049

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PROVISIONAL APPLICATION FOR
3D POINTING DEVICES AND METHODS OF THE SAME

[0001] The present invention may generally related to methods or apparatuses of human interface devices, and more particularly, to methods or apparatuses of 3-dimentional controller devices.

BACKGROUND OF THE INVENTION

[0002] A three-dimensional (3D) pointing device may refer to an input device applicable to be moved by a user in three or more dimensions in the space (e.g., air) in front of a screen (or monitor) to control a corresponding user interface by translating those motions done by the user with the 3D pointing device directly into commands acceptable by the user interface, for example, movement of a cursor on the screen. The transfer of data between the 3D pointing device may be performed via a wire or a wireless way coupled the 3D pointing device to another device where the user interface setup in and/or displayed with. Conventionally, the 3D pointing device may enhance usability by transforming sensed motion data generated accordingly to the user's motion from a body frame of the 3D pointing device into another frame of reference (e.g., a user's frame of reference).

[0003] Conventionally, the 3D pointing device may include an accelerometer (g-sensor) and a gyroscope, wherein the accelerometer is used to detect/measure the acceleration of the 3D pointing device in a specific direction(s) (e.g., the three axis directions), and the gyroscope is used to measure the rotation (e.g., the rotation rate) of the 3D pointing device. The displacement and the rotation of the 3D pointing device may be measured or tracked by applying integral to the acceleration/rotation of the 3D pointing device. However, error, that is or may be the difference between a real track which a user wants to take his/her motion(s) to get and the track generated after the acceleration/rotation of the 3D pointing device is detected or measured by its accelerometer or gyroscope, may be accumulated during continuously calculating the integral for

calculating the displacement or rotation of the tracking (i.e., the error is also integrated into the calculation result).

[0004] Compensation to the accumulated error may be done by calibration with reference to a magnetic direction, for example, the magnetic line(s) or force direction (magnetic field direction) at the position of the 3D pointing device, detected by a magneto-resistance (MR, or magnetic reluctance) sensor equipped in the 3D pointing device. An example of the prior art can easily be found from Chinese patent numbered CN1664506A of which acceleration measured by a 3-axis accelerometer and magneto field detected by a 3-axis MR sensor may be calibrated by measurement done by a 3-axis gyroscope. Another example of the prior art may be found from Chinese patent numbered CN1740746A of which a direction cosine matrix may be modified by a 1-axis accelerometer, a 3-axis MR sensor and a 3-axis gyroscope to estimate/measure a posture of a 3D pointing device.

[0005] However, the MR sensor may suffer from slow response due to its characteristic. Therefore, the calibration of the abovementioned prior art may be delayed and thus the performance of the 3D pointing device may be lowered down.

[0006] It may therefore be desirable to have a 3D pointing device and method of the same to solve the abovementioned problem(s).

PRELIMINARY DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0007] The foregoing summary, as well as the following detailed description of the invention, will be better understood when read in conjunction with the appended drawings. For the purpose of illustrating the invention, there are shown in the drawings examples which are presently preferred. It should be understood, however, that the invention is not limited to the precise arrangements and instrumentalities shown.

[0008] In the drawings:

[0009] FIG. 1 is a diagram illustrating inertial signal definition of a remote controller or a joystick according to an example of the present invention;

[0010] FIG. 2A is a diagram illustrating measuring results of tilt angles generated from an accelerometer;

[0011] FIG. 2B is a diagram illustrating a tilt angle calculated from measuring results of an accelerometer in y-axis direction;

5 [0012] FIG. 2C is a diagram illustrating integrated angles calculated from measuring results of a gyroscope;

[0013] FIG. 2D is a diagram illustrating bias of integrated angles caused by thermal run-away while a gyroscope stays still;

10 [0014] FIG. 2E is a diagram illustrating measuring results related to low sampling rate of an accelerometer and/or sensitivity issues of MR sensor;

[0015] FIGS. 3A and 3B are diagrams of a dynamic analysis and measuring results according to an example of the present invention;

[0016] FIG. 4 is a diagram of a dynamic analysis of a 3D pointing device according to an example of the present invention;

15 [0017] FIG. 5A is a functional block diagram of a 3D pointing device according to another example of the present invention;

[0018] FIG. 5B is a flowchart of a method of a 3D pointing device according to still another example of the present invention;

20 [0019] FIG. 6 is a diagram illustrating measuring results of a 3D pointing device according to yet another example of the present invention;

[0020] FIG. 7A is a block diagram illustrating a system of a 3D pointing device including a mapping tool according to other example of the present invention; and

[0021] FIG. 7B is a diagram illustrating an exemplary graphic user interface (GUI) for setting the mapping tool of the system of the 3D pointing device illustrated in FIG. 7A.

PRELIMINARY DESCRIPTION OF THE INVENTION

[0022] Reference will now be made in detail to the present examples of the invention, examples of which are illustrated in the accompanying drawings. Wherever possible, the same reference numbers will be used throughout the drawings to refer to the same or like parts.

[0023] FIG. 1 is a diagram illustrating inertial signal definition(s) of a remote controller, a joystick or a cellular phone 10 (hereinafter the "remote controller 10") according to an example of the present invention, wherein the cellular phone may also be applicable to control a remote device such as a TV, a PC, a laptop or a gamer if it is configured as a transmitter capable of generating and sending control signals to the remote device, and if the remote device is capable of receiving the control signals, either equipped a receiver for receiving the control signals directly, or coupled with a gateway to receive the control signals in some examples of the present invention.

[0024] Referring to FIG. 1, the remote controller 10 may be used to point a cursor or control a game displayed on a screen 12. The remote controller 10 may include a motion-sensor module which not shown in FIG. 1 but will be described and illustrated as a motion-sensor module 40 with reference to FIG. 4. The motion-sensor module (40 shown in dashed lines) may be formed or disposed in the remote controller 10. The motion-sensor module may include an accelerometer (such as an accelerometer 41 shown in FIG. 4), a gyroscope (such as a gyroscope 42 shown in FIG. 4) and a magnetic sensor (such as an MR sensor 43 shown in FIG. 4). The accelerometer (41) may be configured to measure acceleration of the remote controller 10. In one example, the accelerometer may include, but is not limited to at least one of a single-axis, a dual-axis or a 3-axis accelerometer for measuring acceleration of the remote controller 10 generated in different direction(s). In the example of applying the 3-axis accelerometer in the motion-sensor module, accelerations in x-axis, y-axis and z-axis directions of the remote controller 10 may be defined and measured as (A_x , A_y , A_z). Those skilled in the art can easily understand that the 3-axis accelerometer for measuring accelerations in the three axes can also be

configured, implemented or replaced by three single-axis accelerometers configured for measuring the accelerations in the three directions, that is, to be mounted to face on different direction according to the three axes, or by one single-axis accelerometer and one dual-axis accelerometer instead, and thus should not become limitation to the present invention.

5 **[0025]** The gyroscope (42) may be configured to measure rotation of the remote controller 10. In one example, the gyroscope may include, but is not limited to at least one of a single-axis, a dual-axis or a 3-axis gyroscope for measuring rotation of the remote controller 10 in various direction(s). Similarly, in the example of applying the 2-axis gyroscope in the motion-sensor module, rotations (or rotation rate(s)) defined as W_x and W_z in the x-axis direction and z-axis
10 direction or in at least two directions of the x-axis, y-axis and z-axis directions of the remote controller 10 may be measured. Those skilled in the art can easily understand that the 3-axis gyroscope for measuring rotation(s) defined as W_x , W_y and W_z in the three axes can also be applied according to various design requirement(s). In one example, the 2-axis gyroscope or the 3-axis gyroscope may also be configured, implemented or replaced by combination(s) of single-
15 axis and/or 2-axis gyroscope(s).

[0026] Moreover, the MR sensor may be configured to measure magneto-field (magnetism) which the remote controller 10 suffers in various directions. In one example, the MR sensor may include, but is not limited to at least one of a single-axis, a dual-axis or a 3-axis magnetic sensor for measuring magnetisms of the remote controller 10 in various direction(s). Moreover, the MR
20 sensor may include an electrical compass (or e-compass). In the example of applying the 3-axis magnetic sensor in the motion-sensor module (40), magnetism defined as M_x , M_y and M_z in x-axis, y-axis and z-axis directions of the remote controller 10 may be measured. Those skilled in the art can easily understand that the direction(s), axis or axes, or the number of the axes which the MR sensor may be configured should not become the limitation of the present invention.

25 **[0027]** Therefore, the inertial signal definition(s) of the remote controller 10 according to the present example should be as follows:

A_x , A_y and A_z are the acceleration signals sensed by the accelerometer(s) in the x-, y-, z-axis directions, respectively;

W_x , W_y and W_z are the angle (rotation) rate signals sensed by or calculated from the gyroscope pivoted at the x-, y-, z-axis directions, respectively; and

M_x , M_y and M_z are the magnetic (magneto-field) signals sensed by the MR sensor pivoted at the x-, y-, z-axis directions, respectively.

5 [0028] In one example, when the remote controller 10 is pointed as doing the cursor control in the air, it may use rotation angles pivoted at any two axes to map into cursor movement(s) in x- and y-axis direction(s) shown on the screen 12, of which the tilt angles of the remote controller 10 may be calculated by the A_x and A_y signals, integrated signals I_x and I_z may be calculated by W_x and W_z signals and both tilt angles or integrated angles may be compensated by
10 the magnetic signals.

[0029] FIG. 2A is a diagram illustrating measuring results of the tilt angles θ_x and θ_y generated from the accelerometer when the remote controller 10 is pointed in the air. Referring to FIG. 2A, rotation (tilt) angles θ_x and θ_y may be calculated by A_x and A_y signals as follows:

$$\theta_x = \sin^{-1}\left(\frac{A_y - A_{y0}}{g}\right),$$
$$\theta_y = \sin^{-1}\left(\frac{A_x - A_{x0}}{g}\right)$$

15

wherein the A_{x0} and A_{y0} are acceleration signals at zero gravity, and g is the one gravity value.

[0030] FIG. 2B is a diagram illustrating a tilt angle calculated from measuring results of an accelerometer in y-axis direction when a remote controller is pointed in the air. Those skilled in the art can easily understand that the remote controller may suffer from ergonomic problem such as not quite fit ergonomics when hold by a user for do pointing and/or controls. Moreover, it
20 may induce an extra acceleration A_y in y-axis direction when the controller is sweep left or right (as shown in FIG. 2B). The extra acceleration A_y may be represented as $(\sim R \times W_z^2)$, where R is the distance between the user's wrist and the accelerometer sensing the A_y value. In turn, it may cause rotation interference such as the change of the W_z value according to the extra A_y .

[0031] FIG. 2C is a diagram illustrating integrated angles calculated from measuring results of a gyroscope when a remote controller is pointed in the air. The integrated angles of I_z and I_x signals may be calculated from W_z and W_x as follows:

$$I_z = \int W_z,$$
$$I_x = \int W_x$$

5 [0032] Those skilled in the art can easily understand that the remote controller may suffer from a position drift problem (shown in FIG. 2C) caused by accumulation errors from noise or base-line thermal run-away. Moreover, the remote controller may also suffer from a position jitter problem induced by unconscious operation of the user's hand, and may lose position accuracy seriously when moving the remote controller (or the cursor moved respectively) out of
10 a screen and then draw it back. That is, there may not be any reference for the motion-sensor module of the remote controller to refer as an absolute position information when the cursor is moved out of the screen and then coming back.

[0033] FIG. 2D is a diagram illustrating bias of integrated angles I_z and I_x caused by thermal run-away of a gyroscope in a remote controller, for example, when the remote controller stays or
15 hold still (e.g., while a remote controller or a joystick lays on a table). Referring to FIG. 2D, as the temperature increased, the rotation rate W_z and W_x vary because of the thermal run-away, and thus caused the bias of the integrated angles I_z and I_x .

[0034] FIG. 2E is a diagram illustrating measuring results related to low sampling rate of an accelerometer and/or sensitivity issues of an MR sensor. Referring to FIG. 2E, those skilled in
20 the art can easily understand that the MR sensor may suffer from low sampling rate, for example, about 30 millisecond for a MR sensor chip provided by the vendor Yamaha. Therefore, the MR sensor may not allow fast movements of the remote controller and thus fast movements of the cursor may be failed. Moreover, the MR sensor may be sensitive to external magnetic field and may need a calibration procedure according to an example of the present invention.

25 [0035] For the cursor pointing purpose (such as the cursor movement control), examples of the present invention may apply a dynamic analysis and an integrated inertial and MR signals for the position accuracy and the absolute pointing control.

[0036] The direction of the remote controller 10 may be measured by the MR sensor. However, since the MR sensor provided by an IC vendor (e.g., Yamaha) may include error or bias caused by the temperature, calibration to the measured result may be necessary. Let (Rx, Ry1, Ry2) be raw data read out from the MR sensor. In one example, the calibrated data (Hx, Hy, Hz) may be represented as

$$\begin{bmatrix} Hx \\ Hy \\ Hz \end{bmatrix} = \begin{bmatrix} a1 & a2 & a3 \\ a4 & a5 & a6 \\ a7 & a8 & a9 \end{bmatrix} \begin{bmatrix} Sx \\ Sy \\ Sz \end{bmatrix}$$

where a1~a9 are calibration parameters. Sx, Sy and Sz represent compensations of which:

$$\begin{aligned} Sx &= Rx - CxT \\ Sy1 &= Ry1 - Cy1T \\ Sy2 &= Ry2 - Cy2T \\ Sy &= Sy2 - Sy1 \\ Sz &= Sy1 + Sy2 \end{aligned}$$

where T is the current temperature and Cx, Cy1 and Cy2 are temperature compensation.

[0037] The attitude (or posture) and direction calculation may be represented as follows:

$$\begin{bmatrix} A[0][0] \\ A[0][1] \\ A[0][2] \end{bmatrix} = \begin{bmatrix} Hx \\ Hy \\ Hz \end{bmatrix} \times \begin{bmatrix} Gx \\ Gy \\ Gz \end{bmatrix} \quad (\text{Vector cross product})$$

where the attitude is a 3x3 matrix (i.e., declared as A[3][3]), and [Gx, Gy, Gz]^T is the 3-axis acceleration. Moreover, since

$$\begin{bmatrix} A[1][0] \\ A[1][1] \\ A[1][2] \end{bmatrix} = \begin{bmatrix} A[0][0] \\ A[0][1] \\ A[0][2] \end{bmatrix} \times \begin{bmatrix} Gx \\ Gy \\ Gz \end{bmatrix} \quad (\text{Vector cross product})$$

and

$$\begin{bmatrix} A[2][0] \\ A[2][1] \\ A[2][2] \end{bmatrix} = \begin{bmatrix} G_x \\ G_y \\ G_z \end{bmatrix} \quad (\text{G sensor frame as new z - axis})$$

Therefore, the direction of the remote controller 10 may be represented as:

$$\theta = \text{atan}\left(\frac{\|A[1]\|}{\|A[0]\|}\right)$$

5 [0038] FIGS. 3A and 3B are diagrams of a dynamic analysis and measuring results according to an example of the present invention. Referring to FIG. 3A, the dynamic analysis of the remote controller 10 may be done by continuously rotating the remote controller in a direction shown in FIG. 3A. Referring to FIG. 3B, the measuring results may further be calculated as follows:

$$\begin{bmatrix} W_{xc} \\ W_{yc} \\ W_{zc} \end{bmatrix} = \begin{bmatrix} \cos(\theta_z)\cos(\theta_y) & \sin(\theta_z)\cos(\theta_y) & -\sin(\theta_y) \\ -\sin(\theta_z)\cos(\theta_x) + \cos(\theta_z)\sin(\theta_y)\sin(\theta_x) & \cos(\theta_z)\cos(\theta_x) + \sin(\theta_z)\sin(\theta_y)\sin(\theta_x) & \cos(\theta_y)\sin(\theta_x) \\ \sin(\theta_z)\sin(\theta_x) + \cos(\theta_z)\sin(\theta_y)\cos(\theta_x) & -\cos(\theta_z)\sin(\theta_x) + \sin(\theta_z)\sin(\theta_y)\cos(\theta_x) & \cos(\theta_y)\cos(\theta_x) \end{bmatrix} \begin{bmatrix} W_x \\ W_y \\ W_z \end{bmatrix}$$

10

where (W_{xc}, W_{yc}, W_{zc}) represent sensed signals and (W_x, W_y, W_z) represent real operated value in the dynamic operation.

[0039] FIG. 4 is a diagram of a dynamic analysis of the motion-sensor module 40 of the 3D pointing device according to another example of the present invention. Referring to FIG. 4, the motion sensor module 40 may include the accelerometer 41, the gyroscope 42 and the MR sensor 43. The dynamic analysis on rotation effect on the accelerometer(s) can be represented as follows:

$$\begin{bmatrix} A_{xc} \\ A_{yc} \\ A_{zc} \end{bmatrix} = \begin{bmatrix} \ddot{P}_{mx} \\ \ddot{P}_{my} \\ \ddot{P}_{mz} \end{bmatrix} + \begin{bmatrix} R \dot{W}_z + g \sin(\theta_y) \\ -R(W_x^2 + W_z^2) + g \cos(\theta_y)\sin(\theta_x) \\ R \dot{W}_x - g \cos(\theta_x)\cos(\theta_y) \end{bmatrix}$$

20 where

$$\begin{bmatrix} \ddot{P}_{mx} \\ \ddot{P}_{my} \\ \ddot{P}_{mz} \end{bmatrix} = \begin{bmatrix} A_x \\ A_y \\ A_z \end{bmatrix}$$

and where A_x , A_y and A_z are signals sensed by the accelerometer(s).

[0040] FIG. 5A is a functional block diagram of a 3D pointing device according to another example of the present invention. Referring to FIG. 5A, regular inputs W_z and W_x generated from a gyroscope may be compensated by A_x sensed by an accelerometer and calibrated data (H_x , H_y , H_z) generated from an MR sensor based on a pointing algorithm. The pointing algorithm may include algorithms 1 and 2 (Alg1 and Alg2) of which a compensated angle in z-axis direction θ_{zc} may be calculated as $\theta_{zc} = \text{Alg1}(\theta_z, \theta_{xr})$, and a compensated angle in x-axis direction θ_{xc} may be calculated as $\theta_{xc} = \text{Alg1}(\theta_x, \text{Tilt}_x)$ for generating the output. The algorithm 1, that is the Alg1(...), which may use magnetic direction to compensate z-gyro drift and a horizontal range of the cursor. Moreover, the algorithm 2, that is the Alg2(...), which may use tilt measured by the accelerometer to compensate x-gyro drift and monitor cursor vertical range. The θ_{xr} and the tilt_x may keep information when the remote controller 10 is out of range. Moreover, FIG. 5B is a detailed flowchart of a method of a 3D pointing device according to still another example of the present invention.

[0041] FIG. 6 is a diagram illustrating measuring results of a 3D pointing device according to yet another example of the present invention.

[0042] FIG. 7A is a block diagram illustrating a system of a 3D pointing device including a mapping tool according to other example of the present invention, wherein T1, T2 and T3 are remote controllers and the receiving device may be, for example, a gate way connected/coupled with a remote device, for example, a PC installed with a kernel program thru a USB port. Motion signals generated by the remote controller(s) may first be received by the receiving device and then passed to a motion decode module for deciding its motion information. Next, the decoded motion information may be mapped by a motion mapping module to get/recovery its respected/represented motion(s) or control(s).

[0043] FIG. 7B is a diagram illustrating an exemplary graphic user interface (GUI) for setting the mapping tool of the system of the 3D pointing device illustrated in FIG. 7A, which may include option(s) for a user to configured the motion mapping module.

[0044] It will be appreciated by those skilled in the art that changes could be made to the examples described above without departing from the broad inventive concept thereof. It is understood, therefore, that this invention is not limited to the particular examples disclosed, but it is intended to cover modifications within the spirit and scope of the present invention as defined by the appended claims.

[0045] Further, in describing representative examples of the present invention, the specification may have presented the method and/or process of the present invention as a particular sequence of steps. However, to the extent that the method or process does not rely on the particular order of steps set forth herein, the method or process should not be limited to the particular sequence of steps described. As one of ordinary skill in the art would appreciate, other sequences of steps may be possible. Therefore, the particular order of the steps set forth in the specification should not be construed as limitations on the claims. In addition, the claims directed to the method and/or process of the present invention should not be limited to the performance of their steps in the order written, and one skilled in the art can readily appreciate that the sequences may be varied and still remain within the spirit and scope of the present invention.

PRELIMINARY DRAWINGS

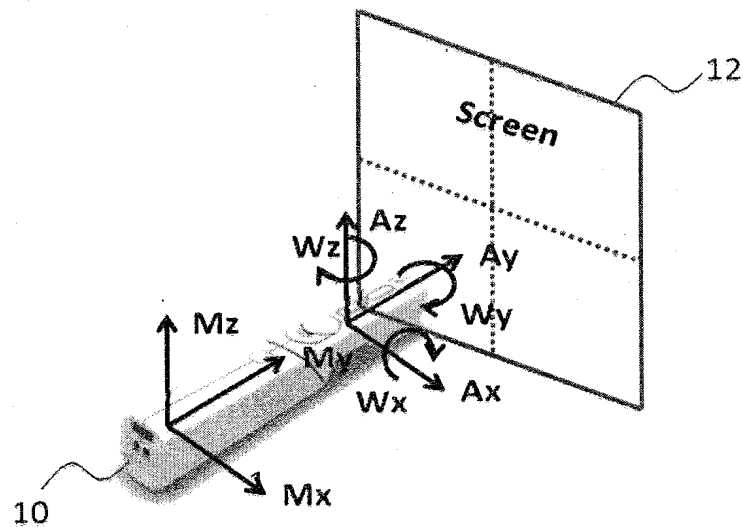


FIG. 1

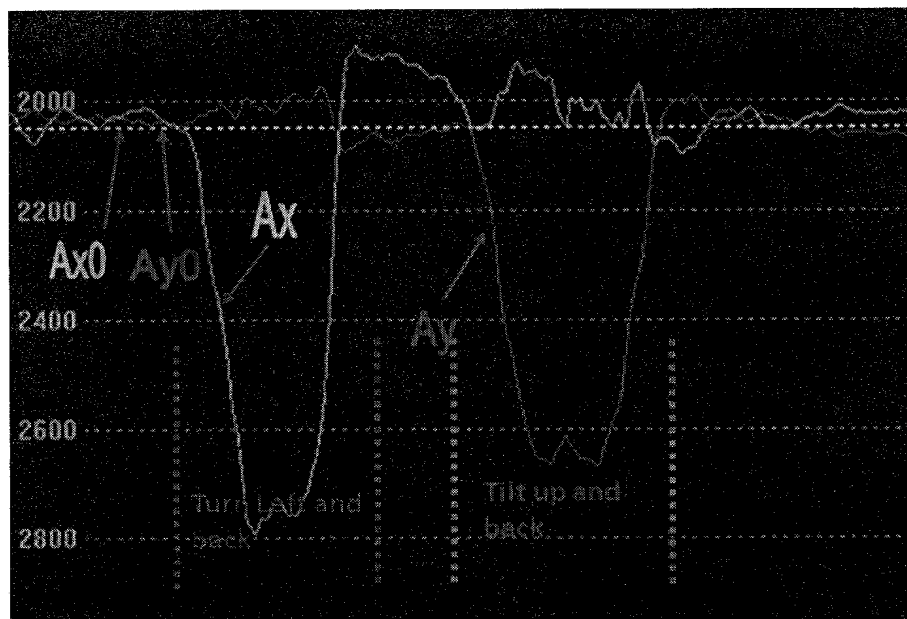


FIG. 2A

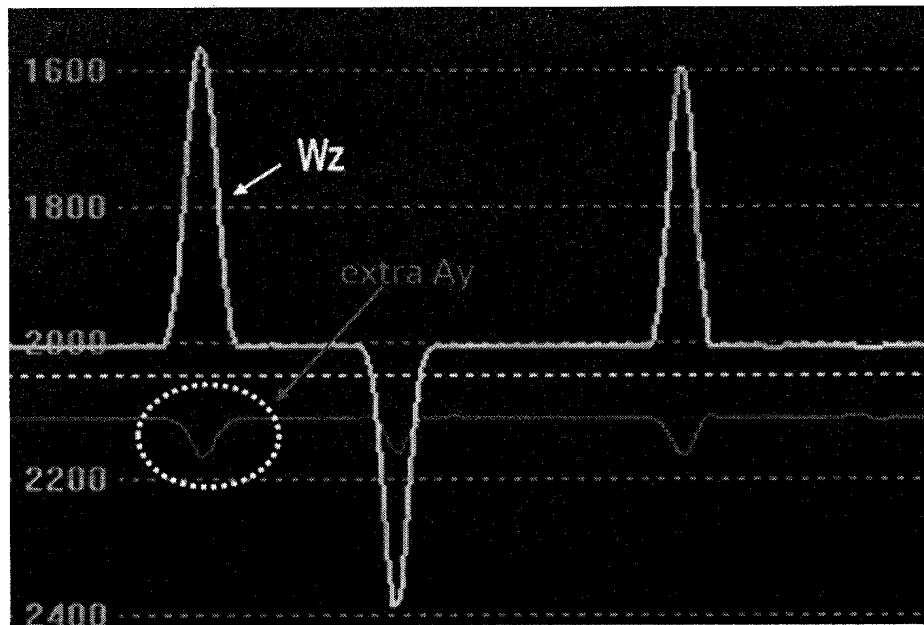


FIG. 2B

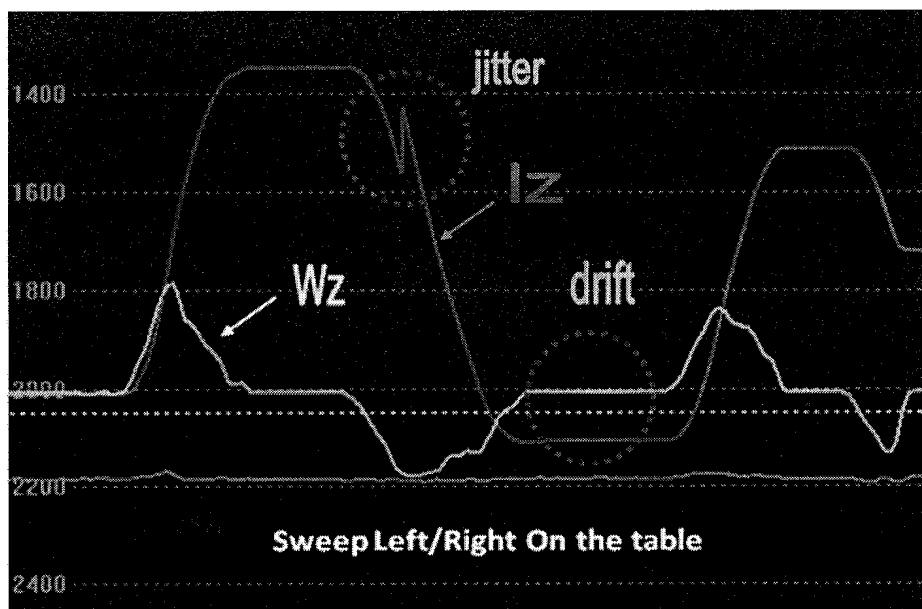


FIG. 2C

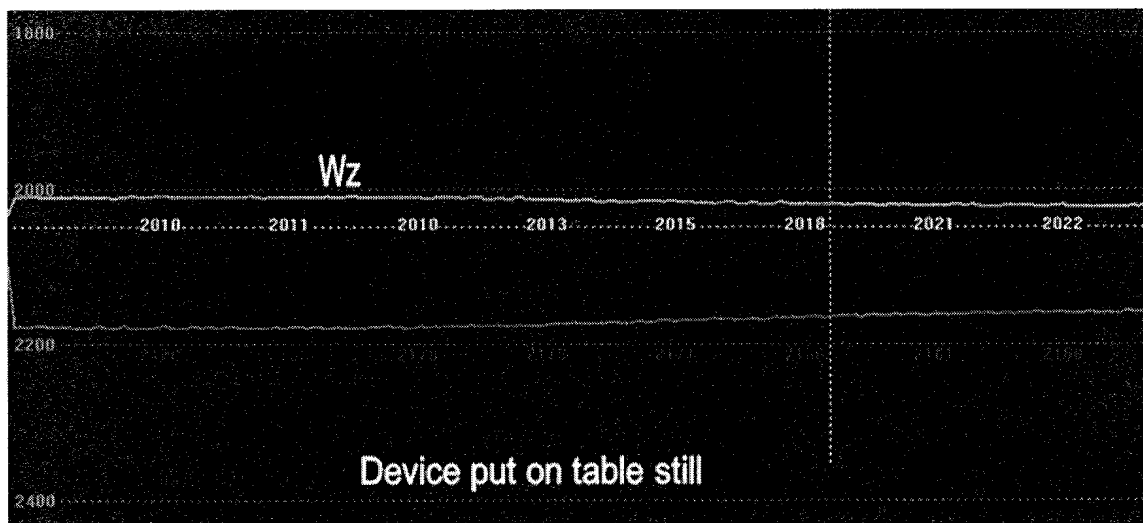


FIG. 2D

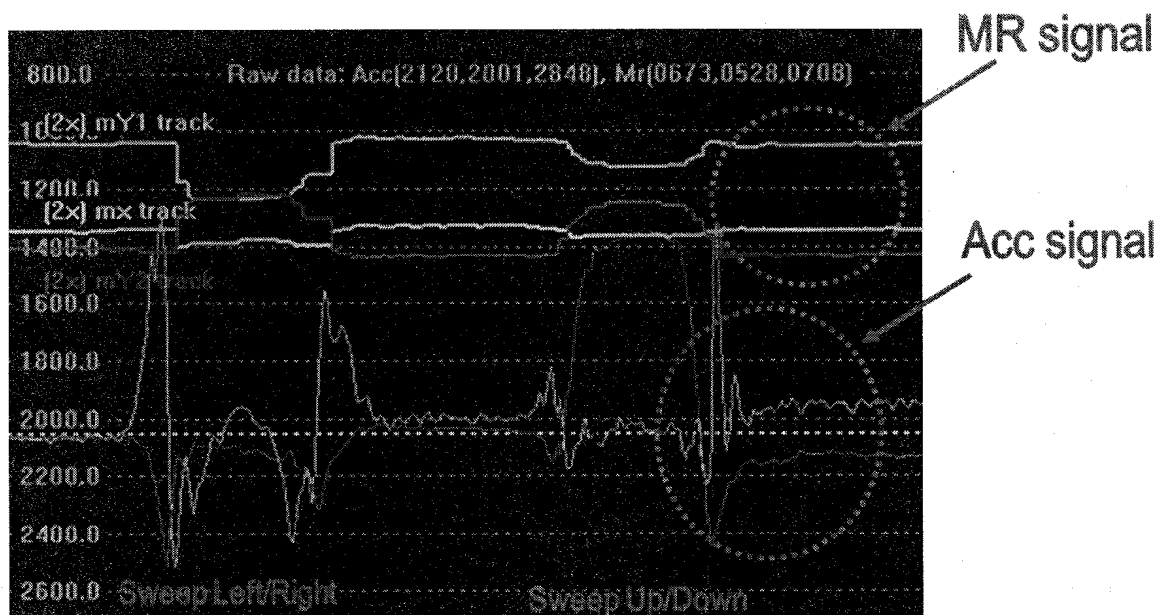


FIG. 2E

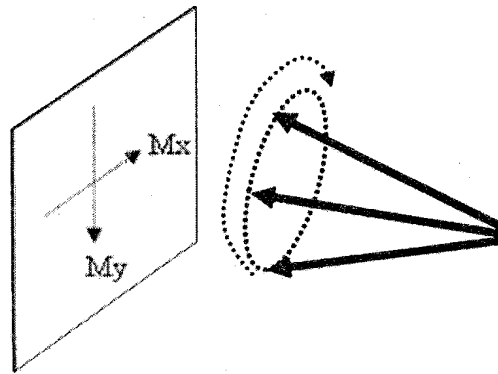


FIG. 3A

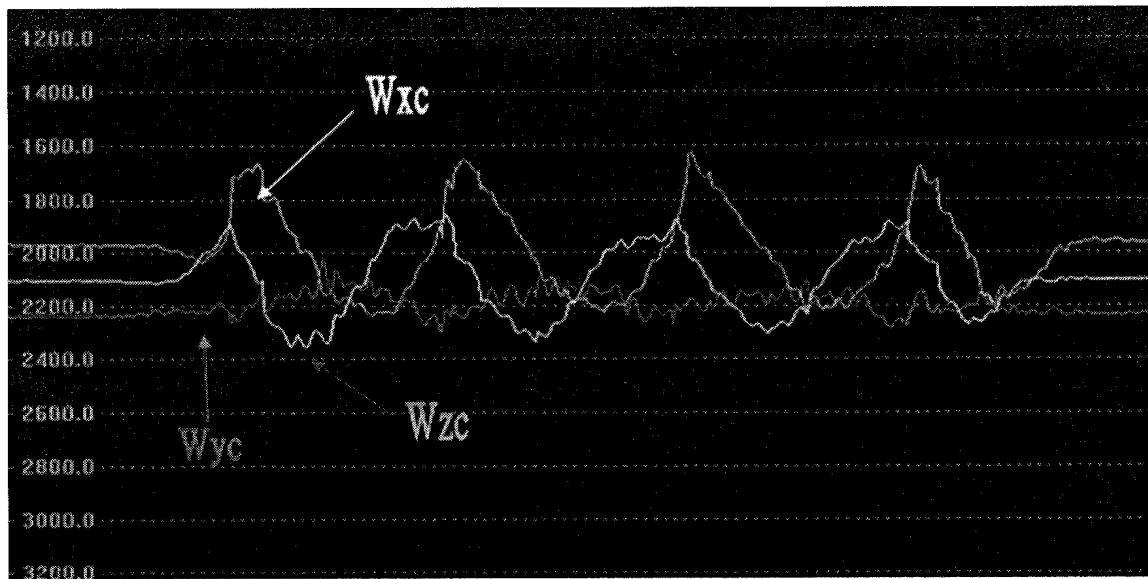


FIG. 3B

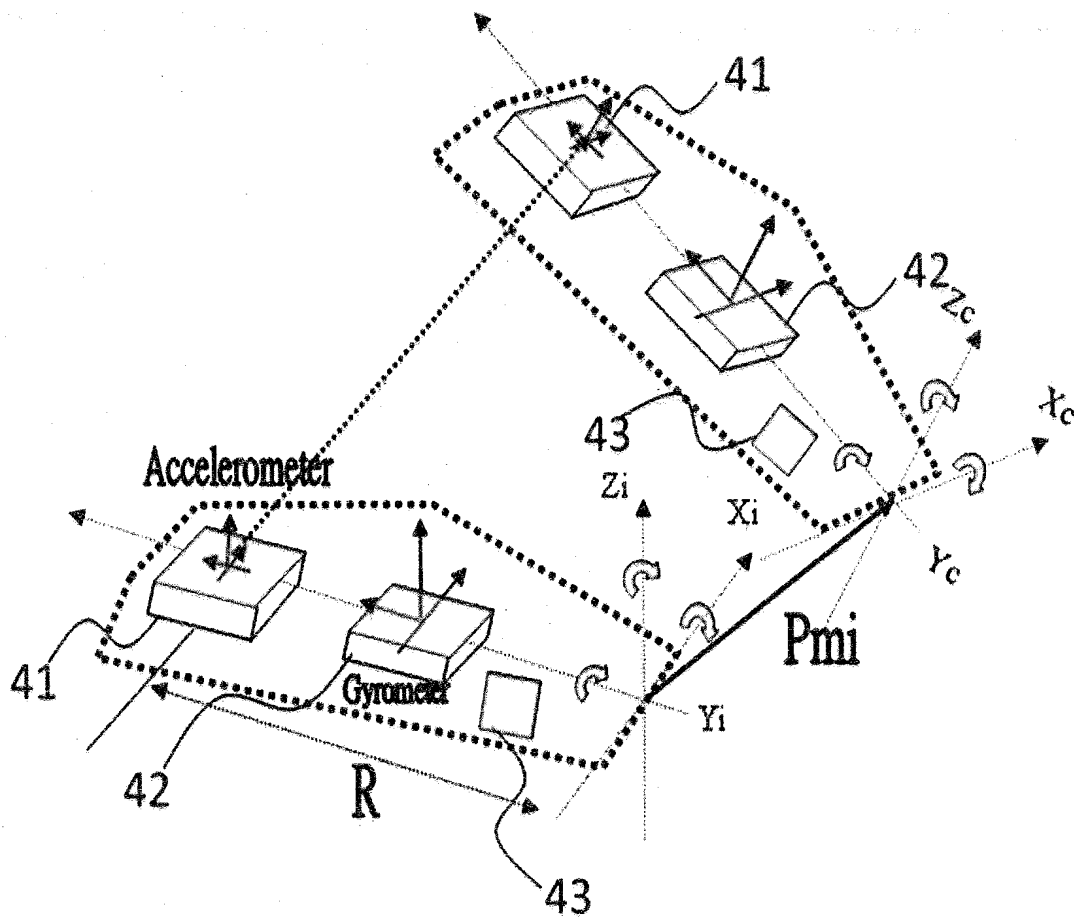


FIG. 4

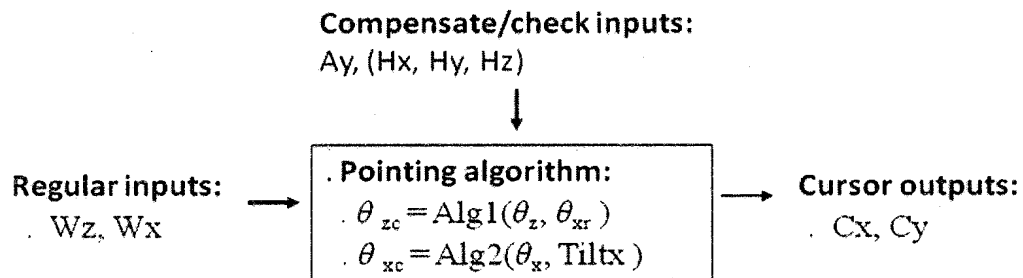


FIG. 5A

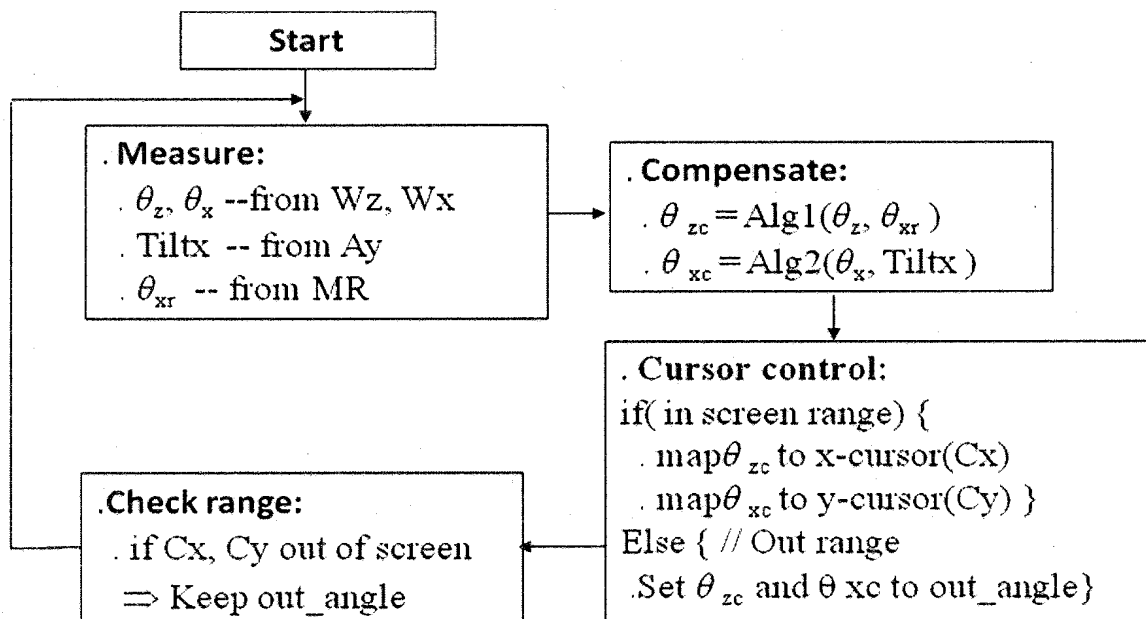


FIG. 5B

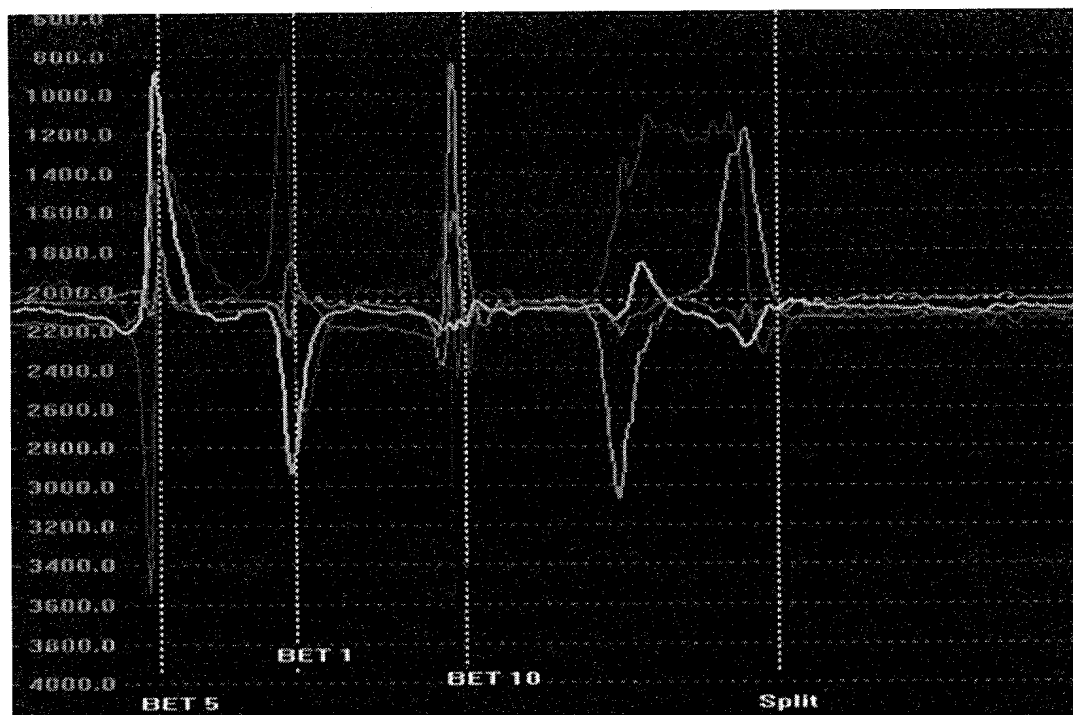


FIG. 6

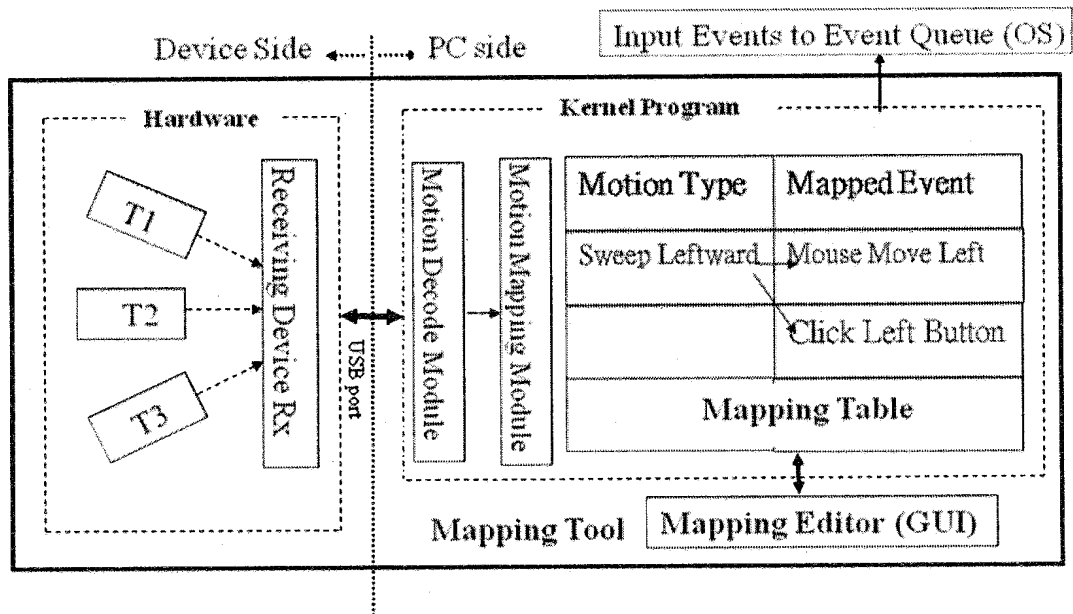


FIG. 7A

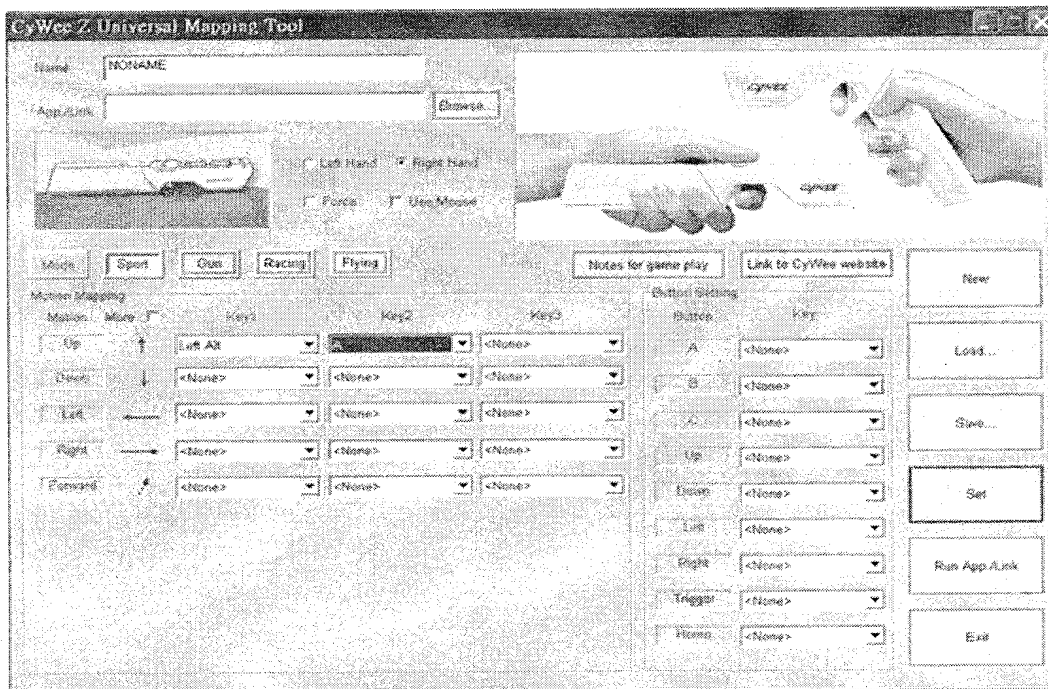


FIG. 7B

Electronic Patent Application Fee Transmittal

Application Number:				
Filing Date:				
Title of Invention:	3D POINTING DEVICES AND METHODS OF THE SAME			
First Named Inventor/Applicant Name:	ZHOU YE			
Filer:	Morton J. Rosenberg.			
Attorney Docket Number:	MR3871-156/P			
Filed as Small Entity				
Provisional Filing Fees				
Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Basic Filing:				
Provisional Application filing fee	2005	1	110	110
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD(\$)
Miscellaneous:				
Total in USD (\$)				110

Electronic Acknowledgement Receipt

EFS ID:	6758117
Application Number:	61292558
International Application Number:	
Confirmation Number:	1981
Title of Invention:	3D POINTING DEVICES AND METHODS OF THE SAME
First Named Inventor/Applicant Name:	ZHOU YE
Customer Number:	04586
Filer:	Morton J. Rosenberg.
Filer Authorized By:	
Attorney Docket Number:	MR3871-156/P
Receipt Date:	06-JAN-2010
Filing Date:	
Time Stamp:	13:25:26
Application Type:	Provisional

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	\$110
RAM confirmation Number	8039
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
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1	Application Data Sheet	3871-156-P-ADS-JAN6-2010.pdf	1258008 7b32532b42ea183322f3e2e68a691c6dba4313b3	no	5
Warnings:					
Information:					
2		3871-156-P-PA-JAN06-2010.pdf	1279385 6032d57534df73ce4165906aa841b6087ec0e9a6	yes	19
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Specification		1	11	
	Drawings-only black and white line drawings		12	19	
Warnings:					
Information:					
3	Fee Worksheet (PTO-875)	fee-info.pdf	29704 873c05d3f541580ce5d0c928d3b264b5060a94ed	no	2
Warnings:					
Information:					
Total Files Size (in bytes):			2567097		
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