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Paper 14
Entered: July 12, 2019

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

ZTE (USA), INC.,
Petitioner,

v.

CYWEE GROUP LTD.,
Patent Owner.

Case IPR2019-00525
Patent 8,552,978 B2

Before PATRICK M. BOUCHER, KAMRAN JIVANI, and CHRISTOPHER L. OGDEN, *Administrative Patent Judges*.

BOUCHER, *Administrative Patent Judge*.

DECISION
Petition for *Inter Partes* Review and Motion for Joinder
35 U.S.C. §§ 314(a), 315(c)

ZTE (USA), Inc. ("Petitioner") filed (1) a Petition (Paper 2, "Pet.") to institute an *inter partes* review of claims 10 and 12 of U.S. Patent No. 8,552,978 B2 (Ex. 1001, "the '978 patent"); and (2) a Motion for Joinder (Paper 3, "Mot.") with IPR2018-01257 ("the related IPR"), which was instituted on December 11, 2018. Cywee Group Ltd. ("Patent Owner") filed

a Preliminary Response (Paper 9, "Prelim. Resp.") to the Petition, as well as an Opposition (Paper 6, "Opp.") to Petitioner's Motion for Joinder. Petitioner filed a Reply (Paper 8, "Reply") to Patent Owner's Opposition in support of its Motion.

We grant the Motion for Joinder, joining Petitioner as a party to the related IPR, and terminate this proceeding.

I. BACKGROUND

A. The '978 Patent

The '978 patent "generally relates to a 3D pointing device," which is described as having the function of "detecting motions of the device and translating the detected motions to a cursor display such as a cursor pointing on the screen . . . of a 2D display device." Ex. 1001, 1:22–23, 1:29–33. For example, the pointing device "may be a mouse of a computer or a pad of a video game console" and the display device "may be a part of the computer or the video game console." *Id.* at 1:36–39. A user may then perform control actions and movements with the pointing device for some purpose, such as playing a video game. *Id.* at 1:52–55. For example, when the user moves the pointing device, a pointer on the display device may "move along with the orientation, direction and distance travelled by the pointing device." *Id.* at 1:56–61.

Figure 3 of the '978 patent is reproduced below.

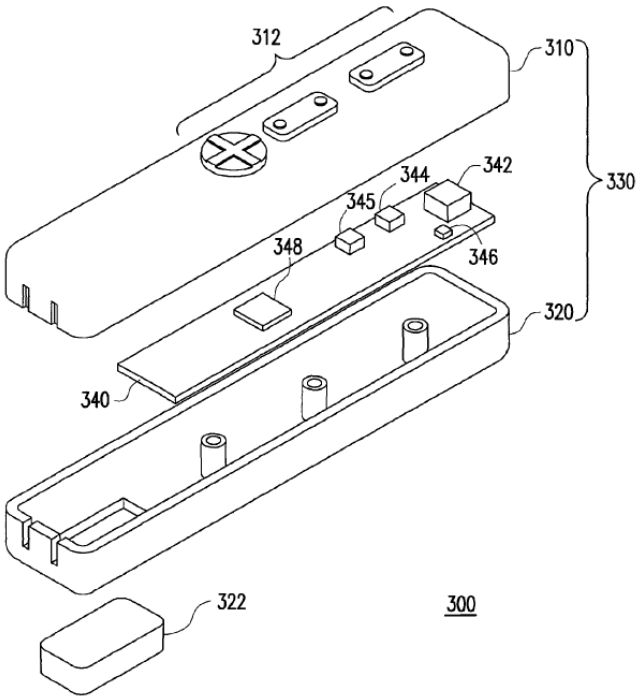

FIG. 3

Figure 3 is an exploded diagram showing electronic device 300, which may correspond to a pointing device. *Id.* at 9:14–16. Within housing 330, formed of top cover 310 and bottom cover 320, are rotation sensor 342, accelerometer 344, and magnetometer 345, each attached to printed circuit board 340, as well as other components that allow data transmission and processing. *Id.* at 9:26–33.

The '978 patent refers to rotation sensor 342, accelerometer 344, and magnetometer 345 as "a nine-axis motion sensor module." *Id.* at 9:57–62. The term "nine-axis" refers to and includes three angular velocities ω_x, ω_y, ω_z detected by rotation sensor 342, three axial accelerations Ax, Ay, Az detected by accelerometer 344, and three "magnetisms" Mx, My, Mz detected by magnetometer 345. *Id.* at 9:65–10:23. The *x*, *y*, and *z* components are illustrated in the patent for a Cartesian spatial reference

frame relative to electronic device 300, but, more generally, "may not need to be orthogonal in a specific orientation and they may be rotated in different orientations." *Id.* at 10:23–29.

Various dynamic environments may present external influences that impact the ability to calculate orientation accurately. *See id.* at 15:53–16:4. For example, nongravitational forces may cause undesirable axial accelerations and/or extraneous electromagnetic fields may cause undesirable magnetism. *Id.* at 15:55–60. Such complications are addressed with a method illustrated by the flow diagram shown in Figure 7 of the '978 patent, reproduced below.

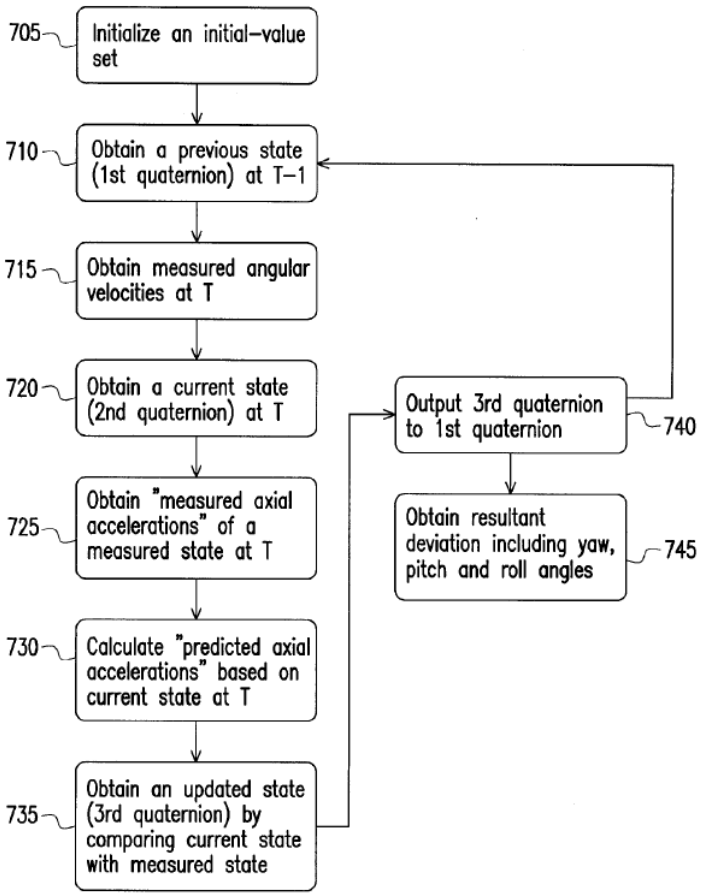

FIG. 7

Figure 7 shows a method "for obtaining and/or outputting a resultant deviation including deviation angles in a spatial reference frame of an electronic device." *Id.* at 13:60–63. The method of Figure 7 uses quaternions, which Petitioner's declarant, Majid Sarrafzadeh, Ph.D., explains are four-valued vector generalizations of complex numbers with "special mathematical properties that allow them to describe rotations efficiently." Ex. 1002 ¶¶ 30–31.

After obtaining a previous state of the nine-axis sensor module at steps 705 and 710, the method obtains measured angular velocities ω_x, ω_y, ω_z

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