UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

WACOH COMPANY,

Plaintiff,

v.

ANALOG DEVICES, INC. and
ROBERT BOSCH LLC,

Defendants

Case No. 09-10119
(Consolidated with No. 09-10123)
Honorable Julian Abele Cook, Jr.

ORDER

On January 12, 2008, the Plaintiff, Wacoh Company ("Wacoh"), initiated this lawsuit in which it accused the Defendants, Analog Devices, Inc. ("ADI") and Robert Bosch LLC, ("Bosch") of infringing upon one if its patents, namely, U.S. Patent No. 6,512,364 ("the '364 patent"). In the '364 patent, Wacoh owns, by assignment,[1] an invention called a "Testing Sensor," which the company describes as "an apparatus for detecting a physical quantity acting as an external force. . . ." (Wacoh Opening Brief at 1). Wacoh accuses the Defendants of violating its '364 patent through the manufacture and sale of accelerometers for use in airbags and other automobile systems. The Defendants define "accelerometer" as a type of sensor that detects sudden changes in speed.[2] The parties have submitted briefs pursuant to *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 976 (Fed. Cir. 1995), *aff'd*, 517 U.S. 370 (1996) and have asked the Court to

[1]Kazuhiro Okada is the inventor of the '364 Patent and owner of Wacoh Company, to which he has assigned this and other patents.

[2]The Defendants refer to the sudden changes in speed as acceleration or deceleration and explain that when an automobile is in a collision, accelerometers detect the resulting sudden change and send electrical signals that trigger deployment of an airbag.

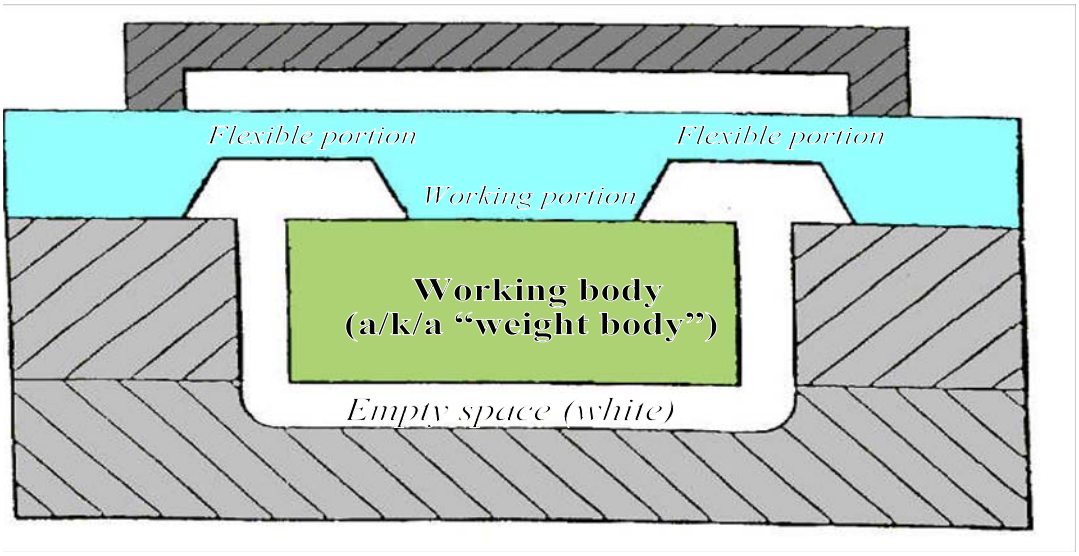
construe several disputed terms used in the '364 patent.

I.

In broad terms, the '364 patent covers an invention wherein a certain type of sensor triggers an electrical signal. The Defendants claim that the '364 patent covers only sensors that operate by causing a "mechanical deformation" of so-called "piezoresistive" material to trigger the electrical signal. According to the Defendants, piezoresistive material is "one whose electrical resistance changes when the material's shape is compressed or deformed." (Defendants' Opening Brief at 1). The Defendants claim that the sensor described in the '364 patent works in the following manner:

- First, a sudden change in speed causes an object (the working body or weight body), which is suspended like a pendulum, to swing;
- That swinging bends the piezoresistive material connected to the pivot point of the pendulum;
- Next, the resulting deformation changes the electrical resistance of the piezoresistive material; and
- Finally, that change is measured and converted into an electrical signal used to trigger, in the Defendants' case, the deployment of an airbag.

The Defendants' brief also reproduces Figure 20 of the patent, with annotations, to assist the Court in understanding the structure of the Plaintiff's claimed sensor. A variation of that image is below, but the Court notes that it reflects only one possible embodiment of the Plaintiff's invention:



Patent '364 Fig. 20 (modified and with annotations).

According to the Defendants, the '364 patent involves two distinct portions: (1) claims involving the sensor itself, which - as discussed – detects a force or a sudden acceleration or deceleration, and (2) a method of testing the sensor to make sure it is operating correctly. The sensor itself comprises two parts. The first, illustrated in blue above, is the strain generative body.[3] According to the Defendants, it is constructed of a material that can bend at the thinner, more flexible portions. The second part of the sensor is the "working body" or "weight body," and as shown, it hangs from the strain generative body. Inasmuch as the working body is suspended in air and capable of swinging back and forth, the Defendants compare its structure to that of a pendulum.

To illustrate the how the sensor works, the Defendants offer an example:

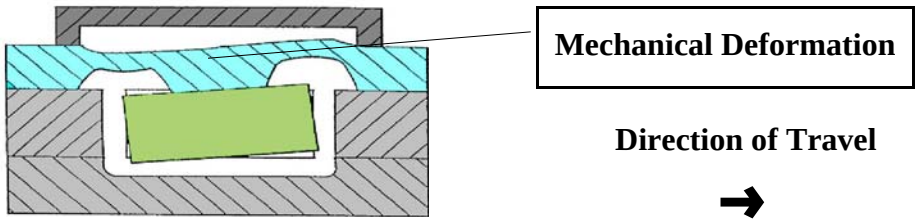
> When a vehicle containing a sensor is moving at a constant speed, the vehicle and the sensor both move at that speed. When the vehicle comes to a sudden stop, such as in a front-end collision, the sensor body will also stop moving. But because the

[3]The Defendants claim that the device is called a "strain generative body" because it generates strain in the form of deformation when it bends in response to an applied force. (Defendants' Opening Claim Construction Brief at 4).

> working body is hanging in air, it continues to move— much like a passenger not wearing a seatbelt. Being a pendulum, the working body moves forward and up. As the working body swings, it transmits a force that bends the strain generative body at its thinner, flexible portions. This displacement of the working body and bending of the strain generative body are shown below in Figure 21 from the patent.

(Defendants' Opening Brief at 4) (citations omitted).

A second illustration of the displacement of the working body and bending of the strain generative body appear in Figure 21 from the patent. A variation of that image appears in the Defendants' brief and is reproduced below:



Patent '364, Fig. 21 (annotated and with color variations).

As noted above, the Plaintiff describes its invention as a "Testing Sensor," namely, an apparatus for detecting a physical quantity acting as an external force. According to the Plaintiff, the novelty of the claims in the '364 patent are that they are directed towards methods of testing such sensors, including self-testing, to ensure that the sensor is working prior to use. Although the Plaintiff acknowledges that Claims 1,3,4,5, and 6 of the '364 patent are at issue in this litigation, it believes that Claim 1 contains all of the terms that are disputed by the parties and, in that regard, is exemplary of the other claims. Claim 1 reads as follows, with disputed terms highlighted in ***bold italics***:

> What is claimed is:
> 1. A method of testing a sensor, said sensor comprising:
> a substrate arranged along an XY-plane of an XYZ three-dimensional coordinate system;

a ***working body*** receiving a force and located adjacent to said substrate with a predetermined distance;
a flexible member supporting said ***working body*** at a periphery thereof so that said ***working body*** is suspended and ***spatial deviation*** of said working body is produced by applying said force thereto;
a fixing member fixing said flexible member to said substrate; and
a ***transducer for transforming said spatial deviation into an electric signal*** that indicates a direction and a magnitude of said force,
said method comprising the steps of:
providing a capacitance element including a ***deviation electrode*** and a ***fixed electrode***, said deviation electrode being located at a position which deviates along with said working body and said fixed electrode being fixed to said substrate so as to face said deviation electrode, and said ***capacitance element*** being arranged so that an electrode distance of said capacitance element changes when said working body is deviated in an X-axis direction of said XYZ three-dimensional coordinate system;
applying a voltage between said deviation electrode and said fixed electrode so that ***Coulomb force*** is produced which causes ***spatial deviation*** of said working body in said X-axis direction;
detecting an electric signal transformed by said transducer while said spatial deviation is caused by applying said voltage; and
testing an operation of said sensor with respect to said X-axis direction based on a relationship between said applied voltage and said detected electric signal.

'364 patent, Col. 34, line 41- Col. 35, line 8. Wacoh argues that the Defendants' vehicle sensors violate claims 1, 3, 4, 5, and 6 of the '364 patent. However, the Defendants contend that because their accelerometers do not use mechanical deformation to trigger the electrical signal, the '364 patent has no applicability to them.

II.

The parties have asked the Court to construe eight disputed terms in Claims 1, 3, 4, 5, and 6 of the '364 patent, namely the meaning of (1) "a working body," (2) "spatial deviation," (3) a "transducer for transforming said spatial deviation into an electric signal," (4) "providing a capacitance element," (5) "capacitance element," (6) "deviation electrode," (7) "fixed electrode," and

(8) "Coulomb force." Both parties have submitted briefs indicating what they believe to be the proper construction of the terms at issue.

In 1995, the Federal Circuit Court of Appeals declared that a trial court should undertake a two step process when attempting to determine if a patent infringement has occurred; namely (1) construe all of the disputed claims, and (2) then determine if the accused product infringes upon any of the claims as properly construed. *Markman v. Westview Instruments, Inc.,* 52 F.3d 967, 976 (Fed. Cir. 1995), *aff'd*, 517 U.S. 370 (1996).

Claim construction is a matter of law which is the responsibility of the trial court. *Cybor v. FAS Techs., Inc.*, 138 F. 3d 1448, 1456 (Fed. Cir. 1998). It is "the process of giving proper meaning to the claim language." *Abtox, Inc. v. Exitron Corp.*, 122 F.3d 1019, 1023 (Fed. Cir. 1997). As such, this process is designed to "define the scope of the protected invention." *Id.* Claim construction is a legal issue, while comparison to the accused product or the prior art are factual undertakings. *TechSearch, L.L.C. v. Intel Corp*., 286 F.3d 1360, 1369 (Fed. Cir. 2002).

When construing claims, a court should initially consider the language of the patent claim. *Teleflex, Inc. v. Ficosa North America Corp.*, 299 F.3d 1313, 1324 (Fed. Cir. 2002). In the absence of an express intent to impart a novel meaning to a term within the claim, there is a "heavy presumption" that a term carries its ordinary and customary meaning to a person of ordinary skill in the relevant art. *Id* at 1325. Thus, when "construing claims, the analytical focus must begin and remain centered on the language of the claims themselves, for it is that language that the patentee chose to use to 'particularly point out and distinctly claim the subject matter which the patentee regards as his own invention.'" *Interactive Gift Express, Inc. v. Compuserve Inc.*, 256 F.3d 1323, 1331 (Fed. Cir. 2001) (quoting 35 U.S.C. § 112). Often, dictionaries are useful resources to assist the

court in determining the ordinary and customary meanings of claim terms, as well as the meanings that would have been ascribed to technical terms by those of skill in the relevant art. *Texas Ditigal Sys., Inc. v. Telegenix, Inc.*, 308 F.3d 1193, 1202 (Fed. Cir. 2002).

The trial courts are also encouraged to examine the intrinsic record in every case in order to "determine whether the presumption of ordinary and customary meaning is rebutted." *Texas Digital*, 308 F.3d at 1209. Although words in a claim are generally given their ordinary and customary meaning, "a patentee may choose to be his own lexicographer" and assign special definitions to the words in the claim, as long as those definitions are clearly stated in the patent specification or file history. *Hoecsht Celanese Corp. v. BP Chems. Ltd.*, 78 F.3d 1575, 1578 (Fed. Cir. 1996). Thus, intrinsic evidence can provide much needed "context and clarification about the meaning of claim terms." *Teleflex,* 299 F.3d at 1325.

The sources of intrinsic evidence that a court first examines are the patent itself, including the claims, the specification, and, if in evidence, the prosecution history. *Ductmate Industries, Inc. v. Famous Supply Corp*., 55 F.Supp.2d 777, 782 (N.D. Ohio 1999) (citing *Cybor Corp. V. FAS Tech., Inc.,* 138 F.3d. 1448, 1454 (Fed. Cir. 1998). However, "[a] construing court does not accord the specification, prosecution history, and other evidence the same weight as the claim itself, but consults these sources to give the necessary context to the claim language." *Ductmate Industries, Inc. v. Famous Supply Corp*., 55 F.Supp.2d 777, 782 (N.D. Ohio 1999) (citing *Cybor Corp. V. FAS Tech., Inc.,* 138 F.3d. 1448, 1454 (Fed. Cir. 1998).

Finally, although trial courts may examine extrinsic evidence, including inventor and expert testimony, such an approach should be utilized only in rare cases. *Frank's Casing Crew & Rental Tools, Inc. v. PMR Techs., Ltd.*, 292 F.3d 1363, 1374 (Fed. Cir. 2002). The Federal Circuit has held

that a trial court may consult extrinsic evidence only for the limited purpose of (1) allowing it to acquire an understanding of the claim terminology or (2) to resolve an ambiguity in a disputed claim term on the basis of the intrinsic evidence. *Markman*, 52 F.3d at 986. Significantly, extrinsic evidence "cannot be used to alter a claim construction dictated by a proper analysis of the intrinsic evidence." *On-Line Tech. v. Bodenseewerk Perkin-Elmer GmbH*, 386 F.3d 1133, 1139 (Fed. Cir. 2004).

III.

A. Construction of "a working body"

The parties' proposed constructions are as follows:

Term	Wacoh's Construction	Defendants' Construction
"Working Body"	Plain meaning	A structure that transmits the received force to the transducer

In each of the claims, the '364 patent refers to the term "working body" in describing the sensor, noting that the sensor comprises, among other things, "a working body receiving a force and located adjacent to said substrate with a predetermined distance . . . ." *See, e.g.*, Col 31, lines 44-45. Wacoh argues that the term "working body" is easily understood by a person of ordinary skill in the art, and thus should be given its plain meaning. Specifically, Wacoh characterizes a working body as the body that moves in relation to the substrate, thereby allowing the system to detect an external force. The company notes, by way of example, that a working body is (1) a weight body if used as part of an acceleration sensor, or (2) a magnetic body if used as part of a magnetic sensor. Wacoh bases its definition in part on the language of the specification, which observes that "[t]his invention relates to an apparatus for detecting a physical quantity acting as an external force, e.g., a force exerted on a working body, an acceleration exerted on a weight body, or a magnetism exerted on a

magnetic body." '364 patent, Col. 1, lines 16-19. The specification continues by noting

> A working body is provided for exerting a force on the strain generative body. If a weight body responsive to acceleration is used as the working body, an acceleration sensor is provided. Further, if a magnetic body responsive to magnetism is used as the working body, a magnetic sensor is provided. *Id* at Col. 1, lines 37-42.

Accordingly, Wacoh seeks to have the Court rely upon the specific language of the '364 patent claims and the specification rather than to look to extrinsic evidence for guidance in construing this term.

The Defendants challenge Wacoh's interpretation, noting that the phrase "working body" is not a recognized term of art. Thus, they urge the Court to view the working body as a structure that receives an applied force and transmits that force to the transducer,[4] which in turn, transforms that deviation of the working body into an electrical signal that represents the force. The specific language proffered by the Defendants is "a structure that transmits the received force to the transducer," and their definition derives from what they perceive as the context provided by the claims, as well as the use of the term in other parts of the '364 patent, including in the Abstract (which notes that "[a] sensor comprises . . . [*inter alia*] a working body (20) for transmitting an exterted [sic] force to the working portion . . . .") and in several parts of the specification itself (which, with minor variation, describe the components of a sensor as including "a working body for transmitting an applied force to the working potion. . . ."). *See,* Col. 5, lines 12-13, 61-62; Col. 8, lines 39-41. The Defendants also note that their construction is consistent with the definition of the term "work" in the realm of physics, which, according to the 1984 edition of The McGraw Hill Dictionary of Scientific & Technical Terms, is "[t]he transference of energy that occurs when a force

[4]The Defendants alternatively refer to the transducer as the peizoresistive elements described above.

is applied to a body."[5]

It appears that the parties agree that the "working body," however defined, receives a force. The dispute appears to involve whether, as the Defendants posit, the working body must transmit this received force to the transducer, or whether – as Wacoh suggests – it is primarily a device that moves and allows force to be detected.

The Court finds that the Defendants' construction, while not perfect, is more precise. Wacoh's proposal generically states that the term "working body" should be given its ordinary and accustomed meaning as understood by one of ordinary skill in the art.[6] Yet, it provides the Court with no guidance for the qualifications that such a person would possess, and cites no authority for its view that such an ordinarily skilled person would define the term in the way the company proposes, namely "as a body that moves in relation to the substrate, thereby allowing the system to detect an external force."

By contrast, the Defendants' interpretation is more consistent with the intrinsic record. As noted above, it is axiomatic that in interpreting the words of a patent, the Court gives preference to the intrinsic record, looking first to the claim language and then to the rest of the intrinsic evidence, beginning with the specification and concluding with the prosecution history, if in evidence. *Interactive Gift Exp., Inc. v. Compuserve Inc.*, 256 F.3d 1323 (Fed. Cir. 2001) ("The starting point for any claim construction must be the claims themselves.") (quoting *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1305 (Fed. Cir. 1999). Here, the Court must determine whether the

[5]The Defendants' definition appears at page 1763 of the dictionary.

[6]The Defendants dispute this assertion and claim that "working body" is not a recognized term of art.

intrinsic record indicates that the "working body" is necessarily a mass that not only receives, but also transmits, a force to the transducer. First, the language of the claim itself indicates that the sensor comprises, in relevant part, (1) "a working body receiving a force and located adjacent to said substrate with a predetermined distance . . . ." and (2) "a flexible member supporting said working body at a periphery thereof so that said working body is suspended and spatial deviation of said working body is produced by applying said force thereto . . . ." ('364 patent, Claim 1, column 34, lines 43-49). Reviewing this language in isolation reveals that the only *required* features of the "working body"are that it (1) receives a force, (2) exists in a space that is adjacent to the substrate within a predetermined distance (3) undergo spatial deviation in response to the force. While the transmission of the force from the working body to the rest of the structure seems to be central to the entire invention, the word "transmit" is never found directly in the language of the claim.

Nevertheless, the Court finds additional guidance by viewing the claims in the broader context of the patent specifications. *See generally*, *Interactive*, *supra* at 1331 ("Claims must be read in view of the specification, of which they are a part.") (quoting *Markman, supra); But see, Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 904 (Fed. Cir. 2004) ("it is improper to read a limitation from the specification into the claims."). Here, repeated references in the specification make it clear that the role of the working body is not only to receive the applied force, but to transmit it to other portions of the apparatus, specifically, the "working portion." *See,* Abstract ("A sensor comprises a semiconductor pellet including a working portion adapted to undergo action of a force, . . . a working body (20) for transmitting an exterted [sic] force to the working portion, ...); ' 364 patent, Col. 5, lines 12-13, 61-62 (describing "a working body for transmitting an applied force to the working portion"); Col. 8, lines 39-41 (referring to "a working body for transmitting a force to the working

portion being connected to the lower surface of the working portion"); Col. 9, lines 47-49 (same). This repeated use of the term by the inventor suggests a deliberate attempt to make reference not to sensors that react to force generally, but rather, to those that receive a force and then transfer it to another portion of the structure.

Wacoh resists this conclusion, noting that the working body is not merely a transmitter, but rather is something that moves in relation to the substrate. Accordingly, the company sees no need to define the working body functionally, as its function is adequately described in the claims themselves. The Court finds this contention to be without merit, especially since its definition of the term is as equally concerned with the function of the working body (e.g. movement in relation to the substrate) as the Defendants' proposed construction. The claims and specifications do not describe working bodies in a vacuum, but in specific relationship to the way they behave within a sensor, which is to both receive and transmit a force. As such, the Defendants' construction is more correct. That said, the Court rejects the Defendants' offer to insert of the word "transducer" into the definition of working body; in the Court's judgment, such an inclusion is not warranted by a reading of the intrinsic record. It is clear from the claim language that the sensor is triggered when the working body receives a force, which causes a spatial deviation along a number of different axes, which *then* reaches the transducer. The steps in this process are distinct and sequential, and nowhere in the claims or the specification are the two terms juxtaposed such that the working body transmits the received force directly to the transducer; there are clearly intermediate interactions with the flexible member and resulting spatial deviations. As such, the imposition of the term "transducer" into the definition of "working body" would make the invention more narrow than suggested by the written language of the claims and specifications. Such a result is unwarranted.

Accordingly, the Court interprets the phrase "working body" in claims 1,3, 4, 5, and 6 to mean "a structure that transmits the received force to the working portion."

B. Construction of "spatial deviation"

Next, the parties disagree about the correct meaning of the term "spatial deviation." In the claims, the term appears in the context of the structure of the sensor, which is said to comprise, *inter alia*, "a flexible member supporting said working body at a periphery thereof so that said working body is suspended and **spatial deviation** of said working body is produced by applying said force thereto;" and "a transducer for transforming said **spatial deviation** into an electrical signal . . . ." ' 364 patent, Col. 34, lines 46-49, 52-53. The term also appears in the context of describing the method for testing the sensor, where the method involves "applying a voltage between said deviation electrode and said fixed electrode so that Coulomb force is produced which causes **spatial deviation** of said working body in said X-axis direction; . . ." and "detecting an electrical signal transformed by said transducer while said **spatial deviation** is caused by applying said voltage . . . ." *Id.* at Col. 34, lines 66-67 through Col. 35, lines 1-5 (emphasis added). The dispute between the parties centers on whether spatial deviation refers to movement generally, as Wacoh proposes, or movement that necessarily includes a vertical direction, as suggested by the Defendants. The parties' proposed constructions are as follows:

Term	**Wacoh's Construction**	**Defendants' Construction**
"spatial deviation"	"movement"	"movement that includes a vertical direction"

Wacoh notes that the word "movement" provides the best construction of the term "spatial deviation" because it clearly and simply defines the claim term and does not artificially import either party's argument into the proper claim construction. Acknowledging that "spatial deviation" is not

a term defined in the specification, Wacoh notes that the inventor uses the word "displacement" in its place, and argues that displacement is an alternative way to define "spatial deviation."

The Defendants agree that "spatial deviation" and displacement as used in the '364 patent are synonymous, but they insist that the specification goes further and also describes and illustrates the manner in which the "displacement" of the working body necessarily includes movement in a vertical direction. Central to the Defendants' argument is their contention that the working body hangs like a pendulum. In the Defendants' view, this necessarily means that even in response to a force applied from a horizontal direction, the working body will move vertically upward, even if only slightly so. *See Figure 21, supra* at page 4 for example. The Defendants further posit that this vertical movement is, in fact, necessary in order to deform the strain generative body, which in turn triggers an electrical signal. The Defendants claim that if the working body did not move vertically, the invention would not work because the apparatus could not activate the piezoresistive elements. Furthermore, they reject Wacoh's construction as being overly broad, inasmuch as it would encompass rotating, twisting, and bending, none of which are contemplated by the patent specifications. Wacoh resists the Defendants' characterizations and responds by noting that the analogy to a pendulum is flawed, particularly since the figures Defendants rely upon represent but one embodiment of the claim.

The Court must reject Wacoh's construction of the term "spatial deviation." Wacoh has not adequately addressed an important distinction raised by the Defendants which affects the analysis. The Defendants' argument is focused not on the horizontal or vertical movement *sensed* by the working body (which, the Defendants note, need not include the vertical direction), but on the direction in which the working body itself *moves* when it is subjected to a force (which, the Defendants claim, will always include a vertical direction given the pendulum-like nature of the working body's structure).

Although Wacoh contends that certain of its claims clearly account for circumstances under which the sensor only detects movement in the horizontal, rather than the vertical, direction, this view is not supported by the existing record. Rather, the illustrative diagrams that appear throughout the patent (e.g., in the Abstract, at Fig. 1, Figs. 19-22, Figs. 24-25, Fig. 28, Fig. 31, Fig. 33, Figs. 45-47, Fig. 51) strongly suggest that the only embodiment reasonably contemplated by the inventor was the one featuring the pendulum design which, as the Defendant correctly argues, necessarily includes at least some quantum of vertical movement. The Court reaches this conclusion notwithstanding Wacoh's proffer of an alternate embodiment during the *Markman* hearing. In the Court's judgment, such an arrangement was not contemplated by the patent specification and claims, and inasmuch as the pendulum design appears to be central to the testing sensor, the Court believes the Defendant's proposed construction of "spatial deviation" is correct.

C. Construction of "transducer for transforming said spatial deviation into an electrical signal"

Perhaps the most hotly contested issue between the parties is the proper construction of the phrase "transducer for transforming said spatial deviation into an electrical signal." This term, like the others, appears in the portion of the claims that describes the structure of the sensor, which comprises, among other things, "a transducer for transforming said spatial deviation into an electric signal that indicates a direction and a magnitude of said force . . . ." *See*, *e.g.* '364 patent, Col. 364, 52-54. The dispute between the parties centers on whether the "transducer" transforms the spatial deviation of the working body by causing a mechanical deformation, as the Defendants argue, or through any general mechanism, as Wacoh appears to contend. The parties' proposed interpretations are as follows:

Term	Wacoh's Construction	Defendants' Construction
"transducer for transforming said spatial deviation into an electrical signal."	"Plain meaning"	"a device for transforming a mechanical deformation, which results from the spatial deviation of the working body, into an electrical signal"

Wacoh contends that the inventor has not strayed from the plain meaning of this term as understood by one of ordinary skill in the art. It argues that, fundamentally, the transducer transforms mechanical energy (namely, spatial deviation) into electric energy in the form of an electrical signal. In Wacoh's view, the meanings of "transforming" and "electrical signal" are well known terms that do not require further explication, as evidenced by both parties' use of those very words in their definitions. That said, Wacoh provides the Court with an alternative meaning based on extrinsic evidence in case it believes the term requires further construction. The company cites the 7th edition of a dictionary published in 2000 by the Institute of Electrical and Electronics Engineers for a definition of the term "transducer" as "a device for converting energy from one form to another." Thus, Wacoh posits, the resulting language in the claim would read "a device for converting energy from one form to another for transforming said spatial deviation into an electric signal . . . ." (Wacoh Opening Brief at 11).

The Defendants reject this definition inasmuch as it fails to account for the primary role that "mechanical deformation" plays in the transformation of spatial deviation into an electrical signal. They insist that one cannot read the intrinsic record and conclude otherwise, inasmuch as the specification describes the sensor as the "the basic principle of detection of acceleration" by the patented device:

When an acceleration is applied to the package, an external force is exerted on the

> weight body due to this acceleration. As a result, the weight body is subjected to displacement from a fixed position. Accordingly, the working portion connected to the weight body is also subjected to displacement from the fixed position. A mechanical strain produced by this displacement is absorbed by a mechanical deformation of the flexible portion. When there occurs a mechanical deformation in the flexible portion, the electric resistance values of the resistance elements R formed on the flexible portion vary. As a result, . . . needles of the voltage meters . . . swing. This is the basic principle of detection of acceleration by this apparatus.

'364 patent, Col. 15, lines 52-67. Moreover, the Defendants note that their proposed definition – "a device for transforming a mechanical deformation, which results from the spatial deviation of the working body, into an electrical signal -- tracks, nearly verbatim, the inventor's definition of "transducer" which appears only once in the specification in the context of describing one of the features of the sensor: ". . . a transducer is formed for transforming a mechanical deformation to an electric signal . . . . " '364 patent, Col. 9, lines 39-41. Thus, the Defendants posit, while other types of devices may generically be called transducers, the inventor acted as his own lexicographer and gave the term a special definition in the context of his invention. The Defendants point to 43 uses of the term "mechanical deformation" in the patent specification, and notes that no other type of technology for triggering the electrical signal is identified in the specification.

In response, Wacoh concedes that "transducer" is used only once in the specification, but it notes that the single usage reflected only one example of how the sensor would operate. It argues that there is no indication that the specific usage was intended to be a defining example, especially when one of ordinary skill in the art would have no confusion about the term's meaning.

However, the Defendants also proffer prosecution history to support their construction. They note that in trying to avoid prior art that existed in a parent patent application with the same specification as the '364 patent (namely, U.S. Patent No. 6,474,133 or "the '133 patent'), the inventor told the Patent Office that he intended to "limit the scope" of that invention to a testing method "for

only this type of particular sensors [sic]." Inasmuch as the specification of the '133 patent – the parent patent – is almost identical to the specification of the '364 patent, and the specification refers only to mechanical deformation sensors, the Defendants contend that the only reasonable conclusion to draw is that the inventor was referring to only a "mechanical deformation sensor."

Wacoh rejects this analogy to the '133 patent and notes that it contains a sensor structure and a testing method that are distinct from those found in the claims of the '364 patent. In terms of sensor structure, Wacoh notes that the '133 patent claims a test method that is expressly limited to a sensor that contains a "strain generative body" and a working body that is fixed to the working portion "on a lower surface of said strain generative body." Such a limitation, Wacoh claims, is never found in the '364 patent.

Similarly, Wacoh points out that in contrast to the testing method identified in the '364 patent, the '133 test method requires (1) "an XY-plane [that] extends along an upper surface of said strain generative body," and (2) "preparing a first electrode and a second electrode on the upper surface of said strain generative body, said first electrode being located on an upper surface of said flexible portion in a positive area of the X-axis and said second electrode being located on the upper surface of said flexible portion in a negative area of the X-axis." (Wacoh Opening Brief at 6-7, citing '133 patent, Col. 34, lines 38-48). Wacoh insists that those differences are dispositive, inasmuch as mechanical deformation *would be* required for the sensing portion and test method to work in the structure described in the '133 patent.

The Court accepts the Defendants' construction. First, the specification reveals, as both parties acknowledge, an express reference to transducer in the context of "mechanical deformation" at Col. 9, lines 39-41, by noting that ". . . a transducer is formed for transforming a mechanical deformation

to an electric signal . . . . " While it is critical to avoid importing an unwarranted limitation from the specification and applying it to the claims, the Court is reminded of the principle that patent claims do not stand alone and are part of a fully integrated written instrument that includes the specification. *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (observing that the specification is "the single best guide to the meaning of a disputed term."). Here, by using the specification to describe a key function of the transducer as "the transforming a mechanical deformation into an electric signal," the inventor adopted a more limited and unique definition of the term "transducer" than what might be understood by an ordinarily skilled person in the art. Wacoh's contrary argument – that this definition reflects but a single, non-defining example– is unpersuasive inasmuch as the language appears not in a preferred embodiment of the invention as Wacoh contends, but in a place where the inventor is providing an overall disclosure of the invention. The Court cannot disregard this fact.

This view is confirmed by the specification's repeated use of the term "mechanical deformation" in the Abstract, in describing the Background Art, in – as noted above – making a thorough "Disclosure of [the] Invention" (which includes repeated references to the fact that sensors are tested by transforming a mechanical deformation into an electrical signal) and in identifying the "Best Mode for Carrying Out the Invention." Together, these portions of the specification indicate that a central aspect of the invention involves a mechanical deformation of the sensor's flexible portion. The Defendants correctly note that there is nothing in the '364 specification that references or describes any type of sensor that works *without* mechanical deformation. Regrettably, Wacoh does not directly address these arguments in its response to the Defendants' Opening Markman brief.

The specifications of the '133 parent patent – with its ubiquitous references to "mechanical deformation" – provide additional instruction, as the language therein is nearly identical to the

specification language of the '364 patent. Importantly, Wacoh concedes that mechanical deformation was essential to the structure and function of the '133 patent. (Wacoh Response at 7). Thus, one can only conclude that the inventor of the '364 patent would have expressly referenced *other* methods for testing the sensor if, in fact, those methods were distinct from those identified in the '133 patent. Considered with the other intrinsic evidence, this fact provides a strong indication that "mechanical deformation" is key to the '364 patent, and that the proper construction for "transducer for transforming said spatial deviation into an electrical signal," is as the Defendants propose: "a device for transforming a mechanical deformation, which results from the spatial deviation of the working body, into an electrical signal." The Court adopts the Defendants' construction in its entirety.

D. Construction of "providing a capacitance element"

In the claims of the '364 patent, the term "providing a capacitance element" appears in the context of describing the steps for testing the sensor, "said method comprising the steps of providing a capacitance element including a deviation electrode and a fixed electrode . . . and said capacitance element being arranged so that an electrode distance of said capacitance element changes when said working body is deviated in an X-axis direction of said XYZ three-dimensional coordinate system. . . ." Col. 34, lines 55-65. The dispute between the parties centers on whether the term "providing" in the phrase "providing a capacitance element" requires construction; Wacoh claims that it is not a technical term, is not used as such, and should not be so construed. On the other hand, the Defendants maintain that "providing a capacitance element" refers to the construction or "forming" of the "capacitance element" inside the sensor. The parties' proposed definitions are as follows:

Term	Wacoh's Construction	Defendants' Construction

"Providing a capacitance element"	"Providing opposing electrodes capable of holding a charge"	"forming a capacitance element within the sensor"

For its argument, Wacoh notes that since the parties agree that "capacitance element" needs to be defined, "providing a capacitance element" should be construed as "providing a [Court's construction of capacitance element]." Again, they urge the Court to conclude that "providing" is not a technical term, and that – contrary to the Defendants' assertion – one of ordinary skill in the art would not use "forming" as a synonym for that word.

The Defendants assert that before the second step of "applying a voltage" between the deviation and fixed electrodes can occur, the method's first step requires that an additional structure not recited in the "sensor structure" portion of the claims – a capacitance element – be constructed and oriented inside the sensor. As support for their view, the Defendants observe that the specification makes reference to the need for "forming" several layers of electrodes "within the sensor," in order to test the acceleration sensors before shipping them out as products. The specification notes, "[i]n accordance with the testing method according to this invention, the sensor can be placed in the same environment where an acceleration is exerted without actually applying acceleration to the sensor. The basic principle is as follows. Initially, several electrode layers are formed at predetermined portions within the sensor." '364 patent, Col. 20, lines 62-67. The Defendants correctly note that the specification goes on to describe how the various electrode layers are "formed," and then to explain how voltage is applied to the electrode layers to generate forces that move the working body. *See generally, id.* at Col. 6, line 37 - Col. 22, line 27 ("The electrode layers are formed at respective portions as described below."; "an electrode layer El . . . is formed within the groove"; "an electrode layer E2 . . . is formed in the groove provided . . ."; "an electrode layer E3. . . is formed on the entire

side surfaces and the bottom surface of the weight body . . . " and so forth); *See also, id.* at Col. 33, lines 35-49.

Once again, the Court finds the Defendants' construction to be more persuasive in light of the intrinsic evidence. Although the term "providing" may not, indeed, be technical in nature, this does not obviate the need for construction. *See generally, Curtiss-Wright Flow Corp. v. Velan, Inc.*, 438 F.3d 1374, 1378 (Fed. Cir. 2006) (reversing district court's construction of term "adjustable" because of an over-reliance on the ordinary meaning of the term, divorced from the context of the specification). Moreover, the Court finds that, viewed in its ordinary sense, the term "provide" could take on any number of meanings (e.g. "to supply," "to make available," or "to take precautionary measures") that may or may not be appropriate if interpreted broadly and without grounding in the specific context of this technology. *See,* Miriam-Webster Online Dictionary, http://www.merriam-webster.com/dictionary/provide, last accessed November 10, 2010. The interpretation proffered by the Defendants most accurately reflects the method of testing the sensor as requiring the "formation" of electrode layers, as depicted by the specification and its accompanying figures, namely Figures 5, 6, 17, and 19. The Court thus construes the term"providing a capacitance element" to mean "forming a capacitance element within the sensor."

E. Construction of "capacitance element"

The proper meaning of "capacitance element" is another starkly contested issue between the parties. Like the phrase "providing a capacitance element," the term "capacitance element" itself first appears in the body of the claims, as the inventor describes the method for testing the sensor, "said method comprising the steps of providing a capacitance element including a deviation electrode and a fixed electrode . . . and said capacitance element being arranged so that an electrode distance of said

capacitance element changes when said working body is deviated in an X-axis direction of said XYZ three-dimensional coordinate system . . . ." Col. 34, lines 55-65. The dispute appears to be whether the capacitance element must be formed as a distinct unit inside the sensor before the test can be performed, as the Defendants contend, or whether the capacitance element need not be distinct, as Wacoh argues. The parties' proposed constructions are as follows:

Term	Wacoh's Construction	Defendants' Construction
"Capacitance element"	"opposing electrodes capable of holding a charge"	"a pair of electrodes that together operate as a capacitor, each of which is distinct from the transducer"

It is Wacoh's position that the "capacitance element" is deliberately omitted from the specification of the '364 patent, inasmuch as it is a general term well known to a person of ordinary skill in the art. The Company notes that the specification describes the function of the capacitance element by identifying opposing electrodes, in relative proximity to each other, that hold the same or an opposite charge in response to a voltage applied to the electrodes. According to Wacoh, the charge of the capacitance element produces either an attractive or repulsive "Coulomb force" that is needed to move the working body. The company points to several passages from the specification to support its view, including one that notes

> "Electrode E22 on the control unit 40 side and electrodes E23 and E24 on the semiconductor pellet side are caused to produce charges of poralities [sic] opposite to each other by means of power supply V, thus allowing an. [sic] attractive force to be exerted therebetween. On the other hand, FIG. 30b is a model view showing a method of applying a voltage for realizing the same state as the state where a force in the —Z direction is exerted on the weight body. Electrode E22 on the control member 40 and electrodes E23 and E24 on the semiconductor pellet 10 are caused to produce charges of the same polarity by means of power supply V, thus allowing a repulsive force to be exerted therebetween."

'364 patent, Col. 25, lines 40-53. That same passage goes further to explain how the fixed and

deviation electrode are given positive or negative charges. *Id.* at lines 54-67. In this manner, Wacoh believes the specification exactly tracks the function of the "capacitance element." Moreover, according to Wacoh, the inventor describes one embodiment of the capacitance by noting "In accordance with the second feature, by applying a voltage across two opposite electrode layers, a Coulomb force can be exerted." *Id.* at Col. 5, lines 47-49.

Wacoh also cites extrinsic evidence in the form of the 1984 version of the McGraw Hill Dictionary of Electrical and Electronic Engineering to support its argument. That source defines "capacitance" as "[t]he ratio of the charge on one of the conductors of a capacitor (there being an equal and opposite charge on the other conductor) to the potential difference between the conducters. Symbolized C. Formerly known as capacity." To the extent that this definition incorporates the concept of opposing electrodes holding a charge, Wacoh argues that it supports its proposed construction.[7] Wacoh resists any interpretation which requires that the opposing electrodes that form the capacitance element be distinct from the transducer. The company notes that neither the specification nor the claims support such a view, and argues that the scope of the patent is not controlled by the inventor's use of such sensors solely for illustrative purposes.

The Defendants urge the Court to arrive at a definition of "capacitance element" that emphasizes it as a separate structure from the transducer. As noted above, they construe it as "a pair of electrodes that together operate as a capacitor, each of which is distinct from the transducer." The Defendants note that the claim language makes it clear that the capacitance element is only used during the test of the sensor to move the "working body," while the "transducer" is the element that

[7]The Defendants also implicitly rely on this definition for giving meaning to the term "capacitor." (Defendants' Responsive Brief at 12-13).

"transforms" the resulting spatial deviation of the working body into an electric signal. '364 patent, Col. 34, line 52 - Col. 35, line 5. They further argue that since references to the transducer appear in the "sensor structure" portion of the claims, instead of the area outlining the "test method," which describes the "capacitance element," the two different elements *must* perform two entirely different functions, and as such, must necessarily be distinct from one another.

This conclusion, the Defendants posit, is supported by the specification, which - on the one hand – describes the "capacitance element" as the electrode layers that generate electrostatic forces to move the working body during, and – in a separate fashion – describes the transducer as the piezoresistive / resistance elements used to detect this movement (by transforming the resulting mechanical deformation into an electrical signal).

Wacoh notes that it provided examples wherein the capacitance element and the transducer were separate merely for the sake of clarity and easy identification in the drawings accompanying the patent, not to limit the scope of the invention to a structure where these two items are separate. These arguments are unavailing, however, in light of the fact that each claim of the '364 patent describes the two features separately, assigning them very different functions. As indicated above, "transducer for transforming said spatial deviation into an electrical signal" appears in the portion of the claims that describes the structure of the sensor and outlines its ability to detect the working body's movement. By contrast, the "capacitance element" is clearly a part of the claims that identify a method for testing the sensor through the creation of a spatial deviation of the working body.[8] Inasmuch as the claim lists these two elements separately, the Court finds that those elements are distinct components of the '364

[8] As the Defendants note, this distinction is only reinforced by the patent's illustrations.

patent and must be so construed. Accordingly, the Court adopts a variation of the Defendants' proposal and defines "capacitance element" as "a pair of electrodes that together operate as a capacitor that is distinct from the transducer." For guidance on the meaning of the word "capacitor," the Court accepts the parties' mutual reliance on the McGraw-Hill Dictionary of Electrical and Electronic Engineering, as referenced, *supra*.

F. Construction of "deviation electrode" and "fixed electrode"

The parties disagree about the correct meaning of the terms "deviation electrode" and "fixed electrode," both of which appear in the portion of the claims describing the method for testing the sensor. Specifically, they are referenced as components of the capacitance element:

> "A method of testing a sensor, . . . said method comprising the steps of: providing a capacitance element including a deviation electrode and a fixed electrode, said deviation electrode being located at a position which deviates along with said working body and said fixed electrode being fixed to said substrate so as to face said deviation electrode, and said capacitance element being arranged so that an electrode distance of said capacitance element changes when said working body is deviated in an X-axis direction of said XYZ three-dimensional coordinate system;."

'364 patent, Col. 34, lines 40, 55-65. They are also the structures between which a voltage is applied to the sensor as part of the testing method: ". . . said method comprising the steps of: . . . applying a voltage between said deviation electrode and said fixed electrode so that Coulomb force is produced which causes spatial deviation of said working body in said X-axis direction; . . . ." *Id.* at lines 66-67 - Col. 35, lines 1-2. The parties agree that these two devices are movable (for the deviation electrode) and/or fixed (for the fixed electrode) and made of a conductive material. Nevertheless, they sharply contest whether the electrodes must be discrete and distinct from the "working body," as the Defendants' contend, or whether this is too narrow an interpretation of the invention, as Wacoh maintains. The parties' proposed constructions are as follows:

Term	Wacoh's Construction	Defendants' Construction
"Deviation electrode"	"Plain meaning"	"A discrete movable structure made of conductive material that is distinct from the working body"
"Fixed electrode"	"Plain meaning"	"A discrete fixed structure made of conductive material that is distinct from the substrate"

Wacoh urges the Court to give these terms their plain meaning. Wacoh defines "deviation electrode" as the capacitance electrode that "moves with the body that moves," as reflected by the claim language quoted above that notes ". . . said deviation electrode being located at a position which deviates along with said working body . . . ." Noting that deviation means movement, Wacoh concludes that the deviation electrode is the moving electrode. It thus resists the Defendants' attempt to impose any additional limitations and observes that the words "distinct" and "discrete" do not appear anywhere in the '364 patent. More specifically, Wacoh argues that the specification contemplates various embodiments and thus accounts for sensors where the deviation electrode is not necessarily distinct from the working body, as argued by the Defendants.

As for the "fixed electrode," Wacoh construes this term as the capacitance electrode that does not move with the body that moves. The company notes that by having one electrode that is fixed, the invention allows for the working body to move along with the deviation electrode (either away from or toward the fixed electrode) in relation to the sensor body. The sensor is aware of this change and simulates an acceleration or other force, causing a Coulomb force to be applied between the two electrodes. The company's only dispute with the Defendants is whether the fixed electrode is discrete from the working body. It opposes a construction where the single embodiment is held to be a limit

of the broader claim language, for in its view, "nothing in the drawings or the written description requires that they be separate." (Wacoh Opening Brief at 16).

The Defendants counter by reminding the Court that each claim refers to the deviation electrode and working body as separate structural elements, specifically reciting that the "deviation electrode . . . deviates along with said working body" and that the "fixed electrode" is being "fixed to said substrate." (Defendants' Responsive Brief at 15). The Defendants note that by describing the electrodes in this fashion, the claims mandate that they be construed as distinct, for an object can neither deviate "along with" itself (in the case of the deviation electrode) nor be "fixed to" itself (in the case of the fixed electrode). Further, the Defendants note that the figures accompanying the patent specification indicate that the deviation electrode is "formed on" the bottom surface of the working body while the fixed electrodes are "formed . . . on" the top surface of the substrate. Wacoh, in response, characterizes the Defendants' proposed construction as neither educational nor helpful, and as an argument mired in semantics.

The Court, upon reviewing the intrinsic record, must reject the Defendants' insertion of the terms "discrete" and "distinct" into the definitions of these terms. The language of the claim makes clear that the deviation electrode "moves "along with" the working body; the same is equally clear from reading the context surrounding the fixed electrode, which is "fixed to said substrate." Moreover, the Defendants' proffered terms do not derive from the language of the claims or the specification itself. In the Court's view, the limitations suggested by the Defendants find no persuasive basis in the intrinsic record, and as such, must be rejected. Accordingly, the Court defines "deviation electrode" as "a movable structure made of conductive material" and "fixed electrode" as "a fixed structure made of conductive material."

G. Construction of "Coulomb force"

The final term to be construed involves the definition of "Coulomb force." The term is used in the portion of the claims that set forth the testing method for the sensor, which involves "applying a voltage between said deviation electrode and said fixed electrode so that Coulomb force is produced which causes spatial deviation of said working body in said X-axis direction; . . . ." '364 patent, Col. 64 lines 66-67 - Col. 35, lines 1-2. "Coulomb force" is also referenced in the Abstract ("By exerting a coulomb force between both the portions, the test of the sensor is carried out") and in assorted places throughout the specification. The parties agree that a Coulomb force is an electrostatic force of attraction or repulsion. Their point of disagreement is whether the inventor acted as his own lexicographer by further defining the terms in the specific context of this invention, namely (as suggested by the Defendants) "an attractive force when the voltages applied to these two electrodes are of opposite polarities," and "a repulsive force when these voltages are of the same polarity." Wacoh, naturally, argues that the definition is not so limited. The proposed constructions appear here:

Term	Wacoh's Construction	Defendants' Construction
"Coulomb force"	"A force of attraction or repulsion caused by charged electrodes"	"an attractive force when a voltage applied to the deviation electrode and a voltage applied to the fixed electrode are of opposite polarities and a repulsive force when a voltage applied to the deviation electrode and a voltage applied to the fixed electrode are of the same polarity"

Wacoh's definition, as the Defendants agree, incorporates a commonly used scientific definition of a physical concept, namely the force of attraction or repulsion that results when charged

electrodes are in relatively close proximity to each other. The Defendants, as noted, do not object to this portion of Wacoh's construction. Wacoh characterizes the Defendants' proposal as unnecessarily long and burdensome and notes that the term is so commonly understood in the art that the inventor did not expressly define it using his own lexicography. The company culls several examples from the specification to indicate that the inventor used a simple straightforward meaning of the term, consistent with its plain definition.

However, according to the Defendants, a particular reference in the specification limits the scope of the definition. Specifically, the Defendants point to language indicating that

> When voltages are applied to electrodes opposite in this way, respectively, coulomb forces are exerted between the respective both [sic] electrode layers. Namely, when voltages of the same polarity are applied to the both [sic] electrode layers, a repulsive force is exerted, while when voltages of different polarities are applied thereto, an attractive force is exerted.

'364 patent, Col. 21, lines 43-49. They reference similar usage earlier in the specification when the inventor observes that "[i]n addition, by selecting the polarity of an applied voltage, the coulomb force can be exerted as either a repulsive force or an attractive force." *Id.* at Col. 5, lines 50-52; Col. 6, lines 9-19. The Defendants argue that by assigning a special definition to the term Coulomb force, the inventor acted as his own lexicographer and limited the meaning of the term.

The Defendants' proposal is unpersuasive, however, as it is clear that the main portion of the specification cited by the Defendants (from Col. 21) refers to a particular embodiment of the invention. The Court does not believe that this reflects an intent to make this particular usage a defining example. And, to the extent that the parties agree that a Coulomb force is a technical term with a well known ordinary meaning in the art, the Court is not convinced that the proposed limitation is warranted. Accordingly, the Court construes the word Coulomb force to mean "a force of attraction

or repulsion caused by charged electrodes."

IV.

For the reasons stated above, the Court construes the disputed terms in claims 1, 3, 4, 5 and 6 as follows:

(1) The phrase "working body" means "a structure that transmits the received force to the working portion."

(2) The term "spatial deviation" refers to "movement that includes a vertical direction."

(3) The term "transducer for transforming said spatial deviation into an electrical signal," means "a device for transforming a mechanical deformation, which results from the spatial deviation of the working body, into an electrical signal."

(4) The term"providing a capacitance element" means "forming a capacitance element within the sensor."

(5) The term "capacitance element" means "a pair of electrodes that together operate as a capacitor that is distinct from the transducer."

(6) The term "deviation electrode" means "a movable structure made of conductive material."

(7) The term "fixed electrode" means "a fixed structure made of conductive material."

(8) The term "Coulomb force" means "a force of attraction or repulsion caused by charged electrodes."

Moreover, the Defendants' motion to file an opening claim construction brief in excess of twenty pages (Docket Entry No. 94) is granted.

IT IS SO ORDERED.

Dated: April 5, 2011
Detroit, Michigan

s/Julian Abele Cook, Jr.
JULIAN ABELE COOK, JR.
United States District Court Judge

CERTIFICATE OF SERVICE

The undersigned certifies that the foregoing Order was served upon counsel of record via the Court's ECF System to their respective email addresses or First Class U.S. mail to the non-ECF participants on April 5, 2011.

s/ Kay Doaks
Case Manager