IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF DELAWARE

HONEYWELL INTERNATIONAL INC. and HONEYWELL INTELLECTUAL PROPERTIES INC., Plaintiffs.	)	
v.	)	C. A. No. 03-242-MPT
UNIVERSAL AVIONICS SYSTEMS CORP. and SANDEL AVIONICS, INC., Defendants.	)	

MEMORANDUM OPINION

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Wilmington, Delaware
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Thynge, U.S. Magistrate Judge

I. INTRODUCTION

This is a patent infringement case. On March 3, 2003, Honeywell International Inc. and Honeywell Intellectual Properties Inc. (collectively "Honeywell")[1] filed suit alleging infringement of its U.S. Patent No. 4,914,436 ("the '436 patent") by certain products of Universal Avionics Systems Corp. ("Universal")[2] and Sandel Avionics Inc. ("Sandel") (collectively "defendants").[3] This court has jurisdiction over the subject matter of this action pursuant to 28 U.S.C. §§ 1331 and 1338(a). This court has personal jurisdiction over defendants because defendants are incorporated in Delaware and/or have been doing business in Delaware. Venue is proper in this judicial district pursuant to 28 U.S.C. § 1400(b). On March 24, 2003, Sandel filed its answer and counterclaims[4] denying Honeywell's allegations and seeking a declaratory judgment of invalidity, noninfringement and unenforceability of the '436 patent. On April 1, 2003, Universal filed its answer and counterclaims[5] also denying Honeywell's allegations and seeking a declaratory judgment of invalidity and noninfringement. On April 14 and April 21, 2003, Honeywell filed its answers to Sandel's and Universal's respective counterclaims.[6] On July 26, 2004, Universal filed a Motion for Summary Judgment of Non-Infringement.[7] On August 2, 2004, Sandel also filed a Motion for Summary Judgment of Non-

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[1] Honeywell International Inc. is a Delaware corporation with its principal place of business in New Jersey. Honeywell Intellectual Properties Inc. is an Arizona corporation with its principal place of business in Arizona.

[2] Universal is an Arizona corporation with a place of business in Delaware.

[3] Sandel is a Delaware corporation with a place of business in California.

[4] D.I. 7.

[5] D.I. 8.

[6] D.I. 26; D.I. 27.

[7] D.I. 91.

Infringement.[8] The parties submitted a Joint Submission of Claim Construction of U.S. Patent No. 4,914,436 on June 29, 2004.[9] The parties submitted briefing on defendants' motions for summary judgment of non-infringement which include the parties' respective proposed definitions of the disputed claim terms relevant to those motions.[10] Pursuant to *Markman v. Westview Instruments, Inc.*[11] and local practice, oral argument was held on November 9, 2005 on the parties' proposed claim constructions and motions for summary judgment. This opinion sets forth the court's construction of the disputed claim terms and the court's determination with regard to defendants' motions for summary judgment.

II. BACKGROUND

A. The Patented Invention

The '436 patent, entitled "Ground Proximity Approach Warning System Without Landing Flap Input," which, as described by Honeywell, discloses and claims:

> A system that determines whether and what modes of a ground proximity warning system should be in effect when an aircraft comes within a specified distance of an airport for landing. . . . The system does so by determining the aircraft's distance from an airport and its alignment with a runway, and enables a warning system as a function of the distance of the aircraft from the airport.[12]

Claims 1, 2, 4, and 5 of the '436 patent are at issue. **Claim 1** reads as follows

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[8] D.I. 94.

[9] D.I. 90.

[10] D.I. 91 (Universal's Opening Brief in Support of its Motion for Summary Judgment of Non-Infringement); D.I. 94 (Sandel's Motion for Summary Judgment of Non-Infringement); D.I. 98 (Plaintiff Honeywell's Response to Defendant Universal's Motion for Summary Judgment of Non-Infringement); D.I. 102 (Honeywell's Response to Defendant Sandel's Motion for Summary Judgment of Non-Infringement); D.I. 104 (Universal's Reply Memorandum in Support of its Motion for Summary Judgment of Non-Infringement); D.I. 106 (Sandel Avionics' Reply in Support of its Motion for Summary Judgment of Non-Infringement).

[11] 517 U.S. 370 (1996).

[12] D.I. 98 at 4.

(with the disputed claim terms in bold):

> 1. A system for use in an aircraft for providing an enabling envelope for a **ground proximity warning system** for an aircraft comprising:
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> a first source of signals representative of the longitude and latitude of an airport;
>
> a second source of signals representative of the current longitude and latitude of said aircraft;
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> means responsive to said first source of signals representative of the longitude and latitude of said airport and said second source of signals representative of the current longitude and latitude of said aircraft for computing the distance of said aircraft from said airport and providing an **enabling envelope** for enabling the **warning system** as a function of said distance of the aircraft with respect to said airport;
>
> a source of signals representative of the relative angular position of a particular runway with respect to the **heading** of the aircraft; and
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> means responsive to said first and second sources of signals for providing a signal representative of the **alignment** of the aircraft with the runway by determining the angle between the runway and the heading of the aircraft.

Claim 2 of the ‘436 patent reads as follows (with the disputed claim terms in bold):

> 2. A **warning system** for use in an aircraft comprising:
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> warning means for providing a ground proximity warning according to predetermined criteria;
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> a first source of signals representative of the longitude and latitude of an aircraft;
>
> a second source of signals representative of the longitude and latitude of a predetermined geometric shape;
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> means responsive to said first source of signals and said second source of signals for computing the distance between the aircraft and said predetermined geometric shape and for enabling the warning means as a function of the difference;
>
> a third source of signals representative of the relative angular position of a particular runway with respect to the **heading** of the aircraft; and

means responsive to said first, second and third sources of signals for providing a signal representative of the **alignment** of the aircraft with the runway.

Claim 4 of the ‘436 patent reads as follows (with the disputed claim terms in bold):

4. A system for an aircraft comprising:

warning means for providing a ground proximity warning when an aircraft encounters a hazardous flight condition;

enabling means for enabling said warning means according to predetermined criteria;

a first source of signals representative of the relative angular position of a predetermined runway at an airport nearest the aircraft with respect to the **heading** of the aircraft;

a second source of signals representative of the longitude and latitude of the aircraft;

a third source of signals representative of the longitude and latitude of the airport nearest the aircraft; and

determining means responsive to said first source of signals, said second source of signals and said third source of signals for determining the aircraft's alignment with respect to said predetermined runway and altering said criteria for said enabling means as a function of the **alignment** of the aircraft with respect to said predetermined runway.

Claim 5 of the ‘436 patent reads as follows (with the disputed claim terms in bold):

5. A system for an aircraft comprising:

a first source of signals representative of the longitude and latitude of an aircraft;

a second source of signals representative of the predetermined airport as modeled by a predetermined geometric shape;

a third source of signals representative of the relative angular position of a predetermined runway at said predetermined airport with respect to the **heading** of the aircraft;

means responsive to said first source of signals, said second source of signals, and said third source of signals for providing a distance signal

representative of the distance between the aircraft and the nearest airport as modeled by said predetermined geometric shape and the **alignment** of the aircraft with said predetermined runway;

warning means for providing a warning when an aircraft encounters a hazardous flight condition;

enabling means responsive to said distance signal providing means for generating an enabling signal for **enabling** said warning means at a predetermined distance from said airport;

first altering means for altering said enabling signal as a function of the distance of the aircraft from said nearest airport;

a third source of signals representative of the **heading** of a predetermined runway at said nearest airport; and

second altering means for altering said enabling signal as a function of the alignment of the aircraft with said runway.

The parties have stipulated that the meaning of the of the following terms and phrases of the asserted claims are disputed:

1. "ground proximity warning system"; "warning system"

2. "heading"

3. "alignment"

4. "enabling"

5. "enabling envelope"

The court will construe each of these claim terms in turn.[13]

[13] Although several additional terms were including in the parties' Joint Submission of Claim Construction, *see* D.I. 90, at oral argument, the parties represented to the court that the *only* claim terms which remained in dispute, and required the court's interpretation, are the five terms recited above. *See* D.I. 127 at 13, 152.

III. THE LAW OF PATENT CLAIM CONSTRUCTION

"A patent infringement analysis involves two steps: claim construction and application of the properly construed claim to the accused product."[14] The patent claims define the scope of the rights afforded to the patentee under the patent, and the interpretation and construction of those claims is a matter of law to be determined by the court.[15]

When construing the claims, the court may consider "both intrinsic evidence (*e.g.,* the patent specification and file history) and extrinsic evidence (*e.g.,* expert testimony)."[16] The court must first examine "the intrinsic evidence of the record, *i.e.,* the patent itself, including the claims, the specification and, if in evidence, the prosecution history."[17]

The starting point for the court's examination is the language of the disputed claim.

> In construing claims, the analytical focus must begin and remain centered on the language of the claims themselves . . . . The terms used in the claims bear a "heavy presumption" that they mean what they say and have the ordinary meaning that would be attributed to those words by persons skilled in the relevant art. . . . [U]nless compelled otherwise, a court will give a claim term the full range of its ordinary meaning as understood by persons skilled in the relevant art. . . . Dictionaries, encyclopedias and treatises, publicly available at the time the patent is issued, are objective resources that serve as reliable sources of information on the established meanings that would have been attributed to the terms of the claims by those of skill in the art. . . . As resources and references to inform and aid courts and judges in the understanding of technology and terminology, it is entirely proper for both trial and appellate

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[14] *KCJ Corp. v. Kinetic Concepts, Inc.*, 223 F.3d 1351, 1355 (Fed. Cir. 2000).
[15] *Markman v. Westview Instruments, Inc.,* 52 F.3d 967, 970-71 (Fed. Cir. 1995).
[16] *Vitronics Corp. v. Conceptronic, Inc.,* 90 F.3d 1576, 1582 (Fed. Cir.1996).
[17] *Id.*

> judges to consult these materials at any stage of a litigation, regardless of whether they have been offered by a party in evidence or not. Thus, categorizing them as 'extrinsic evidence' or even a 'special form of extrinsic evidence' is misplaced and does not inform the analysis.[18]

After consulting relevant dictionaries to determine the ordinary meaning of disputed terms, the intrinsic record must always be analyzed "to determine whether the presumption of ordinary and customary meaning is rebutted . . . [such as when] the specification uses the words in a manner clearly inconsistent with the ordinary meaning reflected, for example, in a dictionary definition. In such a case, the inconsistent dictionary definition must be rejected."[19]

Only if there is still ambiguity as to the meaning of a claim after reviewing the intrinsic evidence should a court consider extrinsic evidence, such as expert or inventor testimony.[20] If the court does find it necessary to consider extrinsic evidence, however, that evidence may never be used "for the purpose of varying or contradicting the terms in the claims."[21]

IV. THE COURT'S CLAIM CONSTRUCTION

A. Ground Proximity Warning System; Warning System

1. Parties' Positions

Although listed as separately-disputed claim terms, the parties propose similar

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[18] *Texas Digital Sys., Inc. v. Telegenix, Inc.*, 308 F.3d 1193, 1201-03 (Fed. Cir. 2002) (internal citations and quotation omitted).

[19] *Id.* at 1204.

[20] *Vitronics,* 90 F.3d at 1584; *see also id.* at 1583 ("In most situations, an analysis of the intrinsic evidence alone will resolve any ambiguity in a disputed claim term. In such circumstances, it is improper to rely on extrinsic evidence."); *Bell & Howell Document Management Prods. Co. v. Alteck Sys.,* 132 F.2d 701, 706 (Fed. Cir. 1997) (Relying on extrinsic evidence to construe a claim is "proper only when the claim language remains genuinely ambiguous after consideration of the intrinsic evidence.").

[21] *Markman*, 52 F.3d at 981.

constructions for "ground proximity warning system" and "warning system."[22] Honeywell argues that the specification supports a construction of these terms as "a system that serves to monitor the flight conditions of an aircraft and provide a warning if flight conditions are such that an inadvertent contact with the ground is imminent."[23]

Defendants argue that these terms "should be construed as reciting the prior art ground proximity warning system (GPWS) modes"[24] referenced in the '436 patent. They argue that, at least as to Claim 1, the warning system is recited in a means-plus-function format and, therefore, that claim is limited to the warning modes described in the specification. Defendants argue further that the understanding of one skilled in the art, the specification, and the prosecution history support their proposed construction.

2. Court's Construction

The parties argue for a common construction for each of the terms "ground proximity warning system" and "warning system."[25] The dispute regarding the warning system limitations centers on whether or not the those limitations cover only the particular prior art ground proximity warning systems recited in the '436 patent. Each party points to the '436 patent specification as supporting their respective constructions.

Defendants' first argument is based upon their assertion that the warning system limitations of claim 1 are written in a means-plus-function format. Claims written in a

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[22] *See* D.I. 90 at 1, 2-3. Throughout this opinion, the court refers to the prior art ground proximity warning systems or modes as "GPWS." The court refers to the warning systems claimed in the '436 patent as "ground proximity warning system," "warning system," or "the warning system limitations."

[23] D.I. 90 at 1.

[24] *Id.*

[25] *See, e.g.*, *id.* ("'Ground proximity warning system' should be construed as reciting the prior art ground proximity warning system (GPWS) modes."); *id.* at 2 ("'Warning system' should be construed as reciting the prior art ground proximity warning system (GPWS) modes.").

means-plus-function format are limited to those structures recited in the specification and their equivalents.[26] Defendants contend that "the warning system of Limitation 3 [of claim 1] is described in mean-plus-function format. It is therefore limited to the precise GPWS modes disclosed in the specification, *i.e*, Mode 2 (Terrain Closure) and Mode 4 (Terrain Clearance)."[27]

The relevant language of claim 1 is as follows:

> 1. A system for use in an aircraft for providing an enabling envelope for a ground proximity warning system for an aircraft comprising:
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> * * *
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> means responsive to said first source of signals representative of the longitude and latitude of said airport and said second source of signals representative of the current longitude and latitude of said aircraft for computing the distance of said aircraft from said airport and providing an enabling envelope for enabling the warning system as a function of said distance of the aircraft with respect to said airport; . . . .[28]

The language "means . . . for computing the distance of said aircraft from said airport and providing an enabling envelope for enabling the warning system as a function of said distance of the aircraft with respect to said airport" is not written in a means-plus-function format with respect to the term "warning system." In that limitation, "*the* warning system" refers back to "*a* ground proximity warning system" recited in the preamble to claim 1. The means-plus-function format is directed at a "means . . . for . . . computing the distance of said aircraft from said airport and providing an enabling

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[26] *See* 35 U.S.C. § 112 ¶ 6 ("An element in a claim for a combination may be expressed as a means or step for preforming a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof."); *J&M Corp. v. Harley-Davidson, Inc.*, 269 F.3d 1360, 1367 (Fed. Cir. 2001); *Johnston v. IVAC Corp.*, 885 F.2d 1574, 1580 (Fed. Cir. 1989).

[27] D.I. 91 at 13.

[28] '436 patent, cl. 1 (emphasis added).

envelope . . . ."[29] Because "the warning system" recited in claim 1 is not written in a means-plus-function format, defendants must point to language in the specification or prosecution history to support their proposed construction.

The '436 patent recites that the invention described therein "generally relates to a system for enabling an aircraft ground proximity warning system . . . ."[30] Describing the prior art, the specification states that:

> Various systems are known that provide warning or advisory indications in the event of hazardous flight conditions. Among such systems are systems generally known as ground proximity warning systems for aircraft that serve to monitor the flight conditions of an aircraft and provide a warning if flight conditions are such that an inadvertent contact with the ground is imminent.[31]

The specification continues with a recitation of examples of prior art warning systems.[32] The parties each cite this language in support of their respective positions. Defendants argue that that language demonstrates that the invention is limited to the referenced prior art GPWS. Honeywell argues that the above-quoted language does not limit the invention to the prior art, but merely defines "ground proximity warning systems" as systems "that serve to monitor the flight conditions of an aircraft and provide a warning if flight conditions are such that an inadvertent contact with the ground is imminent."

Contrary to defendants' position, the patent clearly states that the prior art

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[29] Universal acknowledges that "'warning system' refers to the . . . ground proximity warning system introduced by the preamble." D.I. 91 at 13.

[30] '436 patent, 1:8-9.

[31] '436 patent, 1:15-22.

[32] *See* '436 patent, 1:29-34.

warning systems recited in the specification are merely *examples* of such systems.[33] Thus, even if defendants are correct that those of ordinary skill in the art at the time of the invention would have understood the warning system limitations to refer to the prior art GPWS, the court determines that '436 patent's definition of the warning systems, recited above, controls the construction of that phrase.[34]

Furthermore, and also in contradiction of defendants' position that the specification limits the invention "to the two warning modes described in the specification, i.e., Mode 2 . . . and Mode 4," the '436 patent repeatedly disclaims limitation to particular warning systems. The specification states that, "[an] object of the present invention [is] to provide a warning system that overcomes many of the disadvantages of the prior art systems."[35] "[A]nother object of the invention is to provide an enabling envelope for enabling *various* warning systems . . . ."[36] The preferred embodiment of the '436 patent discloses a system "for generating an enabling envelope

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[33] *See* '436 patent, 1:29-34 ("Typical *examples* of such systems are disclosed in U.S. Pat. Nos. 3,715,718; 3,936,796; 3,958,218; 3,944,968; 3,947,808; 3,947,810; 3,934,221; 3,958,219; 3,925,751; 3,934,222; 4,060,793; 4,030,065; 4,215,334; 4,319,218, all assigned to the same assignee as the assignee of the present invention." (emphasis added)).

[34] *See Vitronics ,* 90 F.3d at 1582 ("The specification acts as a dictionary when it expressly defines terms used in the claims or when it defines terms by implication."); *Renishaw PLC v. Marposs Societa' Per Azioni*, 158 F.3d 1243, 1249 (Fed. Cir. 1998) (Where patent applicant has acted as a lexicographer "the definition selected by the patent applicant controls."). The court notes that Honeywell disputes defendants' contention that one skilled in the art would have understood "ground proximity warning system" to refer only to the prior art GPWS. *See* D.I. 98 at 23-24; D.I. 127 at 201 (Transcript of November 9, 2004 oral argument on claim construction and defendants' motions for summary judgment of non-infringement). Each party offers only extrinsic expert testimony as to the understanding of one skilled in the art. The court determines, however, that it need not rely on the parties' extrinsic evidence to construe the warning system limitations as the intrinsic evidence clearly defines this claim term. *See Bell & Howell Document Management Prods. Co. v. Alteck Sys.,* 132 F.2d 701, 706 (Fed. Cir. 1997) (Relying on extrinsic evidence to construe a claim is "proper only when the claim language remains genuinely ambiguous after consideration of the intrinsic evidence."); *Vitronics,* 90 F.3d at 1584 ("In most situations, an analysis of the intrinsic evidence alone will resolve any ambiguity in a disputed claim term. In such circumstances, it is improper to rely on extrinsic evidence.").

[35] '436 patent, 1:64-66.

[36] '436 patent, 2:7-8 (emphasis added).

for enabling *various warning systems* when an aircraft is on final approach to an airport."[37]

The specification goes on to recite that "various ground proximity warning system, *such as*, Mode 2 and Mode 4 warning systems, can be enabled."[38] Defendants argue that:

> [a]lthough Honeywell asserts that a reference to 'additional modes' in the specification requires a broader construction that includes the enabling of warning systems other than GPWS, there is no support for that contention in the patent or the file history. The specific passage Honeywell relies upon refers to "other *modes*" (i.e. GPWS modes 1, 3 and 5) and not other types of warning systems.[39]

As noted above, the specification recites that the invention enables "various warning systems." While figure 3 of the '436 patent is described as "illustrat[ing] an enabling envelope for a Mode 2 (Terrain Closure) warning system,"[40] the specification states that "[t]he Mode 2 warning envelope is shown *as an example only*. The system in accordance with the present invention may also be used to enable *other warning modes* and even used in control systems."[41]

There is nothing in the '436 patents' claim language that indicates a limitation to particular prior art GPWS modes. The specification provides a general definition of warning systems as those systems "that serve to monitor the flight conditions of an aircraft and provide a warning if flight conditions are such that the inadvertent contact with the ground is imminent."[42] An object of the invention is "to provide an enabling

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[37] '436 patent, 2:12-14 (emphasis added).
[38] '436 patent, 3:40-42 (emphasis added).
[39] D.I. 94 at 19 (emphasis in original).
[40] '436 patent, 3:18-19.
[41] '436 patent, 3:43-46 (emphasis added).
[42] '436 patent, 1:19-22.

envelope for enabling *various* warning systems . . . ."[43] The unambiguous language of the specification, therefore, supports Honeywell's argument that the patentees did not limit their invention to particular prior art warning systems or modes.

Moreover, defendants' argument that the '436 patent should be construed as limited "to the two warning modes described in the specification" would require the court to limit the patent to the preferred embodiment described therein. Contrary to defendants' position, the specification states that signals generated by the invention "may be used with *various ground proximity warning systems* . . . ."[44] Although the specification describes "input to a Mode 2 . . . and a Mode 4 . . . warning system,"[45] the very next sentence reiterates that "the invention is *not limited to such use*. The system . . . *can be used in virtually any warning or control system* where such a signal is required."[46] Reading a preferred embodiment limitation into the claims, here Mode 2 and Mode 4 warning systems, is generally improper and would certainly be so here in light of the plain language of the specification.[47]

Defendants also refer the court to the prosecution history as supporting their proposed construction of the warning system limitations. Defendants contend that the patentee narrowed the scope of the invention to prior art GPWS and that Honeywell can

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[43] '436 patent, 2:7-8.

[44] '436 patent, 5:34-35 (emphasis added).

[45] '436 patent, 5:38-40.

[46] '436 patent, 5:40-45 (emphasis added). This quotation flatly contradicts Universal's contention that the specification "does [not] suggest that the technology could be used with different types of alerting systems to the extent that they existed . . . during the operative time frame." D.I. 104 at 7.

[47] *See Amgen Inc. v. Hoechst Marion Roussel, Inc.*, 314 F.3d 1313, 1325 (Fed. Cir. 2003) ("[C]ourts must take extreme care when ascertaining the proper scope of the claims, lest they simultaneously import into the claims limitations that were unintended by the patentee."); *Leggett & Platt, Inv. v. Hickory Springs Manufacturing Co.*, 285 F.3d 1353, 1357 (Fed. Cir. 2002) ("In consulting the specification, . . . the interpretative process may not import limitations from the specification into the defining language of the claims.").

not now argue that the '436 patent covers art previously disclaimed during prosecution. Each defendant, however, cites different portions of the prosecution history to support this argument.

Universal argues that as a consequence of the '436 patent applicants' amendment of application claim 12 to include the words "ground proximity" before existing the application limitation of "a warning system" recited in that claim, "Honeywell should be estopped from asserting that the ground proximity warning system could be construed generically to cover other types of warning systems."[48]

As originally filed, application claim 12 read, in the relevant part,

> A system for use in an aircraft for providing an enabling envelope for a warning system comprising:
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> * * *
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> means . . . for providing an enabling envelope for enabling a warning system as a function of the relative position of the aircraft with respect to the reference point.[49]

In the first Office Action, the examiner rejected application claim 12 under 35 U.S.C. § 112, second paragraph, because "it is unclear what a warning system is used for."[50] The applicants amended the claim to recite:

> A system for use in an aircraft for providing an enabling envelope for a ground proximity warning system for an aircraft comprising:
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> means . . . for computing the distance of said aircraft from said reference point and providing an enabling envelope for enabling [a] the warning

[48] D.I. 104 at 7.
[49] D.I. 99 at B-18-B-19 (April 6, 1987 Patent Application Serial No. 07/035,112 at 15-16).
[50] *Id.* at B-36 (February 25, 1988 Office Action).

system as a function of the said distance [relative position] of the aircraft with respect to [the] said reference point."[51]

The examiner's rejection did not require, or suggest, that the applicants specify a particular warning system, and the amendment indicated no such limitation. The amendment answered the examiner's question as to what the warning system was used for by reciting that it was a "ground proximity warning system *for an aircraft*." Consequently, the court rejects Universal's argument that the prosecution history limits the '436 patent to covering only prior art GPWS.

Sandel points to a different portion of the prosecution history to support its argument that the warning system limitations should be limited to those prior art GPWS described in the specification. Sandel notes that in a February 25, 1988 Office Action, the examiner rejected twenty of the application's twenty-six claims as obvious over Bateman[52] in view of a 1987 Parnau article entitled "IFR Flight with the New Lorans."[53] Sandel contends that the applicants' amendment in response to that rejection supports its proposed construction of the warning system limitations.

The examiner stated that "Parnau discloses that a Loran, which utilizes latitude/longitude coordinates, can give a warning when an aircraft nears restricted airspace . . . based on how far the aircraft is from the [restricted airspace]."[54] The Parnau system, combined with the invention described in the Bateman patent, led the examiner to reject most of the application claims as obvious. In an August 29, 1988

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[51] *Id.* at B-62 (August 29, 1988 Amendment) (underlining indicating language added; bracketing indicating language deleted).

[52] U.S. Patent No. 4,567,483.

[53] *See* D.I. 99 at B-38-B-39 (February 25, 1988 Office Action at 5-6).

[54] *Id.* at B-38 (February 25, 1988 Office Action at 5).

Amendment, the applicants responded to the examiner's obviousness rejection by arguing that:

> [t]he warning system discussed in the Parnau article relates to a LORAN SYSTEM having a restrictive air space warning . . . . Such a warning is a geographical warning and is based solely on longitude and latitude coordinates. However, it does not suggest in any way how a LORAN system could be used to vary a ground proximity warning system. . . . [The system described in the Parnau article] can only provide longitude and latitude coordinates. There is no suggestion in the Parnau article how such information would be used to vary a warning envelope or enable a warning envelope other than a geographic warning such as a ground proximity warning system as recited in the claims at issue.[55]

In a December 6, 1988 Office Action, the examiner again rejected seventeen of the application claims, this time, as obvious over Nolan[56] in view of Parnau.[57] The examiner stated that "Parnau teaches that it is known in the art to give a warning when an aircraft is within a predetermined distance to a TCA or restricted area."[58] In a March 20, 1989 Amendment, the patent applicants again distinguished Parnau, responding that:

> the Parnau reference relies on distance as an operative warning parameter. Specifically, Parnau discloses . . a restricted airspace warning which generates a warning when an aircraft enters a restricted airspace. However, such a warning is based solely on the distance of the aircraft from the restricted airspace. In contradistinction, the warning system recited in the claims at issue recites "a warning of a hazardous flight condition" enabled "as a function of the distance between the aircraft and a reference point.["] Thus, it should be clear that contrary to the

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[55] *Id.* at B-74-B-75 (August 29, 1988 Amendment (emphasis in original)). The patent application contained the same general definition of "ground proximity warning systems" as is contained in the '436 patent as issued. *See id.* at B-04 (April 6, 1987 Patent Application Serial No. 07/035,112 at 1 (defining "ground proximity warning system" as those systems "for aircraft that serve to monitor the flight conditions of an aircraft and provide a warning if flight conditions are such that an inadvertent contact with the ground is imminent.")). In the August 29, 1988 Amendment, the applicants canceled four application claims and amended many of the remaining twenty claims.

[56] U.S. Patent No. 4,675,823.

[57] D.I. 99 at B-105-B-106 (December 6, 1988 Office Action at 3-4).

[58] *Id.* at B-105 (December 6, 1988 Office action at 3).

> teachings of Parnau, the warning system recited in the claims at issue does not utilize distance as an operative warning parameter, but merely to enable the warning system. No such warning of a hazardous flight condition is taught or implied in Parnau.[59]

In a June 5, 1989 Office Action, the examiner withdrew the objections and rejections made in the December 6, 1988 Office Action in view of the applicants' March 20, 1989 Amendment and did not renew any obviousness rejection based on the Parnau article.[60]

Sandel argues that "Honeywell distinguishe[d] Parnau by amending the claims specifically to recite 'ground proximity warning system. . . .' Thus, to overcome a prior art rejection, Honeywell narrowed the scope of the claimed invention by specifically using words applied to an existing, well-known technology."[61]

Initially, the court notes that Sandel's argument presumes that "ground proximity warning system" is limited to the prior art GPWS. As explained above, the court determines that the specification rebuts that presumption. Secondly, the prosecution history does not support Sandel's contention that the applicants added the words "ground proximity" before "warning system" in some of the claims rejected as obvious in order to distinguish Parnau. In the August 29, 1988 Amendment, the words "ground proximity" were added before "warning system" in application claims 1, 12, 15 and 21. Application claims 1, 12, and 15 were not subject to the Parnau-based obviousness rejection recited in the February 25, 1988 Office Action. Therefore, the addition of the words "ground proximity" to those claims was not made to distinguish Parnau.

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[59] *Id.* at B-118-B-119 (March 29, 1989 Amendment at 8-9 (emphasis in original)).

[60] *Id.* at B-122 (June 5, 1989 Office Action); *see id.* at B-125 ("Claims 14, 19 and 20 are allowable over the prior art of record.").

[61] D.I. 94 at 18-19 (emphasis in original).

Moreover, the applicants' narrative explanation of the amendments to application claims 1, 12, and 15 demonstrate that addition of the words "ground proximity" was not even made to address the particular bases of the examiner's rejection of those claims.[62]

Application claim 21 was the only claim of the twenty application claims rejected as obvious, in part, with reference to the Parnau article amended to include the words "ground proximity." The applicants' narrative explanation of the amendment to application claim 21 is not directed to the examiner's Parnau-based obviousness rejection but, rather, to the examiner's rejection of that claim because "'it [was] unclear how an alignment with the runway is sensed or why criteria is altered'."[63] In response to that rejection, the applicants amended application claim 21 to recite:

> A system for an aircraft comprising:
>
> warning means for providing a ground proximity warning when an aircraft encounters a hazardous flight condition
>
> * * *
>
> determining means responsive to said first source of signals and said second source of signals for determining the aircraft's alignment with respect to said predetermined runway and altering said criteria for said enabling means as a function of the alignment of the aircraft with respect to said predetermined runway.[64]

The section of the August 29, 1988 Amendment in which the applicants distinguished

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[62] *See* D.I. 99 at B-66 (August 29, 1988 Amendment at 7 (discussing amendment of application claim 1, "amended to recite computing means 'for computing the instantaneous distance between the aircraft and a plurality of preselected points'" (emphasis in original)); *id.* at B-67 (August 29, 1988 Amendment at 8 (stating that "[t]he Examiner rejected claim 12 because of the lack of an antecedent basis for 'said reference point' on line 5 and because the Examiner believes 'it is unclear what a warning system is used for' on line 14")); *id.* at B-68 (August 29, 1988 Amendment at 9 (stating that application claim 15 was "rejected because the Examiner believes 'it is unclear how a distance is found'")).

[63] *Id.* at B-70 (August 29, 1988 Amendment at 11 (quoting February 25, 1988 Office Action at 3)).

[64] *Id.* at B-63-B-64 (August 29, 1988 Amendment at 4-5 (underlining indicating language added)).

Parnau made no reference to particular prior art GPWS systems. Instead, the applicants argued that the system described in Parnau "relates to a LORAN SYSTEM having a restrictive air space warning . . . . Such a warning is a geographical warning and is based solely on longitude and latitude coordinates. However, it does not suggest in any way how a LORAN system could be used to vary a ground proximity warning system."[65]

That the addition of the words "ground proximity" in application claim 21 was not included by applicants to distinguish the Parnau article is also confirmed by subsequent prosecution history. Amended application claim 21, and others, were again rejected by the examiner, this time in a December 6, 1988 Office Action "as being unpatentable over Nolan in view of Parnau."[66] Obviously, Sandel's alleged limitation to prior art GPWS was not sufficient in the examiner's opinion to distinguish Parnau. Again, in response to the December 6, 1988 Office Action, the applicants did not distinguish Parnau with any reference to prior art GPWS. The applicants argued that:

> the Parnau reference relies on distance as an operative warning parameter . . . . [The system described in Parnau generates] a warning . . . based solely on the distance of the aircraft from the restricted airspace. . . . [T]he warning system recited in the claims at issue does not utilize distance as an operative warning parameter, but merely to enable the warning system.[67]

Because the applicants never distinguished their invention from Parnau with reference to the prior art GPWS, the court will not construe the asserted claims as so limited by the prosecution history.

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[65] *Id.* at B-75 (August 29, 1988 Amendment at 15-16 (emphasis in original)).
[66] *Id.* at B-105 (December 6, 1988 Office Action at 3).
[67] *Id.* at B-118-B-119 (March 20, 1989 Amendment at 8-9 (emphasis in original)).

Consequently, the court determines that "ground proximity warning system" and "warning system" are construed according to the definition set forth in the '436 patent to mean "a system to monitor the flight conditions of an aircraft and provide a warning if flight conditions are such that an inadvertent contact with the ground is imminent."

B. Heading

1. Parties' Positions

Universal and Sandel each propose that the term "heading" be given its ordinary and accustomed meaning, "the direction in which the aircraft is pointing in relation to magnetic or true North."[68] Defendants cite both general-usage and technical dictionaries to provide this definition of "heading."[69] Honeywell does not dispute defendants' suggested ordinary meaning of the term "heading."[70] Instead, Honeywell contends that the patent specification and prosecution history demonstrate that the patentee acted as his own lexicographer and created a special meaning for the term "heading." Honeywell argues that the patentee defined "heading" as having the ordinary meaning of the term "bearing"; "the angle formed by the line connecting the aircraft position and the airport and a reference datum, usually North."[71] Defendants do not

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[68] D.I. 91 at 14; *see also* D.I. 94 at 9 (stating that the common meaning of "heading" is "'the compass direction in which the aircraft is pointing'"); D.I. 90 at 3 ("'Heading' means the compass direction in which an aircraft is pointing." (emphasis omitted)).

[69] *See* D.I. 96 (Declaration of Howard G. Pollack in Support of Sandel's Motion for Summary Judgment of Non-Infringement (D.I. 96, Ex. K at 9-10 (quoting the definition of "heading" as "[t]he compass direction in which the longitudinal axis of a ship or airplane points," *Webster's Third New International Dictionary*, 1042 (1961); and "[t]he direction, usually expressed in deg [degrees] relative to true or magnetic north, in which the longitudinal axis of an aircraft points." Tomsic, *SAE Dictionary of Aerospace Engineering*, 323 (2d ed. 1998)))); *see also* D.I. 93 (Declaration of Scott J. Bornstein (D.I. 93, Ex. 11 & 12 (citing the same definitions of "heading" from the same sources))).

[70] *See, e.g.*, D.I. 127 at 60, 65.

[71] D.I. 98 at 26; *see also* D.I. 90 at 3 ("'Heading of the aircraft' should be construed as . . . a signal representative of the angle that is formed between a reference datum and the line segment connecting the present aircraft position and the airport." (emphasis omitted)).

dispute the definition of "bearing" proffered by Honeywell, however, they argue there is nothing in the intrinsic record which compels ascribing anything other than the ordinary meaning of "heading" to that term.

2. Court's Construction

The dispute with regard to the term "heading" is whether that term should be construed to have its ordinary meaning or whether "heading" should be defined to have a special meaning; the same meaning as the term "bearing." The parties agree that the ordinary meaning of the term "heading" is "the direction in which the aircraft is pointing in relation to magnetic or true North."[72]

There is a "heavy presumption" that claim terms "mean what they say and have the ordinary meaning that would be attributed to those words by persons skilled in the relevant art."[73] This presumption can be overcome when "a patentee . . . choose[s] to be his own lexicographer and use[s] the terms in a manner other than their ordinary meaning, as long as the special definition of the term is clearly stated in the patent specification or file history."[74] A special definition may be clearly stated by the patentee

[72] *See* D.I. 127 at 60, 85.

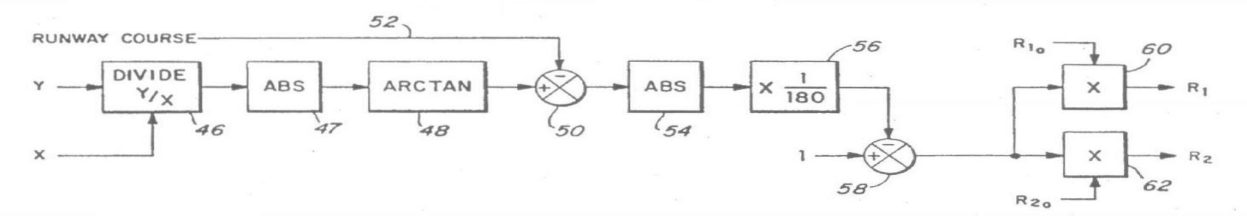
[73] *Texas Digital Sys., Inc. v. Telegenix, Inc.*, 308 F.3d 1193, 1202 (Fed. Cir. 2002) (citations omitted); *Johnson Worldwide Associates, Inc. v. Zebco Corp.*, 175 F.3d 985, 989 (Fed. Cir. 1999) ("[A] court must presume that the terms in the claim mean what they say . . . ."); *cf. Renishaw PLC v. Marposs Societa' Per Azioni*, 158 F.3d 1243, 1250 (Fed. Cir. 1998) ("Ultimately, the interpretation to be given to a term can only be determined and confirmed with a full understanding of what the inventors actually invented and intended to envelop with the claim. . . . A claim construction is persuasive, not because it follows a certain rule, but because it defines terms in the context of the whole patent." (citations omitted)).

[74] *Vitronics*, 90 F.3d 1582; *see also Renishaw*, 158 F.3d at 1249 n.3 ("[A]ny interpretation that is provided or disavowed in the prosecution history also shapes the claim scope."); *Silicon Graphics, Inc. v. n Vida Corp.*, 58 F. Supp. 2d 331, 344-45 (D. Del. 1999) ("The applicants representations throughout the course of the prosecution history demonstrate that the applicants acted as their own lexicographers in defining the phrase 'cache memory.' . . . [T]he applicants acted as their own lexicographers to define cache memory to mean something different than its ordinary meaning.").

without being explicitly stated[75] and that special definition may be set forth in either the specification or in the prosecution history.[76] Here, Honeywell argues that the specification gives a special meaning of the term “heading” which is uncontradicted by the prosecution history.

Each of the asserted claims contain the phrase “signals representative of the relative angular position of a . . . runway . . . with respect to the heading of the aircraft.” Although the word “heading” is not recited in the specification, Honeywell contends that the description of the alignment function recited in the claims demonstrates that the term “heading” was redefined to have the ordinary meaning of the term “bearing.”

The ‘436 patent describes as an “important feature” of the invention “a system . . . for determining the alignment of the aircraft with a particular runway . . . . This feature is illustrated in Fig. 5."[77] Figure 5 is reproduced below for reference.



[75] *Bell Atlantic Network Services, Inc. v. Covad Communications Group, Inc.*, 262 F.3d 1258, 1268 (Fed. Cir. 2001) (“[A] claim term may be clearly redefined without an explicit statement of redefinition.”); *see also SciMed Life Sys., Inc. v. Advanced Cardiovascular Sys., Inc.*, 242 F.3d 1337, 1344 (Fed. Cir. 2001) (holding the written description of the preferred embodiment "can provide guidance as to the meaning of the claims, thereby dictating the manner in which the claims are to be construed, even if the guidance is not provided in explicit definitional format").

[76] *See Honeywell Inc. v. Victor Co. of Japan, Ltd.*, 298 F.3d 1317, 1323 (Fed. Cir. 2002) (“It is well settled that a patentee may define a claim term either in the written description of the patent or, as in the present case, in the prosecution history.”); *see also Vitronics* 90 F.3d at 1582 (“The specification acts as a dictionary when it expressly defines terms used in the claims or when it defines terms by implication.”); *Id.* (“[T]he record before the Patent and Trademark Office is often of critical significance in determining the meaning of the claims.”).

[77] ‘436 patent, 6:7-11.

Honeywell argues that "[t]he structure that performs the 'alignment' function of the '436 Patent includes Col. 6, lines 6-36 and Fig. 5, items 46-58."[78] To determine this alignment, the invention calculates and compares angles that reference the aircraft and a particular runway.

The alignment function of the '436 patent is described in the specification as follows:

> The signals X, Y, which are longitudinal and latitudinal components, respectively represent the distance of the aircraft from the airport. The signals X and Y are applied to a divider 46 (FIG. 5). The signals X and Y are obtained from the outputs of the summing junctions 18 and 20 (FIG. 4). The output quotient signal from the divider 46 is, in turn, applied to an absolute value device 47. The absolute value device 47 generates an output signal which is always positive. The output of the absolute value device 47 is applied to an arctan device 48, which provides a signal which is representative of the angle between a line segment connecting the present aircraft position and the centerpoint coordinates of the nearest airport and a reference datum. The output from the arctan device 48 is applied to a positive input of a summing junction 50. A signal, which represents the angle that the runway of interest makes with a datum, is applied over line 53 to a negative input of the summing junction 50. The output of the summing junction 50 is a signal representing the angular difference between the present relative position of the aircraft and the runway. In other words, the summing junction 50 provides a signal which is representative of the aircraft's alignment with the particular runway.[79]

To summarize, "an arctan device 48, . . . provides a signal which is representative of the angle between a line segment connecting the present aircraft position and the centerpoint coordinates of the nearest airport and a reference datum."[80] Another signal is generated "which represents the angle that the runway of interest makes with a datum . . . ."[81] Finally, the system compares these two angles and

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[78] D.I. 98 at 26.
[79] '436 patent, 6:11-35.
[80] '436 patent, 6:21-25.
[81] '436 patent, 6:27-28.

"provides a signal which is representative of the aircraft's alignment with the particular runway."[82]

The signal generated with respect to the aircraft is described as "representative of the angle between a *line segment connecting the present aircraft position and the centerpoint coordinates of the nearest airport* and a reference datum." This is synonymous with Honeywell's proffered definition of "bearing"; "the angle formed by the *line connecting the aircraft position and the airport* and a reference datum." Nowhere does the specification recite the generation of a signal with respect to the aircraft that meets the ordinary definition or "heading," "*the direction in which the aircraft is pointing* in relation to magnetic or true North."

At oral argument, Sandel conceded that "the angle between a line segment connecting the present aircraft position and the centerpoint coordinates of the nearest airport and a reference datum" describes the bearing of the aircraft.[83] Sandel argues, however, that the patent does not claim that language and does not contain a claim covering figure 5 of the '436 patent.[84] This is a surprising argument for two reasons.

First, Sandel cites figure 5 and the specification's description of the invention's alignment function in support of its proposed construction of the term "alignment."[85] Second, figure 5 is described as "a functional block diagram of a system for determining

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[82] '436 patent, 6:33-35.
[83] D.I. 127 at 158.
[84] *Id.* at 159-60.
[85] *See* D.I. 90 at 4. The apparent contradiction of citing figure 5 and corresponding specification language in support of its proposed construction of the term "alignment" while also arguing that the same figure and specification language is not claimed and should not be considered when construing another disputed term was pointed out by Honeywell at oral argument. *See* D.I. 127 at 185-86. The court notes that Sandel and Universal also cite figure 5 and the corresponding specification description of that figure in support of their proposed construction of "first altering means," *see* D.I. 90 at 17, a term the parties have stipulated is no longer in dispute.

the alignment of the aircraft with respect to a particular runway in accordance with *the patented invention*."[86] The alignment feature that Sandel argues is not claimed by the '436 patent is described as part of the preferred embodiment of the claimed invention. During prosecution, the examiner's attention was also brought to figure 5, clearly indicating that figure 5 was being claimed.[87] To restrict the claim term "heading" to its ordinary meaning would exclude a preferred embodiment recited in the patent since it is agreed by the parties that the above-quoted language clearly describes an embodiment wherein the bearing of an aircraft is calculated.[88] Just as it is improper to read a limitation from a preferred embodiment into the claims, the Federal Circuit has cautioned that to construe a term to *exclude* a preferred embodiment "is rarely, if ever, correct."[89] The court concludes, therefore, that the specification is clear in its implicit

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[86] '436 patent 2:50-53.

[87] *See* D.I. 99 at B-117 (August 28, 1988 Amendment at 7).

[88] Not only would defendants' proposed construction read out a preferred embodiment, in its reply brief Sandel suggests that if the court construes "heading" according to its ordinary meaning, such construction could render the patent invalid as "there is no correspondence between the claimed 'heading' and the specification." D.I. 106 at 4 and 4 n.4. At oral argument, Sandel apparently backtracked from the suggestion of invalidity contained in its reply brief stating that "our definition of heading [does not necessarily] implicate[] patentability." D.I. 127 at 102. Faced with the possibility that accepting defendants' proposed construction of "heading" could possibly impact the validity of the '436 patent, however, the court notes that given two possible constructions, one that would render the patent invalid and one that maintains validity, a court should normally accept the latter. *See Talbert Fuel Sys. Patents Co. v. Unocal Corp.*, 275 F.3d 1371, 1376 (Fed. Cir. 2002), *vacated & remanded for further consideration in light of Festo Corp. v. Shoketsu Kinzoku Kogyo Dabushiki Co.*, 535 U.S. 722 (2002) (agreeing that "a construction that renders the claimed invention inoperable should be viewed with extreme skepticism"); *Karsten Manufacturing Corp. v. Cleveland Golf Co.*, 242 F.3d 1376, 1384 (Fed. Cir. 2001) ("Claims amenable to more than one construction should, when it is reasonably possible to do so, be construed to preserve their validity.").

[89] *Vitronics*, 90 F.3d at 1583; *see also Applera Corp v. Micromass UK Ltd.*, 186 F. Supp. 2d 487, 504-08 (D. Del. 2002) (rejecting proposed construction that would read out preferred embodiment illustrated in figure); *see also Johnson Worldwide*, 175 F.3d at 992 ("However, just as the preferred embodiment itself does not limit claim terms, . . . mere inferences drawn from the description of an embodiment of the invention cannot serve to limit claim terms . . . as they are insufficient to require a narrower definition of a disputed term." (citations omitted)). Defendants argue that *Johnson Worldwide* is "analogous" to this case and supports rejection of a redefinition of "heading." In that case, however, the Federal Circuit rejected the argument that the prosecution history demonstrated that the patentee ascribed a limited meaning to the term "heading." Apart from the distinction that the *Johnson Worldwide* defendant

definition of "heading" to have the ordinary meaning of "bearing."[90]

The prosecution history also supports this conclusion. In a December 6, 1988 Office Action, the examiner rejected application claim 21 and objected to application claim 24,[91] among others, stating that:

> [i]n claim 21 determining means are said to find aircraft alignment with respect to a runway based on runway heading and latitude and longitude data. However, it appears that in order to operate the means would also have to receive inputs from an aircraft heading device. In claim 24 is [sic] appears that aircraft alignment could not be found without aircraft heading inputs. Language as used in amended claims 14 and 19 is suggested to rectify this problem.[92]

In a March 20, 1989 Amendment, the applicants resisted the examiner's suggested amendment to application claims 21 and 24 arguing that:

> [a]s illustrated and described in the specification, the invention as claimed utilizes the latitude and longitude coordinates of the aircraft with respect to the nearest airport to determine the heading of the aircraft with respect to the runway. The Examiner's attention is respectfully direct to FIG. 5 and page 10 of the specification, line 25 et seq. The alignment of the aircraft

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argued for a limited definition of the ordinary meaning of the term "heading," rather than to construe that "heading" was redefined to have an altogether different definition, as here, the defendant in that case supported its proposed definition with reference to a prosecution statement limiting the definition of "heading" which was made with reference to claims not asserted in that litigation. The Federal Circuit determined that statements regarding unasserted claims having additional limitations "sheds no light on the meaning of "heading signal" in claims where that very limitation is not present." *See id.* at 991-92. Here, Honeywell does not argue that "heading" should be construed by limiting the ordinary meaning of that term, but that "heading" in the '436 patent was redefined to have the same meaning as "bearing." In this case, the specification and, as explained below, the prosecution history support Honeywell's proposed construction.

[90] Also in contradiction of Sandel's assertion that "[n]o dictionary definition would equate heading with bearing," one thesaurus found by the court states that "heading" and "bearing" are synonyms. *See Roget's II The New Thesaurus Expanded Edition* 85 (1988) (defining "bearing" as "5. The compass direction in which a ship or aircraft moves" and providing "heading" as a synonym for "bearing"); *id.* at 483 (defining "heading" as "1. The compass direction in which a ship or aircraft moves" and providing "bearing, course, vector" as synonyms of "heading").

[91] Application claims 21 and 24 ultimately issued as '436 patent claims 4 and 5, respectively.

[92] D.I. 99 at B-104 (December 6, 1988 Office Action). Application claims 14 and 19 had previously been amended to include a limitation reciting "with respect to the heading of the aircraft . . ." *Id.* at B-62, B-63 (August 25, 1988 Amendment at 3, 4). Application claims 14 and 19 ultimately issued as '436 patent claims 1 and 2.

> with respect to the runway is determined by utilizing line segments X and Y generated by the local airport search routine 16. The line segments X and Y represent the difference between the current aircraft latitude and longitude and the latitude and longitude of the nearest airport respectively. These line segments Y and X are fed into a dividing circuit 46 to generate a quotient signal Y/X. After being applied to an absolute value circuit 47, this signal is applied to the arctan device 48 to determine the angular relationship between the aircraft heading and the airport. *Thus, the output signal from the arctan device 48 represents the heading of the aircraft.* The heading of the aircraft is compared with the heading of the runway course in a summing device 50 to determine the alignment of the aircraft with respect to a particular runway. Thus, it should be clear that the "determining means" does not require the use of a separate heading sensing device for the aircraft. The heading of the aircraft is determined by the circuitry which includes the function blocks 46, 47 and 48. Accordingly, it is respectfully requested that the rejection of claim 21 be reconsidered and withdrawn.[93]

In a June 5, 1989 Office Action, the examiner again rejected application claims 21 and 24, reiterating that "[i]n claims 21 and 24 the use of aircraft alignment with a runway is described, but it appears that in order to be operational, aircraft heading inputs would have been necessary, and no such inputs are claimed."[94]

In an October 30, 1989 Amendment, the applicants acquiesced to the examiner's previous suggestion and amended application claims 21 and 24 to include the limitation "with respect to the heading of the aircraft."[95] With that amendment, the examiner allowed the claims on November 3, 1989.[96]

Significant to the construction of the term "heading" is the applicants' statement to the examiner that "the output signal from the arctan device 48 represents the heading of the aircraft." This output signal was described in the application specification, to

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[93] *Id.* at B-117 (March 20, 1989 Amendment at 7 (emphasis added)).
[94] *Id.* at B-122 (June 5, 1989 Office Action at 2).
[95] *Id.* at B-133, B-134 (October 30, 1989 Amendment at 2, 3).
[96] *Id.* at B-137 (Notice of Allowability).

which the examiner was referred, as "a signal which is representative of the angle between a line segment connecting the present aircraft position and the centerpoint coordinates of the nearest airport and a reference datum."[97]

Defendants argue that the above-quoted prosecution history does not support Honeywell's construction. Defendants argue that the prosecution history demonstrates that "the Examiner repeatedly rejected application claims for failure to specify a source of heading signals – but not because the commonly understood term required definition."[98] According to defendants it is clear that "that the examiner's concern was not over what 'heading of the aircraft' meant, but that this 'heading' was not explicitly recited in the claims he objected to. . . [and that] the examiner did not agree with Honeywell's arguments or read them to 'redefine' the meaning of heading."[99]

Defendants' argument is unavailing. As defendants correctly point out, "the claims [the examiner] was objecting to defined the runway direction portion of the claim, but failed to recite the necessary aircraft heading."[100] A similar objection was previously made by the examiner and remedied by the applicants with respect to application claims 14 and 19.

As originally filed, application claim 14 recited "[a] system . . . including a source of signals representative of the relative angular position of a particular runway with

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[97] *Id.* at B-14 (April 6, 1987 Patent Application Serial No. 07/035,112 at 11). This same specification language appears in the '436 patent at 6:22-25 and is quoted above.

[98] D.I. 104 at 14.

[99] D.I. 94 at 11.

[100] *Id.*

respect to a datum."[101] The examiner rejected these claims under 35 U.S.C. § 112, second paragraph, as being indefinite.[102] The examiner stated that "[i]n claim 14 it is unclear how a runway is compared to a datum or how alignment with a runway is sensed."[103] The applicants amended those claims by deleting the reference to "a datum" and adding "with respect to the heading of the aircraft."[104] After failing to convince the examiner that the same limitation was not required in application claims 21 and 24, the applicants amended those to include that limitation.

The prosecution history demonstrates that defendants' argument that "the examiner did not . . . read [Honeywell's arguments] to 'redefine' the meaning of heading" misses the point. Indeed, defendants are correct that "the examiner's concern was not over what 'heading of the aircraft' meant, but that this 'heading' was not explicitly recited in the claims he objected to."[105] The applicants did not attempt to avoid the examiner's rejection of application claims 21 and 24 by redefining the meaning of "heading" or arguing that the examiner did not understand the meaning of that term. Rather, the applicants argued that "the 'determining means' [did] not require the use of a separate heading sensing device for the aircraft."[106]

Nothing concerning the examiner's rejections or the applicants' responsive amendments suggests that the application failed to define "heading." That fact negates

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[101] *See* D.I. 99 B-19 (April 6, 1987 Patent Application Serial No. 07/035,112 at 16). Application claim 19 similarly recited "[a] system . . . including a third source of signals representative of the relative angular position of a particular runway within a datum . . . ." *Id.* at B-20 (April 6, 1987 Patent Application Serial No. 07/035,112 at 17).

[102] *Id.* at B-36 (February 25, 1988 Office Action at 3).

[103] *Id.* Likewise, the examiner stated that "in claim 19 it is unclear what is meant by 'the relative angular position of a particular runway within a datum. . . .'" *Id.*

[104] *See* D.I. 99 at B-62, B-63 (August 29, 1988 Amendment at 3, 4).

[105] D.I. 94 at 11.

[106] D.I. 99 at B-117 (March 20, 1989 Amendment at 7).

defendants' assertion that "[i]f Honeywell's engineers truly meant to define the claims in terms of bearing, rather than attempting to use an ambiguous and counter-intuitive 'special use' of the term 'heading', they would have simply amended (or originally written) the claims to read 'bearing' instead of 'heading.'"[107] As defendants acknowledge, it was not the definition of heading (or bearing) that concerned the examiner, it was the absence of the limitation reciting heading (or bearing) signals that lead to the examiner's rejection. Once that limitation was added, the examiner allowed the '436 patent to issue.[108] Whether or not the examiner knew the ordinary meaning of "heading" is immaterial since a patent applicant may redefine its claim terms to have a definition other than the ordinary meaning of that term.[109] It is clear from both the specification and the prosecution history that the "heading" of the aircraft is represented by "a signal which is representative of the angle between a line segment connecting the present aircraft position and the centerpoint coordinates of the nearest airport and a reference datum."[110] That representation of "heading" is the same as the ordinary meaning of the term "bearing."

Consequently, defendants' argument that "heading" should be construed

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[107] *Id.* at 12.

[108] Therefore, construing "heading" to have the same meaning as "bearing" does not improperly permit Honeywell "to revise the prosecution history in order to recapture that which it gave up in order to gain allowance." D.I. 104 at 14. What the applicants gave up to gain allowance is claiming a system that does not include a limitation referencing the heading of an aircraft. That concession did not involve defining "heading."

[109] *See Renishaw*, 158 F.3d at 1249.

[110] The clarity of this redefinition also rebuts defendants' contention that if "heading" is construed to mean the same thing as the term "bearing" that the public notice function of patent claims would be frustrated.

according to the ordinary meaning of that term is rejected.[111] The court determines that "heading" was redefined by the applicants to mean "the angle formed by the line connecting the aircraft position and the airport and a reference datum."

C. Alignment

1. Parties' Positions

Honeywell argues that "'[a]lignment' is the arrangement, or position, of parts of an object or system in correct relationship to each other."[112]

Sandel argues that "'[a]lignment' should be afforded its plain and ordinary meaning of 'lined up with' or 'in line with'"[113] Universal offered no proposed definition for the this claim term in the parties' Joint Submission of Claim Construction.

2. Court's Construction

None of the parties has cited a reference to the court for their proposed meanings of "alignment," however, the proposed constructions are consistent with the ordinary meaning of those terms as reflected in common usage dictionaries available at the time of the invention.[114] One meaning of "alignment" is "1. Arrangement or position in a straight line. 2. [t]he process of adjusting a device or mechanism or the condition of a device or mechanism being adjusted."[115] Those definitions are consistent with

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[111] *See CVI/Beta Ventures, Inc. v. Tura LP*, 112 F.3d 1146, 1159 (Fed. Cir. 1997) (rejecting construction "squarely at odds with the meaning of the term that emerges from our examination of the specifications and the prosecution and reexamination histories").

[112] D.I. 90 at 4.

[113] *Id.*

[114] *See Texas Digital*, 308 F.3d at 1202 ("As resources and references to inform and aid courts and judges in the understanding of technology and terminology, it is entirely proper for both trial and appellate judges to consult these materials at any stage of a litigation, regardless of whether they have been offered by a party in evidence or not.").

[115]. *Webster's II New Riverside University Dictionary* 92 (1988);

other general use dictionary definitions of "alignment" and "align."[116]

There is no dispute over the structures described in the specification that perform the alignment function[117] and the ordinary meaning of that term is consistent with that description. Since the parties' proposed constructions of "alignment" is consistent with the ordinary meanings of that term, the court determines that the broadest appropriate definition of "alignment" that is consistent with the structures that perform the alignment function described in the specification is "the process of adjusting to produce a proper condition or relationship."[118]

D. Enabling

1. Parties' Positions

Although the parties include "enabling" on the Joint Submission of Claim Construction,[119] there is no difference in the parties' proposed definitions in that submission. Each party contends that the term "enable" means "to activate or turn on."[120] At oral argument, the parties were in substantial agreement with this definition. Honeywell agreed with that definition of "enable."[121] Defendants first stated that

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[116] *See The Random House Dictionary of the English Language* 53 (2 ed. 1987) (defining "alignment" to mean "1. an adjustment to a line; arrangement in a straight line. 2. the line or lines so formed. 3. the proper adjustment of the components of an electronic circuit, machine, etc., for coordinated functioning . . . ."); *Webster's II New Riverside University Dictionary* 92 (1988) (defining "align" to mean "1. To place in a line 2. To adjust (*e.g.*, the parts of a mechanism) to produce a proper condition or relationship.");*The Random House Dictionary of the English Language* 53 (2 ed. 1987) (defining "align" to mean "1. to arrange in a straight line; adjust according to a line. 2. to bring into a line or alignment . . . .").

[117] *See* D.I. 90 at 4; D.I. 127 at 149 ("There's no dispute over the corresponding structure [of the "alignment means."]).

[118] *See Texas Digital*, 308 F.3d at 1204 ("If more than one dictionary definition is consistent with the use of the words in the intrinsic record, the claim terms may be construed to encompass all such consistent meanings.").

[119] *See* D.I. 90 at 2.

[120] *See id.*

[121] *See* D.I. 127 at 139.

"enable" means "to activate or turn on as distinguished from issuing an alert"[122] Later Universal directed the court to the parties' Joint Submission of Claim Construction stating that each party defined "enabling [as] 'mean[ing] activating or turning on'. So it would seem that the record presently before the Court reflects a unanimous . . . position with respect to all three parties concerning the definition of the word enabling."[123] Based on this assertion, and Honeywell's agreement that "[enable] should be construed the way the parties agreed and submitted it to [the court] as a claim construction,"[124] the court will construe "enabling" according to that submission to mean "activating or turning on."

2. Court's Construction

While neither party cites relevant dictionaries in support of its position, the court notes that the proposed definitions by the parties is consistent with the definitions of enable recited in common-use dictionaries.[125] No party pointed to any intrinsic evidence, and the court has found none, that would lead to a contrary construction of "enable." Consequently, the court determines that "enabling" means "activating or turning on."

E. Enabling envelope

1. Parties' Positions

The parties did not propose specific constructions of the term "enabling

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[122] D.I. 127 at 140.
[123] *Id.* at 145.
[124] *Id.* at 141.
[125] *See e.g.*, *The American Heritage Dictionary of the English Language*, (3d ed. 1992) (defining "enable" as (3) To make operational; activate: *enabled the computer's modem; . . .*" (emphasis in original)); *see also The Random House Dictionary of the English Usage*, (2d ed. 1987) (providing "to turn on" as a synonym for "activate.").

envelope" in their Joint Submission of Claim Construction but informed the court at oral argument that this is a term that requires the court's construction. At oral argument, Universal argued that "enabling envelope" should be not defined as "limited to any envelope which activates or turns on" but should exclude any envelope which is, in part, enabled by the use of flap position input.[126] Honeywell contends that such a construction would improperly read a negative limitation into the asserted claims. Sandel argues that an enabling envelope cannot be construed to include a system that suppresses alerts, as its VAP allegedly does.[127]

2. Court's Construction

At oral argument, the parties did not contend that "enabling envelope" is a term of art having a specific definition. The court has construed "enabling" to mean "activating or turning on." Therefore, the claim term "enabling envelope" must mean turning on or activating an "envelope." None of the parties specifically addressed the definition of the word "envelope." One relevant definition of "envelope" found by the court is "[t]he set of limitations within which a technological system, especially an aircraft, can perform safely and effectively."[128] This definition is consistent with the '436 patent's description of

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[126] D.I. 127 at 142.

[127] The court notes that whether a system that suppresses alerts is different from an "enabling envelope" which "activates or turns on" is a question of fact not a question of law and, therefore, is not properly considered as part of claim construction.

[128] *The American Heritage Dictionary of the English Language* 616 (1992). The court acknowledges that this dictionary was copyrighted two years after the April 3, 1990 issue-date of the '436 patent and that the Federal Circuit has stated that "[d]ictionaries . . . publicly available at the time the patent is *issued*, are objective resources that serve as reliable sources of information on the established meanings that would have been attributed to the terms of the claims by those of skill in the art." *Texas Digital*, 308 F.3d at 1203 (emphasis added). The *Texas Digital* court also stated that "the intrinsic record also must be examined in every case to determine whether the presumption of ordinary and customary meaning [found in relevant dictionaries] is rebutted." *Id.* Here, the court's construction is informed by reference to this dictionary definition but that construction is not determined by the above-quoted definition. The court's examination of the intrinsic record, below, reveals that the ultimate construction of

"enabling envelope."

The specification describes "provid[ing] an enabling envelope for enabling various warning systems . . . ."[129] In describing the "generation [of] an enabling envelope for enabling various warning systems" the specification recites that "individual airports, together with contiguous terrain topography, are modeled by a simple geometric shape, such as, a truncated inverted cone . . . ."[130] "Whenever the aircraft is within the boundaries of the envelope, various ground proximity warning systems . . . can be enabled."[131] As defined by the specification, and construed by the court, the "warning system" enabled by the warning envelope is "a system to monitor the flight conditions of an aircraft and provide a warning if flight conditions are such that an inadvertent contact with the ground is imminent." These warning systems "provide an advisory warning in the event of a hazardous flight condition."[132] The envelope described in the specification, therefore, is "the set of limitations within which . . . an aircraft can perform safely and effectively." That set of limitations corresponds to a determined volume of airspace which is "modeled by a simple geometric space." Thus, when an aircraft is within the envelope, the invention can enable (activate or turn on) various warning systems which will alert the pilot of a hazardous flight condition, *i.e.*, when the aircraft is *not* flying safely and effectively.

Although the specification's statement that "[t]he system in accordance with the present invention avoids [the] problem [encountered by prior GPWS] because it does

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the term "enabling envelope" would be the same with, or without, reference to that dictionary definition.

[129] '436 patent, 2:7-8.

[130] '436 patent, 2:12-17.

[131] '436 patent, 3:39-42.

[132] '436 patent, 1:35-36.

not rely on flap or landing gear position signals," might appear to support Universal's argument that the '436 patent does not cover an enabling envelope which does use flap or landing gear position, the claims, specification, and prosecution history support Honeywell's argument that that "negative limitation" is not included in the claimed invention.

The specification recites three objects of the invention:

> [1] to provide a means for detecting whether an aircraft is on a final approach to an airport without the use of a flap position signal. . . .
> [2] to provide a means for detecting the proximity of an aircraft to a particular airport without utilizing a substantial amount of memory on board the aircraft [*i.e.*, determining the distance of the aircraft from a particular airport]. . . .
> [3] to provide an enabling envelope for enabling various warning systems based on the position of the aircraft relative to the airport.[133]

Turning first to the claims, the third limitation of claim 1, upon which the parties focused their arguments, states:

> means responsive to first source of signals representative of the longitude and latitude of said airport and said second source of signals representative of the current longitude and latitude of said aircraft for computing the distance of said aircraft from said airport and providing an enabling envelope for enabling the warning system as a function of said distance of the aircraft with respect to said airport.[134]

The functions of this means-plus-function limitation are: (1) determining the distance of the aircraft from a particular airport and (2) providing an enabling envelope for enabling the warning system.[135] Determination of whether the aircraft is on final approach is not

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[133] '436 patent, 1:64-2:10.

[134] 436 patent, claim 1.

[135] *See Micro Chemical, Inc. v. Great Plains Chemical Co.,* 194 F.3d 1250, 1258 (Fed. Cir. 1999) (Construing a limitation in means-plus-function format "requires both identification of the claimed function and identification of the structure in the written description necessary to perform that function.") Because the parties have not asked the court to construe this means-plus-function limitation, it is unnecessary for the court to identify the structures necessary to perform the claimed functions.

a function claimed in the above-quoted limitation and it would be improper for the court to import that additional limitation.[136] Furthermore, there is no mention of the absence of flap or gear position inputs in any of the '436 patent's claims.

Turning to the specification, each of the several references to flap and gear position therein refer to a determination of whether an aircraft is on final approach.[137] None of the '436 patents' claims, however, includes any reference to a determination of whether an aircraft is on final approach. Examination of the prosecution history reveals that, originally, the patent application included such a claim. Application claim 3 recited: "[a] system for use in an aircraft comprising: . . . means responsive to said determining means for providing a signal representing that the aircraft is on said final approach."[138] In a February 25, 1988 Office Action, the examiner rejected application claim 3 under 35 U.S.C. § 112, first paragraph, for "not adequately describ[ing] how a final approach would be sensed."[139] In an August 29, 1988 Amendment, the applicants cancelled application claim 3, as well as application claims 4 and 5 which depended therefrom and had also been subject to the examiner's February 25, 1988 rejection.[140] The application specification was not amended to remove the references to a determination of when an aircraft is on final approach.

Because the specification refers to the absence of flap and gear position inputs

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[136] *See id.* ("The statute [does not] permit limitation of a means-plus-function claim by adopting a function different from that explicitly recited in the claim. Nor does the statute permit incorporation of structure from the written description beyond that necessary to perform the claimed function.").

[137] *See, e.g.,* '436 patent, Abstract, 1:8-13, 1:56-60, 1:64-66, 3:35-38, 3:64-4:4, 5:30-34, 5:41-45; 5:67-6:3.

[138] D.I. 99 at B-17 (April 6, 1987 Patent Application Serial No. 07/035,112 at 14).

[139] D.I. 99 at B-35 (February 5, 1988 Office Action at 2).

[140] D.I. 99 at B-60 (August 29, 1988 Amendment at 1).

only in connection with a determination of whether an aircraft is on final approach and because none of the '436 patent's claims recite any flap and gear position limitation, or determination of final approach limitation, the court rejects Universal's argument that "enabling envelope" should be construed so as not to include systems which include flap and gear position inputs.

Consequently, the court construes "enabling envelope" to mean "activating or turning on a set of limitations within which an aircraft can perform safely and effectively."

V. CONSTRUCTION OF DISPUTED CLAIM TERMS

The court construes the disputed claim terms as follows:

Claim Language	Court's Construction
"ground proximity warning system"; "warning system"	a system to monitor the flight conditions of an aircraft and provide a warning if flight conditions are such that an inadvertent contact with the ground is imminent
"heading"	the angle formed by the line connecting the aircraft position and the airport and a reference datum
"alignment"	the process of adjusting to produce a proper condition or relationship
"enabling"	activating or turning on
"enabling envelope"	activating or turning on a set of limitations within which an aircraft can perform safely and effectively

VI. PARTIES' SUMMARY JUDGMENT ARGUMENTS

Honeywell alleges that defendants' products[141] infringe the '436 patent either literally or under the doctrine of equivalents. Universal and Sandel have each filed motions for summary judgment of non-infringement pursuant to Federal Rule of Civil Procedure Rule 56(c). Under Rule 56(c), summary judgment is appropriate when "the pleadings, depositions, answers to interrogatories, admissions on file, together with affidavits, if any, show that there is no genuine issue as to any material fact and that the party is entitled to judgment as a matter of law."[142] "Determination of infringement . . . is a question of fact. . . . Thus, summary judgment of non-infringement can only be granted if, after viewing the alleged facts in the light most favorable to the non-movant, there is no genuine issue whether the accused device is encompassed by the claims."[143]

A. Universal's Motion for Summary Judgment of Non-Infringement

Universal makes five arguments that it contends supports summary judgment that its TAWS does not literally infringe claim 1 of the '436 patent. First, Universal argues that its TAWS does not have an "enabling envelope." Second, Universal argues that its TAWS uses landing flap or gear signal inputs, which Universal contends the '436 patent specifically disclaims. Third, Universal argues that its TAWS does not enable a ground proximity warning system. Fourth, Universal contends that its TAWS can not infringe the '436 patent because the Minimum Ground Clearance Boundary ("MGCB") of

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[141] The Virtual Approach Path ("VAP") and the Premature Decent Alert ("PDA") functions of Sandel's Terrain Awareness and Warning Systems ("TAWS") and the Minimum Ground Clearance Boundary ("MGCB") of Universal's TAWS.

[142] Fed. R. Civ. P. 56(c).

[143] *Dayco Products, Inc. v. Total Containment, Inc.*, 258 F.3d 1317, 1227 (Fed. Cir. 2001) (internal citation and quotation omitted).

its TAWS is different from the prior art GPWS modes to which '436 patent claims were alleged to be limited. Fifth, and finally, Universal states TAWS cannot infringe the '436 patent because its system does not use "heading," as that term is ordinarily defined.

Several of Universal's arguments in favor of summary judgment fail in light of the court's claim construction, recited above. Universal's argument that its TAWS does not use "heading," as that term is ordinarily defined is unavailing in light of the court's determination that, in the '436 patent, "heading" has the same meaning as "bearing"; "the angle formed by the line connecting the aircraft position and the airport and a reference datum." Universal has presented no argument in support of summary judgment based on "heading" as the court has construed the term. Indeed, at oral argument, Universal conceded that there would be a material question of fact if the court were to construe "heading" to have the same meaning as "bearing."[144]

Universal's argument that its TAWS cannot infringe the '436 patent because its MGCB is distinguishable from the prior art GPWS modes also fails in light of the court's determination that the claims of the '436 patent are not limited to only the particular prior art GPWS referenced in the specification. The court has construed the warning system limitations to mean "a system to monitor the flight conditions of an aircraft and provide a warning if flight conditions are such that an inadvertent contact with the ground is imminent." In light of that construction, there remains a material question of fact as to whether Universal's MGCB reads on that limitation. Similarly, Universal's argument

[144] *See* D.I. 127 at 163-64 (acknowledging that "there may be coverage issues" if the court construed "heading" to have the same meaning as "bearing" and agreeing that this would raise a genuine issue of material fact).

that it is entitled to summary judgment of non-infringement because its TAWS uses flap and gear position input also fails as the court has determined that the claims of the '436 patent are not limited to only systems which do not use flap and gear input.

Universal also argues that because its TAWS is alleged not to have an "enabling envelope," and that its system does not "enable" a ground proximity warning system, its TAWS cannot infringe the '436 patent. According to Universal, "Honeywell has construed the term 'enabling envelope' to require an envelope which activates a GPWS when an aircraft is on final [a]pproach without using landing flap or gear signal inputs."[145] As noted above, the court has determined that the warning system limitations are not limited to the prior art GPWS recited in the '436 patent specification and that Honeywell's claimed invention does not exclude from coverage systems which utilize flap and gear position inputs. The court has construed "enabling envelope" to mean "activating or turning on a set of limitations within which an aircraft can perform safely and effectively." When construing "enabling envelope" the court pointed out that none of the claims recite a limitation requiring a determination of whether an aircraft is on final approach. Therefore, Universal's only remaining arguments for summary judgment based on the "enabling envelope" limitation are that its TAWS does not enable, or activate, a set of limitations within which an aircraft can perform safely and effectively. Honeywell argues that Universal's TAWS does just that and points to documentary and deposition testimony purportedly describing "a wedge-shaped area around the airport that activates Universal's MGCB warning system."[146]

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[145] D.I. 91 at 22.
[146] D.I. 98 at 2.

As the court previously noted, the third limitation of claim 1 performs two functions: it calculates the distance of an aircraft from a particular airport and provides an enabling envelope for enabling the warning system as a function of the distance of the aircraft with respect to that airport. The court has construed the "warning system" to be "a system to monitor the flight conditions of an aircraft and provide a warning if flight conditions are such that an inadvertent contact with the ground is imminent."

Universal's TAWS includes a mode, referred to as the Minimum Ground Clearance Boundary ("MGCB"), which is described in Universal's Software Requirements Document as "a protection floor generated around an Airport. . . . It serves as a reference surface below which it is not considered safe to fly. TAWS alerts whenever the airplane descends below the following alert thresholds . . . ."[147] According to Honeywell, "Universal's TAWS monitors the aircraft's position relative to nearby airports and runways and, if it determines that the aircraft is within a particular distance and alignment of a nearby runway, the TAWS enables the [MGCB] Envelope with respect to that runway or airport."[148] The MGCB warning envelope is illustrated in Universal's Software Requirements Document as a wedge shape extending out 15 nautical miles from a runway threshold and extending 22 degrees on either side of the runway.[149] Honeywell contends that the MGCB warning envelope, defined by Universal as the "Destination Determination," is enabled if the aircraft enters that wedge shaped envelope. Honeywell argues that "when an aircraft enters [the] . . . 'Destination

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[147] D.I. 100, Ex. 4 at 4-76 (Universal Avionics Systems Corporation Software Requirements for the Terrain Awareness Warning System).

[148] D.I. 98 at 9.

[149] *See* D.I. 100, Ex. 4 at 4-49.

Determination' envelope beginning 15 nautical miles from a nearby runway or airport, the system 'generates' or 'builds' or 'locates' . . . the MGCB warning envelope around that runway or airport."[150] Honeywell equates deposition testimony that Universal's TAWS "generates," "builds," or "locates"[151] the MGCB warning envelope with "enabling" that warning envelope. Honeywell concludes, therefore, that Universal's TAWS calculates the distance of an aircraft from a particular airport and generates the MGCB warning envelope based on that distance. According to Honeywell, once that warning envelope is generated, or enabled, the MGCB will issue an alert if the system senses a hazardous flight condition, *i.e.*, if the aircraft is flying at an altitude below which it is considered safe to fly.

Universal does not disagree that "the Destination Determination, in appropriate circumstances, may have an effect on the location of the MGCB envelope."[152] Universal contends, however, that "Honeywell's argument is flawed because locating and placing the MGCB warning envelope in proximity to a destination runway is patentably distinct from activating or enabling the same warning envelope."[153]

Universal supports this argument with the testimony of Michael M. Grove, '436 patent

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[150] D.I. 98 at 13.

[151] *See* D.I. 100, Ex. 12 at 39 (transcript of July 29, 2004 deposition of Patrick Glaze, former Universal system developer currently employed by Honeywell (agreeing with the statement that "the Universal TAWS system *generates* this minimum ground clearance boundary envelope either with respect to a destination runway or a destination airport" (emphasis added))); *id.*, Ex. 10 at 79 (transcript of May 26, 2004 deposition of John Jorgensen, Universal's 30(b)(6) witness on the operation of its MGCB (agreeing with the statement that "if the runway is not selected as the destination runway the code will not use that as the runway from which it will *build* the [MGCB] envelope" (emphasis added))); *id.*, Ex. 13 at 40 (transcript of May 27, 2004 deposition of Dean L. Farnham, Universal employee involved in developing the software for the MGCB function (agreeing with the statement that "if TAWS selects a runway through the destination runway determination, that TAWS will use that runway to *locate* the envelope for the MGCB function" (emphasis added))).

[152] D.I. 104 at 2.

[153] *Id.* at 2.

co-inventor, that allegedly supports Universal's position "that modulating (modifying) parameters of a ground proximity warning system is different from enabling (turning on) a ground proximity warning system."[154] Universal also contends that the testimony of Honeywell's expert, Dr. John Hansman, contradicts "Honeywell's contention that the 'enabling' function can be interpreted to cover 'locating' or 'centering' an MGCB envelope. . . ."[155] Universal also argues that the deposition testimony of Universal witnesses Farnham, Jorgensen, and Glaze also confirms that the Destination Determination plays no role in enabling the MGCB.[156] Furthermore, Universal argues that its system does not have an enabling envelope because its system is always on, *i.e.*, its system is always enabled so it does not enable the MGCB.

Honeywell counters the argument that there is no enabling envelope when a system is always on by pointing out that Universal's TAWS can only issue an alert when an aircraft comes within 15 nautical miles of a destination envelope and the MGCB envelope is generated.[157] At oral argument, Honeywell again argued that this demonstrates that Universal's TAWS enables a warning system in the same manner as Honeywell's patented invention stating, "we enable based on the distance. They do.

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[154] *Id.*; *see* D.I. 105, Ex. 15 at 96 (transcript of June 16, 2004 deposition of Michael Grove, '436 co-inventor and Honeywell's 30(b)(6) witness (responding to a question as to the difference between modulating an envelope of a GPWS and enabling a GPWS envelope by stating that "the envelope modulation is changing the conditions that are determined to give or not give the order. So it's not necessarily enabling the order itself by just changing the conditions around that.")).

[155] D.I. 104 at 3; *see* D.I. 105, Ex. 16 at 58-59 (transcript of July 20, 2004 deposition of Robert John Hansman, Jr. (agreeing with the statement that "[e]nable doesn't mean to issue an alert")).

[156] D.I. 104 at 3-5; *see, e.g.,* D.I. 105, Ex. 18 at 78 (Jorgensen deposition transcript (stating that "One of the inputs [to the MGCB] is . . . destination airport or destination runway position. So the MGCB alert will run, but where it runs is dependent upon the position. So there's not enabling going on.")).

[157] Partrick Krohn, the Director of Advanced Projects at Universal, and former Honeywell employee, testified that, regardless of an aircraft's radio altitude, Universal's system "won't issue the minimum ground clearance boundary alert if [the aircraft] is greater than 15 miles from the destination runway." D.I. 105, Ex. 17 at 39 (transcript of July 28, 2004 deposition of Patrick Krohn).

We do. We warn only if the rest of the conditions are met, i.e., we drop below the altitude level."[158]

The court determines, based on the evidence before it and conflicting conclusions drawn by the parties from that evidence, that reasonable minds could differ as to whether "generating," "building," or "locating" the MGCB warning envelope of Universal's TAWS means the same thing as "enabling" a warning system as claimed in the '436 patent. Likewise, whether or not the fact that the MGCB is "always on" means that Universal's system is not covered by the '436 patent's claims, as Universal contends, is a question of material fact properly left for the finder of fact to answer since it appears undisputed that Universal's system can not issue any alert until an aircraft comes within a certain distance from a destination airport and the MGCB envelope is generated.

Consequently, Universal's motion for summary judgment of non-infringement is denied.

B. Sandel's Motion for Summary Judgment of Non-Infringement

Honeywell alleges that two functionalities of Sandel's TAWS infringe the '436 patent: the Virtual Approach Path ("VAP") functionality and the Premature Descent Alert ("PDA") functionality. Sandel makes three arguments in favor of its motion for summary judgment of non-infringement. First, that its products do not calculate the "heading" of an aircraft, as that term is ordinarily defined. Second, that the accused

[158] D.I. 127 at 197. The court notes that Honeywell's argument that a system which is purportedly always enabled still infringes the '436 patent was made in response to similar arguments made by both Universal and Sandel that their systems were always enabled.

VAP and PDA functions of Sandel's TAWS do not "enable" anything. Third, that the VAP and PDA functions of Sandel's TAWS do not enable GPWS.

Sandel's first and third arguments in favor of summary judgment of non-infringement are based on its proposed construction of the terms "heading" and "ground proximity warning system." In light of the court's construction of those terms, which did not adopt Sandel's proposed definitions, Sandel's summary judgment arguments based on those terms are rejected.

Sandel's argument that its TAWS does not infringe the '436 patent based on its proposed construction of the term "heading" necessarily fails in light of the court's determination that, as described in the patent-in-suit, the term "heading" has the same meaning as the term "bearing." Honeywell points out that Sandel's 30(b)(6) witness confirmed that Sandel's TAWS computes an aircraft's alignment with the runway using the aircraft's bearing.[159] Sandel makes no argument that its TAWS does not read on the '436 patent's heading limitations if the court determines, as it has, that the term "heading" has the same meaning as the term "bearing." In light of the court's construction of that term, therefore, Sandel's argument for summary judgment of non-infringement relating to the term "heading" is rejected.

Sandel argues that if the court construes the warning system limitations to be limited to prior art GPWS technology, its TAWS system cannot infringe the '436 patent because that system does not enable a GPWS.[160] The court has determined that the

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[159] *See* D.I. 103, Ex. 4 at 62 (June 23, 2004 Deposition of Leslie Corn (stating that VAP "uses the ground point intercept coordinate and the aircraft's current position and computes the *bearing* of that point to the aircraft . . . ." (emphasis added))).

[160] D.I. 94 at 17, 19.

term “ground proximity warning system” is not limited to the prior art warning modes referenced in the ‘436 patent specification. Therefore, to the extent that Sandel argues that the VAP and PDA functions of its TAWS can not infringe the ‘436 patent were the court to adopt its proposed construction of “ground proximity warning system,” that argument necessarily fails in light of the court’s construction of that term.

In addition to its argument that its products do not enable the prior art ground proximity warning systems, Sandel argues that its products do not “enable” *any* warning system. Sandel makes separate arguments in favor of non-infringement for its TAW’s VAP and PDA functions. Sandel states that the VAP functionality does not enable, or activate, a warning system but, rather, suppresses alerts.[161] Sandel argues “[n]o reasonable construction of the term ‘enabling’ can capture a function that suppresses alerts as the VAP does.”[162] Sandel also argues that “the . . . PDA functionality of Sandel’s TAWS does not enable a warning system. Rather, PDA is itself a stand-alone warning system, mandated by the FAA pursuant to the TAWS rule and TSO-c151, that issues alerts; it does not enable some other alerting function.”[163] According to Sandel, because “suppressing” and “alerting” is different that “enabling,” its TAWS can not infringe the ‘436 patent. Sandel points to the prosecution history to support this argument.

In a December 6, 1988 Office Action, the examiner stated that “Parnau teaches that it is known in the art to give a warning when an aircraft is within a predetermined

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[161] *Id.* at 1-2 (emphasis in original).
[162] *Id.* at 2.
[163] *Id.* at 1-2 (emphasis in original).

distance to a TCA or restricted area."[164] In a March 20, 1989 Amendment, the '436 patent applicants distinguished the Parnau article by stating:

> it is equally clear that the warning system referred to in the Parnau reference relies on distance as an operative warning parameter. Specifically, Parnau discloses at page 6 a restricted airspace warning which generates a warning when an aircraft enters a restricted airspace. However, such a warning is based solely on the distance of the aircraft from the restricted airspace. In contradistinction, the warning system recited in the claims at issue recites 'a warning of a hazardous flight condition' enabled 'as a function of the distance between the aircraft and a reference point.' Thus it should be clear that contrary to the teachings of Parnau, the warning system recited in the claims at issue does not utilize distance as an operative warning parameter, but merely to enable the warning system. No such warning of a hazardous flight condition is taught or implied in Parnau.[165]

Sandel characterizes the applicants' explanation as demonstrating that in the claimed invention "the envelope was not a warning system itself, but was used only to turn on some other warning system."[166] Sandel argues that that explanation demonstrates that a system that "enables" is different from a system that "alerts," or issues a "warning." Sandel states that inventor Grove's testimony confirms this difference as well. In relevant part, Grove testified as follows:

> Q. What do you believe the term "enable" means?
>
> A. I think enable is a necessary but not necessarily sufficient condition. Whereas activate sort of says that it's going to happen, that all the necessary conditions have been achieved.
>
> Q. So in other words, enable – actually, I'm not sure I understand. Could you clarify that distinction between enable and activate in your mind?
>
> A. Well, as an example, you may have something that enabled but not

[164] D.I. 99 at B-105 (December 6, 1988 Office Action at 3).
[165] *Id.* at B-118-B-119 (March 20, 1989 Amendment at 8-9 (emphasis in original)).
[166] D.I. 94 at 13.

activated because other conditions have to come into play to activate it.

Q. So in other words, your invention would essentially turn on a system. But it wouldn't necessarily cause this other system to issue an alert; is that correct?

A. That's a potential example of that, yes.[167]

Sandel argues that the prosecution history and Grove's testimony "– that enabling as recited in the '436 patent is different from determining an alert condition – is fatal to Honeywell's claims."[168]

Honeywell does not dispute that "enabling" is not the same thing as "warning."[169] What Honeywell does dispute, however, is Sandel's position that its PDA and VAP systems "warn" but are not "enabled." In the report of its expert, Robert John Hansman, Jr., Hansman states that "[Honeywell's] claimed invention defines an area around the airport where the system enables particular alerting criteria as a function of the aircraft's distance to the airport."[170] Hansman opines that "[t]he Sandel ST3400 system accomplishes this function through use of a mode called Premature Descent or PDA alerting and a mode called Virtual Approach Path or VAP processing and alerting."[171] Honeywell states that "Sandel's system defines geometric areas around airport and runways that it refers to as PDA Zones, VAP Zones, and VAP Wedges" which enable the VAP and PDA functionalities of Sandel's TAWS.[172] In support of this conclusion, Honeywell quotes several statements in Sandel's Design Requirements and Objectives

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[167] D.I. 96, Ex. L at 43 (transcript of June 16, 2004 deposition of Michael Grove).
[168] D.I. 94 at 14.
[169] D.I. 102 at 14.
[170] D.I. 103, Ex. 5 at 5 ¶ 25. (Opening Expert Report of Robert John Hansman, Jr. Regarding Defendant Sandel).
[171] *Id.*, Ex. 5 at 5 ¶ 26.
[172] D.I. 102 at 14.

for Sandel ST3400 TAWS/RMI document (the "Design Requirements document") which purportedly support its enablement argument.[173]

Sandel contends that Honeywell's reliance on its Design Requirements document is misplaced because that document "do[es] not describe the actual implementation of Sandel's TAWS."[174] Sandel argues that "the only relevant and admissible evidence of how Sandel implements its system is the source code and the undisputed testimony of those who designed the code."[175] Ultimately, however, Sandel concedes that "the statement that the 'VAP capability shall enable VAP processing when' certain parameters are met . . . does not contradict the source code . . . [because] the VAP processing is, in fact, already 'enabled' by the time the aircraft gets within the range addressed by the first suppressing cirteria."[176] Sandel argues that "[t]he 'shall enable' quote relied upon by Honeywell does not say that the VAP functionality is turned on because of the aircraft entering a particular area . . . . Instead, the passage is consistent with the fact that the VAP capability, including all of the stages of

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[173] *See id.* ("The PDA capability **shall be enabled** when the aircraft enters a PDA Zone . . . ." (quoting D.I. 103, Ex. 3 at 27 [sic, 25] (Design Requirements and Objectives for Sandel ST3400 TAWS/RMI); "The VAP capability **shall enable VAP processing** when the aircraft enters any active VAP Zone." (quoting D.I. 103, Ex. 3 at 30); "The VAP capability **shall enable VAP alert processing** when the aircraft's ground track is aligned within 45º of an active VAP Wedge's bearing, the aircraft's position within the VAP Wedge's vertical and lateral limits and the aircraft is not in the GO Around POF." (quoting D.I. 103, Ex. 3 at 31) (all emphasis supplied by Honeywell)).

[174] D.I. 106 at 8. At oral argument, Sandel acknowledged that it, not Honeywell, introduced the Design Requirements document but that Sandel introduced a different part of that document than the part cited by Honeywell and that "[t]here are parts of [the design document] that do accurately reflect the implementation." *See* D.I. 127 at 124-25.

[175] D.I. 106 at 7. Sandel refers the court to deposition testimony of Gerald Block and Leslie R. Corn to support its argument that the Design Requirements document "does not purport to set out the details of implementation." *See, e.g.* D.I. 107, Ex. S at 180 (transcript of May 19, 2003 deposition of Gerald Block (stating that the Design Requirements document "is an objective for – it's a requirement and – for what the system has to do when it's tested. It has absolutely nothing to do with how it is implemented. The only things in this document that would refer to implementation are specific things that we want in our product that must be there, some of which could be, you know, implementation specific.")).

[176] D.I. 106 at 9 (emphasis in original).

'processing', will not run its entire course and suppress the enunciation of alerts, unless all of the relevant criteria are met."[177]

As stated above, Sandel argues that its VAP is always enabled and that the function of the VAP is to suppress alerts which can not be equated with enabling a warning system. Sandel states that "the whole purpose of the VAP is to determine when the aircraft is 'safe' and, if so to trap what would by definition at that point be spurious or 'nuisance' alerts."[178]

Honeywell contends that "'enabling' and 'suppressing' are two sides of the same coin."[179] Honeywell agrees that Sandel's system is always on at the code level, however, Honeywell argues that it is not enabled because no alert will issue until the aircraft comes within a VAP Zone or Wedge.[180] Honeywell again points to Sandel's Design Requirements document that states VAP processing is "enabled" when an aircraft enters a VAP Zone or Wedge. Once VAP processing is "enabled" the system "determines the threshold altitude at which the Sandel TAWS will give the crew a GPWS Mode 2 alert – if the other factors for a Mode 2 alert are present."[181] Likewise, with regard to Sandel's PDA function Honeywell responds to Sandel's argument that the PDA is, itself, a warning system which does not enable any other warning system by again referring to the Design Requirements document's statement that "PDA capability shall be *enabled* when the aircraft enters a PDA Zone."[182]

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[177] *Id.* (emphasis in original).
[178] D.I. 94 at 14-15.
[179] D.I. 102 at 15.
[180] D.I. 127 at D.I. 127 at 199.
[181] D.I. 102 at 15.
[182] D.I. 103, Ex. 3 at 25 (emphasis added).

Despite Sandel's argument that the Design Requirements document does not describe the implementation of its TAWS system, it was Sandel that initially introduced that document as an exhibit to its opening brief in support of its motion for summary judgment of non-infringement.[183] Sandel acknowledged at oral argument that at least portions of that document "do accurately reflect the implementation [of its TAWS system]."[184] At this stage of the litigation, the court determines that the language of the Design Requirements document raises a question of material fact as to whether Sandel's TAWS reads on the "enabling" and/or "enabling envelope" limitations of the '436 patent as construed by the court. This question pertains to both Sandel's VAP and PDA functionalities.

Consequently, Sandel's motion for summary judgment of non-infringement is denied.[185]

VII. CONCLUSION

For the reasons stated above, Universal's Motion for Summary Judgment of Non-Infringement (D.I. 91) is DENIED and Sandel's Motion for Summary Judgment of Non-Infringement (D.I. 94) is DENIED. An appropriate order consistent with this memorandum will follow.

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[183] *See* D.I. 96, Ex. O.

[184] D.I. 127 at 125.

[185] Although the abbreviated period between oral argument on the parties' proposed claim constructions and motions for summary judgment of non-infringement and the scheduled date of the trial in this matter, unfortunately, precludes the court from providing a detailed written analysis of all of the arguments made by the parties, each of those arguments was considered (as well as the relevant evidence) in the court's determination of both the proper construction of the disputed claim terms and Universal's and Sandel's motions for summary judgment.