Serial No.: 08/274,394 Art Unit: 2304

#### Conclusion

9. The following references are cited as being of general interest: Lewis (4,028,725), Lerche (4,910,674), Baird et al. (4,954,837), Fitzpatrick et al. (5,072,396), Ferguson et al. (5,192,208), Pitts (5,208,590), and Wells et al. (5,334,991).

10. All claims are rejected.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Tan Nguyen, whose telephone number is (703) 305-9755. The examiner can normally be reached on Monday-Thursday from 7:30 AM-6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kevin J. Teska, can be reached on (703) 305-9704. The fax phone number for this Group is (703) 305-9564.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-3800.

KEVIN J. TESKA SUPERVISORY PATENT EXAMINER GROUP 2300 ---

TAN NGUYEN November 06, 1994 9

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ŀ	A copy of this reference is not being furnished with this office action. (See Manual of Patent Examining Procedure, section 707.05 (a).)																	

# TO SEPARATE, HOLD TOP AND BOTTOM EDGES, SNAP-APART AND ENCARD CARBON

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Form PTO 948 (Rev. 10-93)

U.S. DEPARTMENT OF COMMERCE - Patent and Trademark Office

274 Application No. Ę.(

## NOTICE OF DRAFTSPERSON'S PATENT DRAWING REVIEW

PTO Draftpersons review all originally filed drawings regardless of whether they are designated as formal or informal. Additionally, patent Examiners will review the drawings for compliance with the regulations. Direct telephone inquiries concerning this review to the Drawing Review Branch, 703-305-8404.

The drawings filed (insert date) - / / / 24 are	Madified former 27 (PED 1 94(b)(6)
	Modified forms. 37 CFR 1.84(h)(5) 
B objected to by the Draftsperson under 37 CFR 1.84 or 1.152 as	Fig(s)
inflicated below. The Examiner will require submission of new, corrected	·
drawings when necessary. Corrected drawings must be submitted	8. ARRANGEMENT OF VIEWS, 37 CFR 1,84(I)
according to the instructions on the back of this Notice.	View placed upon another view or within outline of another.
	Fig(s)
<ol> <li>DRAWINGS. 37 CFR 1.84(a): Acceptable categories of drawings:</li> </ol>	Words do not appear in a horizontal, left-to-right fashion when
Black ink. Color.	page is either upright or turned so that the top becomes the right
Not black solid lines. Fig(s)	side, except for graphs. Fig(s)
Color drawings are not acceptable until petition is granted.	anal analy for Bulant + B(a)
2. PHOTOGRAPHS. 37 CFR 1.84(b)	9. SCALE. 37 CFR 1.84(k)
Photographs are not acceptable until petition is granted.	<ul> <li>Scale not large enough to show mechanism without crowding</li> </ul>
	when drawing is reduced in size to two-thirds in reproduction.
3. GRAPHIC FORMS. 37 CFR 1.84 (d)	Fig(s)
Chemical or mathematical formula not labeled as separate figure.	Indication such as "actual size" or "scale 1/2" not permitted.
	Fig(s)
Fig(s)	Elements of same view not in proportion to each other.
Group of waveforms not presented as a single figure, using	Fig(s)
common vertical axis with time extending along horizontal axis.	* • • • • • • • • • • • • • • • • • • •
Fig(s)	
Individuals waveform not identified with a separate letter	10. CHARACTER OF LINES, NUMBERS, & LETTERS. 37 CFR 1.84(i)
designation adjacent to the vertical axis. Fig(s)	Lines, numbers & letters not uniformly thick and well defined,
• • • • • • • • • • • • • • • • • • •	clean, durable, and black (except for color drawings).
4. TYPE OF PAPER, 37 CFR 1.84(c)	Fig(s)
Paper not flexible, strong, white, smooth, nonshiny, and durable.	* *9<-/
Slicet(a)	
Ensures, alterations, overwritings, interlineations, cracks, creases,	11. SHADING. 37 CFR 1.84(m)
and folds not allowed. Sheet(s)	Shading used for other than shape of spherical, cylindrical, and
and total not anowed. Sheet(a)	conical elements of an object, or for flat parts.
	Fig(s)
5. SIZE OF PAPER. 37 CFR 1.84(f): Acceptable paper sizes:	Solid black shading areas not permitted. Fig(s)
21.6 cm. by 35.6 cm. (8 1/2 by 14 inches)	
21.6 cm. by 33.1 cm. (8 1/2 by 13 inches)	
21.6 cm. by 27.9 cm. (8 1/2 by 11 inches)	12. NUMBERS, LETTERS, & REFERENCE CHARACTERS. 37 CFR
21.0 cm. by 29.7 cm. (DIN size A4)	1:84(p)
All drawing sheets not the same size. Sheet(s)	Numbers and reference characters not plain and legible. 37 CFR
Drawing sheet not an acceptable size. Sheet(s)	1.84(p)(i) Fig(s)
	Numbers and reference characters used in conjuction with
6. MARGINS. 37 CFR 1.84(g): Acceptable margine:	brackets, inverted commas, or enclosed within outlines. 37 CFR
	1.84(p)(I) Fig(s)
Paper size	Numbers and reference characters not oriented in same direction as
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(8 1/2 X 14 inches) (8 1/2 X 13 inches) (8 1/2 X 11 inches) (DIN Size A4)	English alphabet not used. 37 CFR 1.84(p)(2)
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B .64 cm. (1/4") .64 cm. (1/4") .64 cm. (1/4") 1.0 cm.	.32 cm. (1/8 inch) in height, 37 CPArto(3)
Margins do not conform to chart above.	Fig(a)
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	13. LEAD LINES, 37 CFR 1.84(q)
7. VIEWS. 37 CFR 1.84(h)	Lead lines cross each other. Fig(s)
REMINDER: Specification may require revision to correspond to	Lead lines missing. Fig(s)
drawing changes.	Lead lines not as short as possible. Fig(s)
All views not grouped together. Fig(s)	
Views connected by projection lines, Fig(s)	14. NUMBERING OF SHEETS OF DRAWINGS. 37 CFR 1,84(1)
Views contain center lines. Fig(s)	14. NUMBERING OF SIGES OF DRAWINGS, 57 (JR 1,84(1)
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Sectional views. 37 CFR 1.84(h)(3)	beginning with number 1. Fig(s)
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Fig(a)	Fig(s)

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002055.P002	카 PATENT <sup>L</sup>
1995	ENT AND TRADEMARK OFFICE
Application of:	
Jed Margolin	
) Serial No.: 08/274,394	Examiner: T. Nguyen
, Filed: July 11, 1994	Art Unit: 2304
For: PILOT AID USING SYNTHETIC ) REALITY	. \}
SUBMISSION OF F	ORMAL DRAWINGS
Hon. Commissioner of Patents and Trademarks Washington, D.C. 20231	ORMAL DRAWINGS
Dear Sir:	

Enclosed herewith for filing in the above-identified application are 13 sheets of formal drawings.

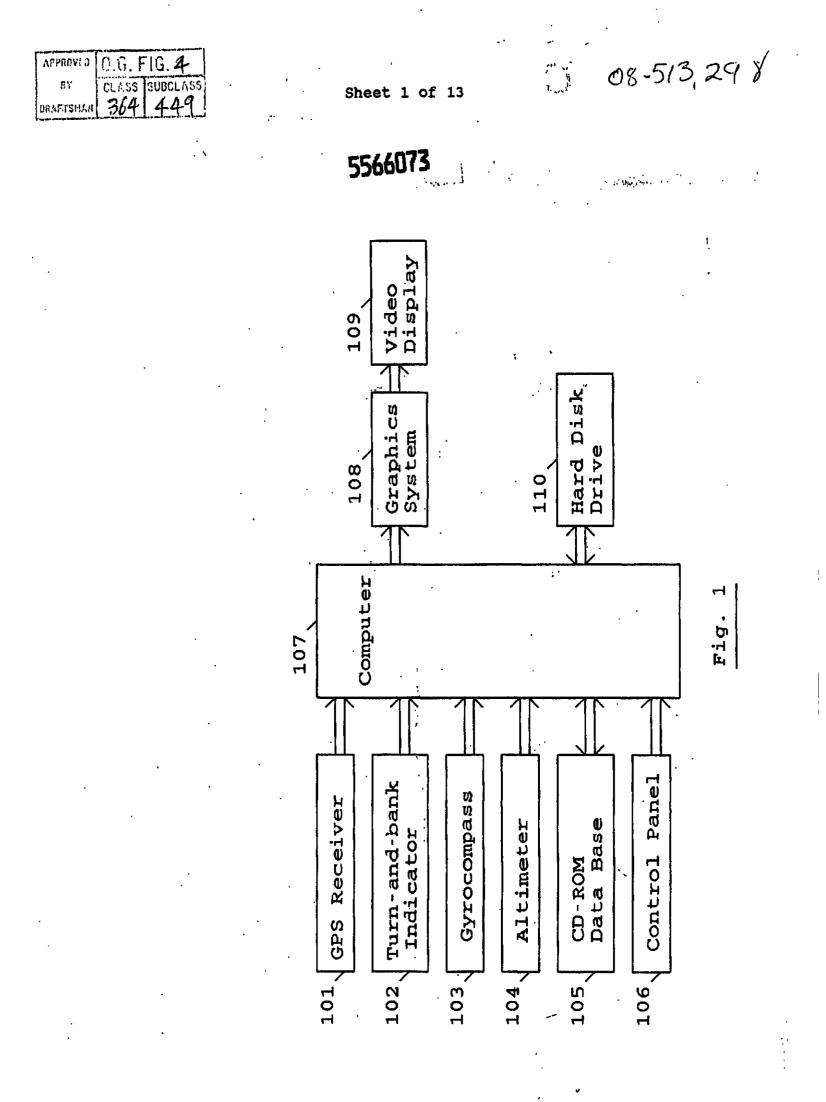
Respectfully submitted, BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN

Date: Februar 8 1995

Keith G. Askoff Reg. No. 33,828 12400 Wilshire Boulevard Seventh Floor Los Angeles, California 90025 (408) 720-8598

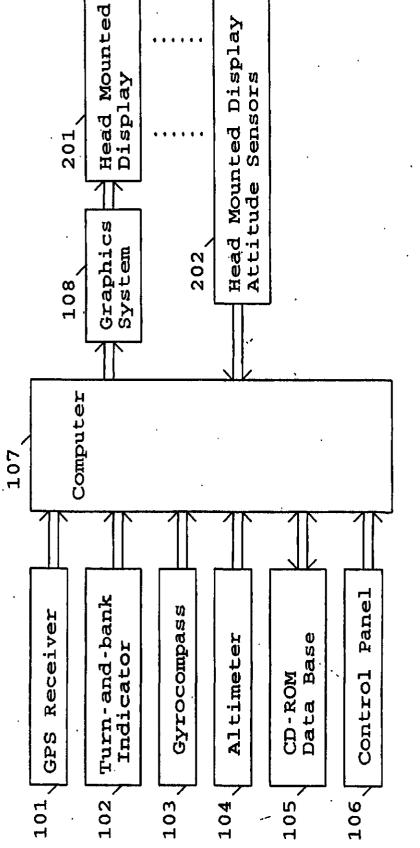
I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail with sufficient postage in an envelope addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231

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on	February 8, 1995	·	
	Date of Deposit		
	Carolyn C. Caires		_
	Name of Person Mailing Corre	Ispondence	
Ca	John C. Caines	218/95	
	Signature	Date	-



APPROVED By Oraptshan	O.G. F	FIG.	Sheet 2 of 13	$\langle \rangle$	08-513,278
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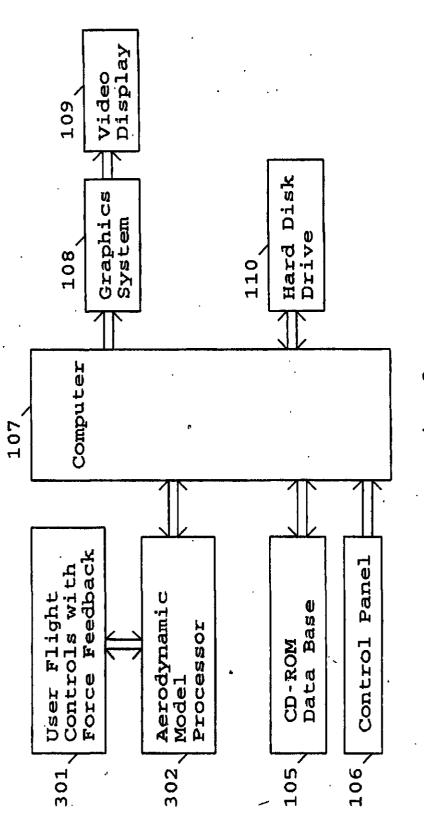
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Fig.

APPROVED	0.G. F	IG.
BY	CLASS	SUBCLACS
DRAFTSHAN		

Sheet 3 of 13

08-513,298  $\langle \rangle$ 



m Fig.

APPROVED	0.G. FIG. 4			
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ORAFTSMAN	364	449		

Sheet 4 of 13

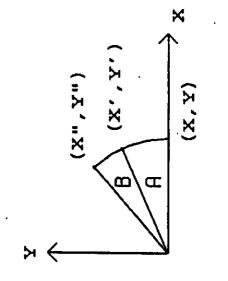
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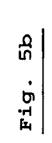
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O.G. FIG. CLASS SUBCLASS APPROVED ey Oraftshan

Sheet 5 of 13





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08-513, 29,8

× (X', Y') ы Д (Х, У) Fig. Ē

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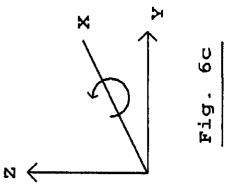
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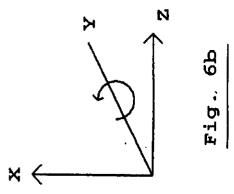
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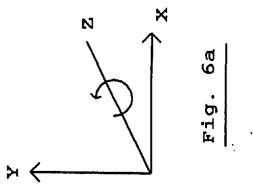
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Sheet 6 of 13

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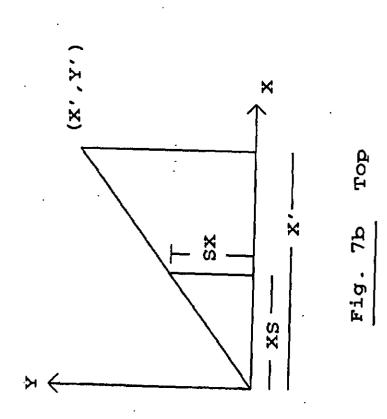
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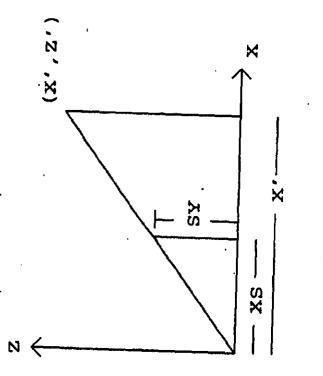
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APPROVED O.G. FIG. BY CLASS SUBCLASS DRAFTSHAN



Sheet 7 of 13



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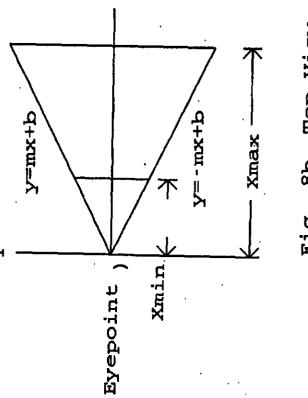
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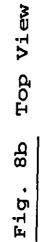
Fig. 7a Side

APPROYED	O.G. FIG.				
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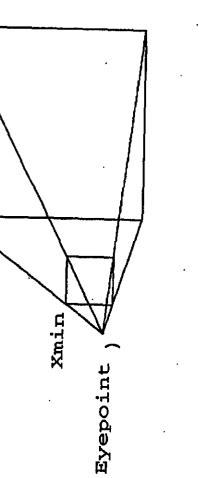








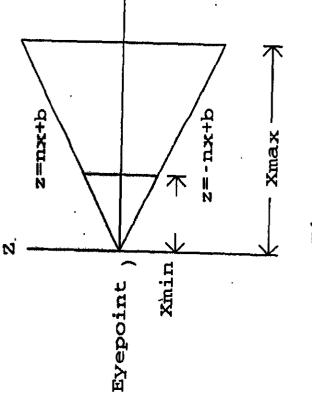


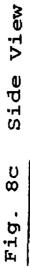


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Fig.

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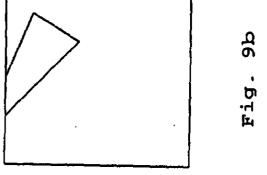


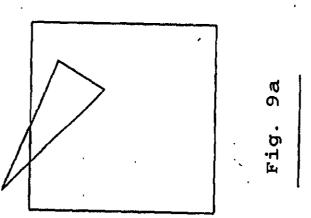


APPROVED	0.G. FIG.			
EY	CLASS	SUBCLASS		
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# Sheet 9 of 13

06-513,298





APPROVED O.G. FIG. BY CLASS SUBCLASS DRAFTEMAN

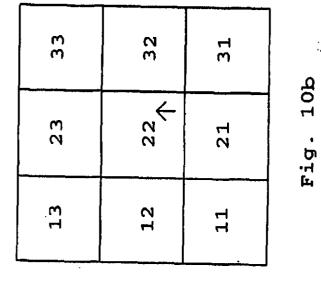
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Sheet 10 of 13

08-513,298



12 22 32 32 11 21 31 10 20 30 Fig. 10a

APPROVED O.G. FIG. ORAFTSMAN

Sheet 11 of 13

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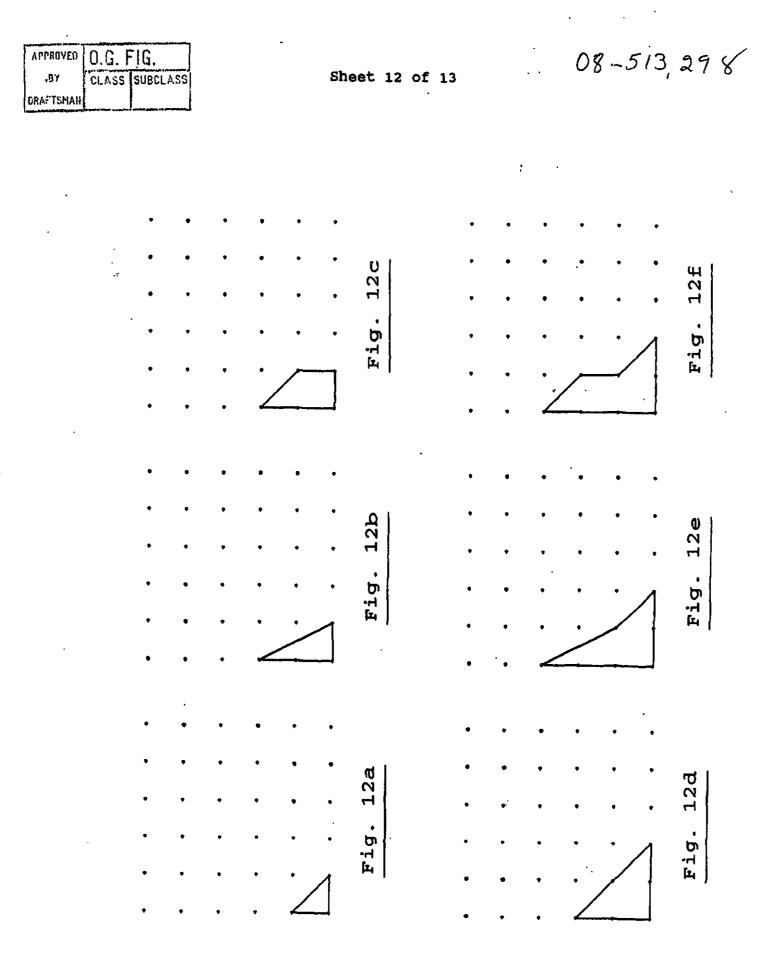
Fig.

11b

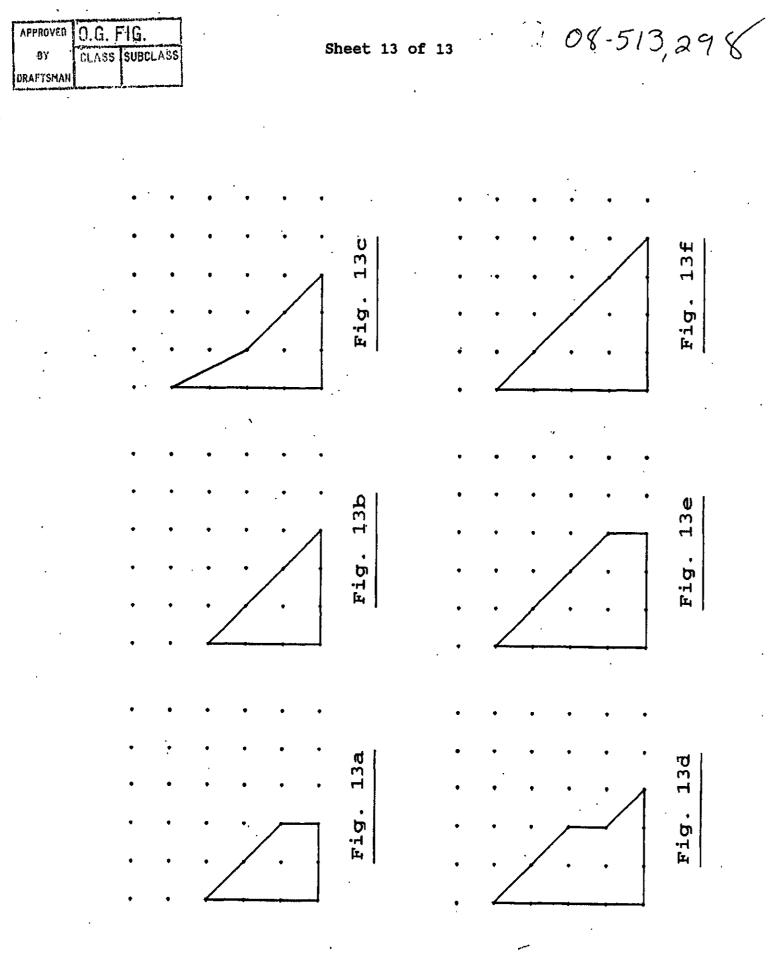
08-513,27

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Fig. 11a



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002055.P002

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

re Application of:

Jed Margolin

Serial No.: 08/274,394

Filed: July 11, 1994

For: PILOT AID USING SYNTHETIC REALITY

Commissioner of Patents and Trademarks Washington, D.C. 20231

Art Unit: 2304

Examiner: T. Nguyen

76-202-203-

PATENT

## AMENDMENT AND RESPONSE

Dear Sir:

In response to the Office Action of November 9, 1994, please enter the following amendments and consider the following remarks.

IN THE TITLE

Please delete the entire title and replace it with: --PILOT AID USING A SYNTHETIC ENVIRONMENT--

## IN THE ABSTRACT

Page 36, fines 1-2, please delete "means for determining" and replace it with:

--way to determine--090 BA 02/27/95 08274394 090 BA 02/27/95 08274394

76.00 CK ·

209.00 CK

# IN THE SPECIFICATION

On page 7, line 12, please delete "service" and replace it with: --survey--

On page 7/line 15, please delete "service" and replace it with: --survey--

On page 11, line 9, please delete "12e" and replace it with: --12f--

On page 11, line 9, please delete "13e" and replace it with: --13f--

On page 15, line 10, please delete "104" and replace it with: --106--

On page 16, line 4, please delete "the the" and replace it with: --to the--

On page 29, line 2, please delete "service" and replace it with: --survey--

On page 30, line 16, please delete "12e" and replace it with:.

--12f---

On page 30, line 17, please delete "13e" and replace it with: --13f--

-2-

#### IN THE CLAIMS

Please amend claims 1 - 13.

1. (Once Amended) A pilot aid which uses an aircraft's position and attitude to transform data from a digital data base to present a pilot with a synthesized three dimensional projected view of the world comprising:

a position determining <u>system</u> [means] for locating said aircraft's position in three dimensions;

a digital data base [means containing/polygon] <u>comprising terrain</u> data. <u>said</u> <u>terrain data</u> representing terrain <u>as one or more polygons</u> [and manmade structures];

an attitude determining system [means] for determining said aircraft's orientation in three dimensional space

[a control panel means for allowing said pilot to select different operating features;]

a computer [means for using said aircraft position data] to access said terrain data according to said aircraft's position and [manmade structure data from said digital data base and using said aircraft orientation data] to transform said terrain [and manmade structure] data to provide three dimensional projected image data according to said <u>aircraft's orientation</u> [operating features selected by said pilot];

a display [means] for displaying said three dimensional projected image data.

2. (Once Amended) The <u>pilot aid</u> [position determining means] of claim 1, wherein said position determining <u>system</u> [means] comprises a standard system for receiving and processing data from the global positioning system.

3. (Once Amended) The <u>pilot aid</u> [attitude determining means] of claim 1, wherein said attitude determining <u>system</u> [means] comprises a standard avionics system.

4. (Once Amended) The <u>pilot aid</u> [digital data base] of claim 1, wherein said digital data base [means] comprises a cd rom disc and cd rom drive.

5. (Once Amended) The <u>pilot aid</u> [control panel means] of claim 1, <u>further</u> <u>comprising a control panel to select one or more operating features</u> [wherein said control panel means selects the functions of pan, tilt, and zoom].

6. (Once Amended) The <u>pilot/aid</u> [control panel means] of claim 1, wherein said <u>one or more operating features comprise one or more features selected from</u> the group consisting of panning a viewpoint of said three dimensional projected image, tilting a viewpoint of said three dimensional projected image, zooming a viewpoint of said three dimensional projected image, zooming a viewpoint of said three dimensional projected image, and providing a three dimensional projected image of a route ahead [control panel means permits said pilot to preview the route ahead].

7. (Once Amended) A pilot aid which uses an aircraft's position and attitude to transform data from a digital data base to present a pilot with a synthesized three dimensional projected view of the world comprising:

a position determining system [means] for locating said aircraft's position in three dimensions;

a digital data base [means containing polygor] <u>comprising terrain</u> data, <u>said</u> <u>terrain data</u> representing terrain <u>as one or more polygons</u> [and manmade structures];

an attitude determining <u>system</u> [means] for determining said aircraft's orientation in three dimensional space;

[a control panel means for allowing said pilot to select different operating features;]

a computer [means for using said aircraft position data] to access said terrain data according to said aircraft's position and [manmade structure data from said digital data base and using said aircraft orientation data] to transform said terrain [and manmade structure] data to provide three dimensional projected image data according to said <u>aircraft's orientation</u> [operating features selected by said pilot];

[a display means for displaying said three dimensional projected image data;]

a mass storage memory for recording said aircraft position data and said aircraft's attitude data for allowing [said aircraft's] <u>a</u> flight <u>of said aircraft over said</u> <u>terrain</u> to be displayed at a later time.

8. (Once Amended) The <u>pilot aid</u> [position determining means] of claim X, wherein said position determining <u>system</u> [means] comprises a standard system for receiving and processing data from the global positioning system.

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 $\chi$  (Once Amended) The <u>pilot aid</u> [attitude determining means] of claim  $\chi$ , wherein said attitude determining <u>systems</u> [means] comprises a standard avionics system.

digital data base [means] comprises a cd rom and a cd rom drive.

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11. (Once Amended) The <u>pilot aid</u> [control panel means] of claim 7, <u>further</u> <u>comprising a control panel to select one or more operating features</u> [wherein said control panel means selects the functions of pan, tilt, and zoom].

12. (Once Amended) The <u>pilot aid</u> [control panel means] of claim <u>11</u> [7], wherein said <u>one or more operating features comprise one or more features</u> <u>selected from the group consisting of panning a viewpoint of said three</u> dimensional projected image, tilting a viewpoint of said three dimensional projected image. The projected image of a route and projected image. Three dimensional projected image of a route and and providing a three dimensional projected image of a route and providing a three dimensional projected image of a previous flight [control panel means permits said pilot to preview the route ahead or to review previous flights].

13. (Once Amended) A pilot aid which uses an aircraft's position and attitude to transform data from a digital/data base to present a pilot with a synthesized three dimensional projected view of/the world comprising:

a position determining system [means] for locating said aircraft's position in three dimensions;

a digital data base [means containing polygon] <u>comprising terrain</u> data. <u>said</u> <u>terrain data</u> representing terrain <u>as one or more polygons</u> [and manmade structures];

[an] <u>a first attitude determining system</u> [means] for determining said aircraft's orientation in three dimensional space;

a head mounted display [means] worn by said pilot of said aircraft;

[an] a second attitude determining system [means] for determining the orientation of said pilot's head in three dimensional space;

[a control panel means for allowing said pilot to select different operating features;]

a computer [means for using sald/alrcraft position data] to access said terrain data according to said aircraft's position and [manmade structure data from said digital data base and using said aircraft orientation data and said pilot head orientation data] to transform said terrain [and manmade structure] data to provide three dimensional projected image data to said head mounted display according to said aircraft's orientation and said pllot head orientation [operating features selected by said pilot].

Please add the following new claims

all

(New) The pilot aid as described in claim 1 wherein said digital data base further comprises structure data, said structure data representing manmade structures as one or more polygons.

19 The pilot aid as described in claim, wherein said digital data (New) base further comprises structure data, said structure data representing manmade structures as one or more polygons.

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The pilot aid as described in claim 13 wherein said digital data 18. (New) base further comprises structure data, said structure data representing manmade structures as one or more polygons.

17. (New) The pilot aid as described in claim 1 wherein said terrain data Is generated from elevation data comprising an array of elevation points, wherein each said polygon representing said terrain defines a plane, wherein in a first region of terrain represented by one or more of said polygons no elevation point within each said polygon is below said plane of each said polygon by a first distance or more.

18. (New) The pilot aid as described in claim 7 wherein said terrain data is generated from elevation data comprising an array of elevation points, wherein each said polygon representing said terrain defines a plane, wherein in a first region of terrain represented by one or more of said polygons no elevation point within each said polygon is below said plane of each said polygon by a first distance or more.

19. (New) The pilot aid as described in claim 13 wherein said terrain is generated from elevation data comprising an array of elevation points, wherein each said polygon representing said terrain defines a plane, wherein in a first region of terrain represented by one or more of said polygons no elevation point within each said polygon is below said plane of each said polygon by a first distance or more.

20. (New) The pilot aid as described in claim 17 wherein in a second region of said terrain represented by one or more of said polygons no elevation point within each said polygon is below said plane of each said polygon in said second region by a second distance or more, said second distance different from said first distance.

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21. (New) The pilot aid as described in claim 18 wherein in a second region of said terrain represented by one or more of said polygons no elevation point within each said polygon is below said plane of each said polygon in said second region by a second distance or more, said second distance different from said first distance.

22. (New) The pilot aid as described in claim 19 wherein in a second region of said terrain represented by one or more of said polygons no elevation point within each said polygon is below said plane of each said polygon in said second region by a second distance or more, said second distance different from said first distance.

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In the pilot aid as described in claim if wherein no elevation point within each said polygon in said first region is above said plane of said polygon.

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24. (New) The pilot aid as described in claim 18 wherein no elevation point within each said polygon in said first region is above said plane of said polygon.

25. (New) The pilot aid as described in claim 19 wherein no elevation point within each said polygon in said first region is above said plane of said polygon.

26. (New) The pilot aid as described in claim 20 wherein no elevation point within each said polygon in said first region and said second region is above said plane of said polygon.

21. (New) The pilot aid as described in claim 27 wherein no elevation point within each said polygon in said first region and said second region is above said plane of said polygon.

26. (New) The pilot aid as described in claim 22 wherein no elevation point within each said polygon in said first region and said second region is above said plane of said polygon.

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29 (New) A method for producing a terrain data base comprising terrain data, said terrain data represented as one or more polygons, said method comprising the steps of:

providing a plurality of elevation points, each of said plurality of elevation points representing an elevation of a point on a terrain;

defining a polygon having one or more vertices defined by one or more of said elevation points;

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examining an adjacent one of said plurality of elevation points to determine if expanding said polygon to an expanded polygon to include said adjacent one of said plurality of elevation points causes one or more of said plurality of elevation points within said expanded polygon to be below a plane of said expanded polygon by a first distance or more; and,

expanding said polygon to include said adjacent one of said plurality of elevation points if none of said elevation points within said expanded polygon is below said plane by said first distance or more.

30. (New) The method as described in claim 29 wherein said adjacent one of said plurality of elevation points is further examined to determine if one of

morè of said plurality of elevation points within said expanded polygon is above said plane of said expanded polygon, and said polygon is expanded if none of said elevation points within said expanded polygon is above said plane of said expanded polygon and if none of said elevation points within said expanded polygon is below said plane by said first distance or more.

31. (New) The method as described in claim 23 wherein one or more additional adjacent ones of said plurality of elevation points are examined, and wherein said polygon is expanded to include said one or more additional ones of said plurality of elevation points which do not cause any of said elevation points within said expanded polygon to be below said plane of said expanded polygon by said first distance or more.

32. (New) The method as described in claim 23 wherein one or more additional adjacent ones of said plurality of elevation points are examined, and wherein said polygon is expanded to include said one or more additional ones of said plurality of elevation points which do not cause any of said elevation points within said expanded polygon to be above said plane of said expanded polygon to be below said plane of said elevation points within said expanded polygon to be below said plane of said expanded polygon by said first distance or more.

33. (New) The method as described in claim 31 wherein said polygon is stored in said terrain data base after all of said elevation points adjacent to said polygon have been examined.

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34. (New) The method as described in claim 32 wherein said polygon is stored in said terrain data base after all of said elevation points adjacent to said polygon have been examined.

35. (New) The method as described in claim 31 wherein additional polygons are defined, expanded, and added to said terrain database.

36. (New) A method of using an aircraft's position and attitude to transform data from a digital data base to present a pilot with a synthesized three dimensional projected view of the world comprising:

locating said aircraft's position in three dimensions;

providing a data base comprising terrain data, said terrain data representing terrain as one or more polygons;

determining said aircraft's orientation in three dimensional space;

accessing said terrain data according to said aircraft's position;

transforming said terrain data to provide three dimensional projected image data according to said aircraft's orientation; and,

displaying said three dimensional projected image data.

37. (New) The method of claim 36 further comprising selecting one or more operating features, wherein said one or more operating features comprise one or more features selected from the group consisting of panning a viewpoint of said three dimensional projected image, tilting a viewpoint of said three dimensional projected image, zooming a viewpoint of said three dimensional projected image, zooming a viewpoint of said three dimensional projected image, and presenting a three dimensional projected image of a route ahead.

38. (New) The method as described in claim 36/wherein said terrain data base is produced by a method comprising the steps of:

providing a plurality of elevation points, each of/said plurality of elevation points representing an elevation of a point on a terrain;

defining a polygon having one or more vertices defined by one or more of said elevation points;

examining an adjacent one of said plurality of elevation points to determine if expanding said polygon to an expanded polygon to include said adjacent one of said plurality of elevation points causes one or more of said plurality of elevation points within said expanded polygon to be below a plane of said expanded polygon by a first distance; and,

expanding said polygon to include said adjacent one of said plurality of elevation points if none of said elevation points within said expanded polygon is below said plane by said first distance of more.

39. (New) The method as described in claim 38 wherein said adjacent one of said plurality of elevation points is further examined to determine if one or more of said plurality of elevation points within said expanded polygon is above said plane of said expanded polygon, and said polygon is expanded if none of said elevation points within said expanded polygon is above said plane of said expanded polygon and if none of said elevation points within said expanded polygon is below said plane by said first distance or more.

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#### **BEMARKS**

In the Office Action of November 9, 1994, a new title was required. Applicant has supplied herewith a new title which is descriptive of the invention to which the claims are directed. Further, Applicant has made correction to the abstract as requested. In addition, minor informalities throughout the specification have been corrected. In this regard, Applicant notes that the originally filed Figures contain two Figures labeled 12e, and two Figures labeled 13e. Applicant has re-labeled the second Figure in each case to read 12f, and 13f, respectively, on the corrected formal drawings submitted concurrently herewith, and has corrected the specification accordingly.

Claims 1 - 13 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Applicant has amended the claims, and has provided, below, clarification where requested. Applicant submits that the amendments, and clarification overcome all 35 U.S.C. § 112, second paragraph rejections. However, should the Examiner believe any further § 112 issues remain, any further guidance, including suggested claim language, would be appreciated.

With regard to the phrase "polygon data representing terrain and manmade structure," Applicant has amended the claims to recite that the data base comprises terrain data, wherein the terrain data represents the terrain as one or more polygons. Applicant submits that as described throughout the present specification, the terrain may be represented by a collection of polygons where, for example, an elevation data point may be used as one of the vertices of the polygon. With regard to the phrase "different operating features" Applicant has removed this phrase from the independent claims. Applicant has amended claim 5 to recite that the pilot aid of claim 1 further comprises a control panel to

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selected one or more operating features. Further in this regard, Applicant has more clearly stated, in claim 6, that the functions may include panning, tilting, and zooming a viewpoint of the recited three dimensional projected image. Applicant submits that the terms "pan," "tilt," and "zoom" are well known in the film, video, and computer graphics industries. For example, in the present invention pan may mean to rotate the observer's eyepoint around the yaw axis, tilt may mean to rotate the observer's eyepoint around the pitch axis, and zoom may mean to change the magnification or change the angular field of view. This allows the pilot to "look" at any portion of the terrain. See, for example, page 15, lines 10 - 18 of the present specification.

Further, Applicant has amended the claims to recite that the computer accesses the terrain data according to the aircraft's position. Referring to page 12, lines 19 - 26, and Figures 10a, 10b, 11a, and 11b, the computer uses the plane's position, in one embodiment, by accessing the data in blocks, which blocks are dependent upon the aircraft's position as described. Of course, the present invention is not limited to this embodiment, and other methods of accessing terrain data around the aircraft's position may be used. Further, Applicant has amended the claims to recite that the computer transforms the terrain data according to the aircraft's orientation as described, for example, on page 13, lines 1 - 4. The transformation is described in detail, on pages 16 - 28 of the present application.

Claims 1 - 12 were rejected under 35 U.S.C. § 103 as being unpatentable over *Beckwith et al.* in view of *Behensky et al.* or *Atari Game Corporation's Hard Drivin' Brochure*, or *Atari Game Corporation's Steel Talons Brochure.* The Examiner states that *Beckwith et al.* discloses a digital system for producing a real time video display in perspective of terrain over which an aircraft is passing on the basis of compressed digital data stored on a cassette tape. The data is read by the computer to provide a 3-D perspective on the display. The

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Examiner states that *Beckwith et al.* does not disclose that the database contain polygon data representing the terrain. The Examiner states that *Behensky et al.* suggests a driving simulator for a video game which includes the road and other terrain which are produced by mathematically transforming a three dimensional polygon database. The Examiner states that the suggestion of *Behensky et al.* in at least column 2 would have motivated one of ordinary skill in the art to combine with the system of *Beckwith et al.* In order to provide a significant reduction of database storage and a larger geographic area can be stored so it is not necessary to generate a database of each mission.

Applicant respectfully submits that there is no teaching or suggestion to combine the references as suggested by the Examiner and that further, a combination of the references would require significant modifications not taught in the references singly or in combination, to arrive at the present invention. Please note that *Beckwith et al.*, like the present invention, is concerned with displaying a representation of actual terrain. There is nothing therein to suggest using the compressed data described therein to construct polygons, nor is there any teaching or suggestion to combine the method therein with anything contained in a driving simulator.

Referring to *Behensky et al.*, note that the polygons described therein are used to represent a fictional universe. The polygons of *Behensky et al.* do not represent real terrain in any manner, but rather are, instead, essentially "building blocks" which may be accessed from the data base to create the fictional scene through which the driver is driving. Although the Examiner states that the suggestion in column 2 in *Behensky et al.*, wherein the use of a visual scene comprising polygons is disclosed, would have motivated one of ordinary skill in the art to combine with the system of *Beckwith et al.* in order to provide a significant reduction of database storage, there is nothing therein to suggest that these

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polygons would be useful for representing the terrain of *Beckwith et al.* That is, in *Behensky et al.*, the polygons are disclosed as simply a means to create this fictional, high resolution scene, and there is no suggestion that these visual building blocks be used to represent actual terrain, or how this would be accomplished.

Furthermore, even if the references are combined note that there is no teaching or suggestion of how to modify the combination of Behensky et al. and Beckwith et al. to arrive at the present invention. Specifically, where, other than the present invention, is there any teaching of constructing polygons based on an array of elevation points? In this regard, note that the data of Beckwith et al. from which the perspective view is obtained, comprises grid points several meters apart. As such, this data would be of far too low a resolution to be useful in the system of Behensky et al. For example, referring to the Hard Drivin' and the Steel Talons Brochure, note that such fine details as road markings, signs, etc. are present. These type of details have no use in the system of Beckwith et al. In Beckwith et al. actual terrain data must be used, and a low resolution perspective view as is provided in Beckwith et al. is all that is needed for the purposes of Beckwith et al. Note that although Beckwith et al. were aware of flight simulation techniques, (column 2, lines 24 - 49) they considered the perspective techniques described therein as being desirable to create a realistic three dimensional view. Thus, Beckwith et al. teaches away from the present invention.

Absent the teachings of the present invention, there is nothing in Beckwith et al. or Behensky et al. that would motivate one of skill in the art to modify the combination of Beckwith et al. with Behensky et al., since the compressed data of Beckwith et al. appears to be satisfactory for the purposes described therein. For example, note that the Examiner states that Beckwith et al. may use these polygons so that it is not necessary to generate a data base of each

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mission. However, while a game based on a fictional universe may use a library of polygons to create a display of scenes in that universe, the invention of *Beckwith et al.* must create a perspective view based on the data for the actual terrain. Clearly, there is no teaching in either reference as to how actual terrain would be represented by polygons. Additionally, absent the present invention, there exists no motivation to do so. The only such teaching and motivation comes from the present invention.

Claim 13 was rejected under 35 U.S.C. § 103 as being unpatentable over Beckwith et al. and Behensky et al., as applied to claims 1 - 12, and further in view of the sales brochure from the Polhemus company. Applicant submits, for the above-described reasons, that the claims are unobvious over the combination of Beckwith et al. and Behensky et al. Furthermore, note the brochure of Polhemus makes no mention of its use in the claimed combination, nor does the combination of references teach or suggest that the head mounted display of Polhemus would be useful therein. Thus, Applicant submits that claim 13 is further unobvious over the prior art of record.

Applicant has added new claims 14 - 39. Claims 14 - 16 claim that the data base of claims 1, 7, and 13 further comprises structure data. Claims 17 - 19 claim that each of the polygons defines a plane, wherein no elevation point within a first region represented by the polygons is below the plane of each polygon by a first distance or more. In this way, it can be ensured that the terrain represented by a polygon is sufficiently flat for accurate representation as described generally on pages 29 - 30 of the present specification. Applicant submits that this feature is nowhere taught or suggested in the prior art of record. Claims 20 - 22 claim that no elevation point within a second region of terrain represented by one or more polygons is below the plane of the polygons in the second region by a different distance. In this way, some regions such as those surrounding airports, may be

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represented with greater accuracy, again as described on pages 29 - 30. Claims 23 -28 claim that no elevation point within an expanded polygon is above the plane of the region. Applicant submits that the pilot aid as described in the above-described claims is further unobvious over the prior art of record.

Claims 29 - 35 claim a method of generating the database using elevation points. Applicant submits the claimed method is nowhere taught or suggested anywhere in the prior art of record. Applicant has added claims 36 - 37 which claim a method of presenting a pilot with a synthesized three dimensional projected view of the world. For the reasons discussed in relation to claims 1 - 12, Applicant submits the claimed method is unobvious over the prior art of record. Further, Applicant has added dependent claims 38 - 39 which claim the method of generating the polygons. For the reasons discussed in relation to claims 29 - 35, Applicant submits that these claims are further unobvious over the prior art of record. For the foregoing reasons, Applicant submits that all objections and rejections have been overcome. Applicant submits that all pending claims are in condition for allowance and allowance of the same is respectfully requested.

> Respectfully submitted, BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN

Date: Februrs, 1995

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Patent

### IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of:

Jed Margolin

Serial No.: 08/274,394

Filed: July 11, 1994

#### For: PILOT AID USING SYNTHETIC REALITY

Examiner: T. Nguyen Group Art Unit: 2304

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#### POWER OF ATTORNEY AND REVOCATION OF PREVIOUS POWERS

#### Pursuant to 37 C.F.R. § 1.36, the undersigned sole inventor hereby

revokes all powers of attorney previously given and appoints

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(LJV/cak 11/28/94)

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**EXAMINER'S ACTION** 

Part III DETAILED ACTION

Notice to Applicants

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 This office action is responsive to the amendment filed on February 13, 1995. As per request, claims 1-13 have been amended. Claims 14-39 have been added. Thus, claims 1-39 are pending.

2. New title has been entered.

#### Election/Restriction

3. Newly submitted claims 29-30 are directed to an invention that is independent or distinct from the invention originally claimed for the following reason:

Newly added claims 29 and 30 are directed to a method for producing a terrain data based comprising terrain data and said terrain data represented as one or more polygons. However, the original set of claims are directed to a pilot aid which uses an aircraft's position and attitude to transform data from a digital based to present a pilot with a synthesized three dimensional projected view of the world.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution

on the merits. Accordingly, claims 29-30 are withdrawn from consideration as being directed to a non-elected invention. See 37 C.F.R. § 1.142(b) and M.P.E.P. § 821.03.

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#### Claim Rejections - 35 USC § 112

4. Claim 1-28 and 31-39 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4.1. As per claim 1 (as exemplary of claims 1, 7 and 13), line 7, the phrase "one or more" is vague and indefinite. The word "and" should be added after the phrase "to said aircraft's orientation" on line 17.

4.2. As per claim 5 (as exemplary of claims 5 and 11), line 2, the phrase "one or more operating features" is unclear since they are not defined properly.

4.3. As per claim 6 (as exemplary of claims 6, 12 and 37), the phrases "said one or more operating features" and "the group" on lies 2 and 3, respectively, have no antecedent basis.

4.4. As per newly added claim 17 (as exemplary of claims 17-19), the instant passage on lines 3-6 is unclear as to what the first region of terrain represented. Verification is requested. Furthermore, the phrases "one or more" and "distance

or more" on lines 5 and 6, respectively, are vague and indefinite.

4.5. As per newly added claim 20 (as exemplary of claims 20-22), similar to the above, it is unclear as to what the second region represented. Moreover, the phrases "one or more" and "distance or more" on lines 2 and 4, respectively, are vague and indefinite.

4.6. As per newly added claims 23 and 26 (as exemplary of claims 23-28), it is unclear as to what the no elevation point means. Clarification is requested.

4.7. As per newly added claim 36, the comma at the end of line 10 should be deleted.

4.8. As per newly added claim 38, lines 5-6, the phrase "one or more vertices defined by one or more of said elevation points" is vague and indefinite. Furthermore, the instant passage on lines 7-14 is unclear as to how to examining an adjacent one of the plurality and how to expanding the polygon to include the adjacent one of the plurality of elevation points. Verification is requested. Moreover (as exemplary of claims 38 and 39), the phrases "one or more" and "distance or more" on lines 9 and 14, respectively, are vague and indefinite.

4.9. The remaining claims, not specifically mentioned, are rejected for incorporating the defects from their respective parent by dependency.

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5. The following rejections are based on the examiner's best interpretation of the claims in light of the 35 U.S.C. 112 errors noted above.

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#### Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. § 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Subject matter developed by another person, which qualifies as prior art only under subsection (f) or (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.

7. Claims 1-12 are rejected under 35 U.S.C. § 103 as being unpatentable over Beckwith et al (4,660,157) in view of Behensky et al. (5,005,148) or a brochure from Atari Game Corp. (Hard Driving') or a brochure from Atari Game Corp. (Steel Talons).

7.1. With respect to claims 1, 5-7, 11-12, 14 and 36-37, Beckwith et al. discloses a digital system for producing a real time video display in perspective of terrain over which an aircraft is passing on the basis of compressed digital data stored on a cassette tape (see at least an abstract). Beckwith

et al. discloses that the system includes a position determining means for locating the aircraft's position in three dimensions and an attitude determining means for determining the aircraft's orientation in three dimensional space (see at least figure 1 and columns 5 and 6). Beckwith et al. further discloses that the system includes a digital data base means for storing a compressed terrain data (see at least the abstract). Beckwith et al. also discloses a computer means for reading compressed terrain data from the digital data base means in a controlled manner based on the instantaneous geographical of the aircraft as provided by the aircraft navigation computer system, reconstructing the compressed data by suitable processing and writing the reconstructed data into a scene memory, and then providing a 3D perspective on the display (see at least columns 2 and 3).

Beckwith et al. does not explicitly disclose that a digital data base means containing polygon data representing terrain and manmade structures. However, Behensky et al. suggests a driving simulator for a video game which includes the road and other terrain are produced by mathematically transforming a threedimensional polygon data base (see at least column 2, lines 33-38). The suggestion of Behensky et al. in at least column 2 would have motivated one of ordinary skill in the art to combine with the system of Beckwith et al. in order to provide a significant reduction of data base storage and a larger

geographic areas can be stored so that it is not necessary to generate a data base of each mission. Similarly, the digital data base means containing polygon data representing terrain and manmade structures is also taught in a brochure from Atari Game Corp. (Hard Driving') or a brochure from Atari Game Corp. (Steel Talons). Thus, because of the motivation set forth above, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings of Behensky et al. or the brochure from Atari Game Corp. (Steel Talons) with the system of Beckwith et al.

With respect to claims 2-3 and 8-9, Beckwith et 7.2. al. discloses the claimed invention as discussed above but does not explicitly discloses that the position determining means comprises a standard system for retrieving and processing data from the global positioning system and the attitude determining means comprises a standard avionics systems. However, the use of the standard system for retrieving and processing data from global positioning system and the standard avionics systems are well known effective and efficient means for determining the position and the orientation of the aircraft. For examples, the Maher patent (4,485,383) shows a receiver for receiving global. positioning system and the Timothy patent shows a method for determining the orientation of a moving object form a single GPS receiver and producing roll, pitch, and yaw information. Ιt

would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the global positioning system and the standard avionics system in such a system as taught through Beckwith et al. because it would produce high degree of accuracy in determining the position and orientation of the aircraft including roll, pitch, and yaw information.

7.3. With respect to claims 4 and 10, Beckwith et al. does not specifically disclose that the digital data base means comprises a CD rom disc and CD rom drive. However, the use of CD rom disc and CD rom drive for storing data is well known effective and efficient means for storing any data. It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize CD rom disc and CD rom drive in such a system as taught through Beckwith et al. because it would permit high degree of accuracy in the storing and restoring data, random access to the data so that the requirements for cache storage are reduced.

8. Claim 13 is rejected under 35 U.S.C. § 103 as being unpatentable over Beckwith et al and Behensky et al. as applied to claims 1-12 above, and further in view of the sales brochure from the Polhemus company.

Beckwith et al. and Behensky et al. disclose the claimed invention except for a head mounted display means worn by the pilot and an attitude determining means for determining the

orientation of the pilot's head in three dimensional space. However, the sales brochure from the Polhemus company suggests the commercial available of a position and orientation sensor which can be used on a head-mounted display. The suggestion of the Polhemus company would have motivated one of ordinary skill in the art to combine the teaching of Polhemus company with the system of Beckwith et al. in order to allow the pilot to have a complete range of motion to receive a synthesized view of the world, a complete unhindered by the aircraft structure. Thus, because of the motivation set forth above, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings in Polhemus's brochure and Beckwith et al. patent.

9. In view of the indefinite state(s) of the claimed invention, no prior art has been applied against the claims 17-28, 31-35 and 38-39. However, applicants are requested to consider the cited references below fully when responding to the office action.

10. All claims are rejected.

11. The following references are cited as being of general interest: Sullivan et al. (4,213,252), Heartz (4,715,005), Dawson et al. (5,179,638) and Nack et al. (5,317,689).

#### Remarks

12. Applicant's arguments filed on February 13, 1995 have been fully considered but they are not deemed to be persuasive.

13. On page 16, second paragraph, the applicants argue that claims 1-12 are patentable over Beckwith et al. and Behensky et al. because there is no teaching or suggestion to combine the references. It is not necessary that the references actually suggest, expressly or in so many words, the changes or improvements that applicant has made. The test for combining references is what the references as a whole would have suggested to one of ordinary skill in the art. <u>In re Shecler</u>, 168 USPQ 716 (CCPA 1971); <u>In re McLaughlin</u>, 170 USPQ 209 (CCPA 1971); <u>In re</u> Young, 159 USPQ 725 (CCPA 1986).

The Examiner recognizes that references cannot be arbitrarily combined and that there must be some logical reason why one skill in the art would be motivated to make the proposed combination of references. <u>In re Regel</u> 188 USPQ 136 (CCPA 1975). However, there is no requirement that the motivation to make the combination be expressly articulated in one or more of the references; the teaching, suggestion or inference can be found not only in the references but also from knowledge generally available to one of ordinary skill in the art. <u>Ashland Oil v.</u> <u>Delta Resins</u> 227 USPQ 657 (CAFC 1985). The test for combining

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references is what the combination of disclosures taken as a whole would suggest to one of ordinary skill in the art. <u>In</u> <u>McLaughlin</u> 170 USPQ 209 (CCPA 1971); <u>In re Rosselet</u> 146 USPQ 183 (CCPA 196). References are evaluated by what they collectively suggest to one versed in the art, rather than by their specific disclosures. <u>In Re Simon</u>, 174 USPQ 114 (CCPA 1972); <u>In Re</u> <u>Richman</u> 165 USPQ 509, 514 (CCPA 1970).

14. On page 16, third paragraph, the applicants argue that the polygon of Behensky et al. do not represent real terrain in any manner, but rather are, instead, 'essentially "building blocks" which may be accessed from the data base to create the fictional scene through which the drive is driving. This limitation is not found in the claims. The only recitation is that "data base comprising terrain data, said terrain data representing as one or more polygons". Therefore, the building blocks as taught in Behensky et al. still are considered as the terrain data. Therefore, the rejection under 35 U.S.C. § 103 is considered to be proper.

In addition, the digital data base which comprises terrain data representing as at least one of polygons is well known in the art at the time the invention was made (see at least U.S. patent number 5,192,208 issued to Ferguson et al., for example).

15. On page 17, second paragraph, the applicants argue that there is no teaching of constructing polygon based on an array of elevation points. This limitation is not found in the claims. Claimed subject matter not the specification, is the measure of invention. Disclosure contained in the specification can not be read into the claims for the purpose of avoiding the prior art. <u>In re Sporck</u>, 55 CCPA 743, 386 F.2d 924, 155 USPQ 687 (1986); <u>In</u> <u>re Self</u>, 213 USPQ 1,5 (CCPA 1982); <u>In re Priest</u>, 199 USPQ 11,15 (CCPA 1978).

16. Applicant's amendment necessitated the new grounds of rejection. Accordingly, THIS ACTION IS MADE FINAL. See M.P.E.P. \$ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 C.F.R. \$ 1.136(a).

A SHORTENED STATUTORY PERIOD FOR RESPONSE TO THIS FINAL ACTION IS SET TO EXPIRE THREE MONTHS FROM THE DATE OF THIS ACTION. IN THE EVENT A FIRST RESPONSE IS FILED WITHIN TWO MONTHS OF THE MAILING DATE OF THIS FINAL ACTION AND THE ADVISORY ACTION IS NOT MAILED UNTIL AFTER THE END OF THE THREE-MONTH SHORTENED STATUTORY PERIOD, THEN THE SHORTENED STATUTORY PERIOD WILL EXPIRE ON THE DATE THE ADVISORY ACTION IS MAILED, AND ANY EXTENSION FEE PURSUANT TO 37 C.F.R. § 1.136(a) WILL BE CALCULATED FROM THE MAILING DATE OF THE ADVISORY ACTION. IN NO EVENT WILL THE STATUTORY PERIOD FOR RESPONSE EXPIRE LATER THAN SIX MONTHS FROM THE DATE OF THIS FINAL ACTION.

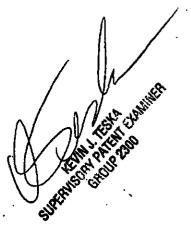
17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Tan Nguyen, whose telephone number is (703) 305-9755. The examiner can normally be reached on Monday-Thursday from 7:30 AM-6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kevin J. Teska, can be reached on (703) 305-9704. The fax phone number for this Group is (703) 305-9564.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-3800.

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**TAN NGUYEN** May 04, 1995



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08/274,394 714 UNITED STATES DEPARTMENT OF COMMERCE mark Office Patent and Trad COMMISSIONER OF PATENTS AND TRADEMARKS Addre Washington, D.C. 20231 SERIAL NUMBER FILING DATE FIRST NAMED APPLICANT ATTORNEY DOCKETT NO. 08/274,394 07/11/94 MARGOLIN J NGUYEN, T EXAMINER B3M1/0707 JED MARGOLIN 3570 PLEASANT ECHO. DRIVE ART UNIT PAPER NUMBER SAN JOSE CA 95148-1916 2304 DATE MAILED: 07/07/95 EXAMINER INTERVIEW SUMMARY RECORD All participants (applicant, applicant's representative, PTO personnel): 07/06 aphonic: 🗆 Personal (copy is given to 🛛 applicant 🕅 applicant's repres Exhibit shown or demonstration conducted: D Yes XNo. If yes, brief description: with respect to some or all of the claims in question. ID was not reached. Claims discuss Beckunth Identification of prior art discuss re) ſће d to if an acreement was reached, or any oth er comments: Ê won the  $\mathbf{a}$ cription, if necessary, and a copy of the amendments, if available, which the examiner agreed would render the claims allowable must be (A<sup>f</sup>ul ad. Also, where no copy of the amendments which would render the claims allowable is available, a summary thereof must be attached.) attact It is not necessary for applicant to provide a separate record of the substance of the interview. Unless the paragraph below has been checked to indicate to the contrary, A FORMAL WRITTEN RESPONSE TO THE LAST OFFICE ACTION IS NOT WAIVED AND MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW (e.g., items 1-7 on the reverse side of this form). If a response to the last Office action has already been filed, then applicant is given one month from this interview date to provide a statement of the substance of the interview. 2. Since the examiner's interview summary above (including any attachments) reflects a complete response to each of the objections, rejections and requirements that may be present in the last Office action, and since the claims are now allowable, this completed form is considered to fulfill the response requirements of the last Office action. Applicant is not relieved from providing a separate record of the substance of the interview unless box 1 above is also checked.

PTOL-413 (REV. 2 -93)

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BATENT A.

AUG I 1995 GROLIP 2300

Examiner: T. Nguyen

Art Unit: 2304 (

12055.P002

# IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

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Jed Margolin

Serial No.: 08/274,394

Filed: July 11, 1994

For: PILOT AID USING SYNTHETIC REALITY

Commissioner of Patents and Trademarks Washington, D.C. 20231

# AMENDMENT AND RESPONSE

Dear Sir:

In response to the Office Action of May 9, 1995, please enter the following amendments and consider the following remarks.

# IN THE CLAIMS

Please delete claims 29 - 30, without prejudice. Please amend the following claims.

1. (Twice Amended) A pilot aid which uses an aircraft's position and attitude to transform data from a digital data base to present a pilot with a synthesized three dimensional projected view of the world comprising:

a position determining system for locating said aircraft's position in three dimensions;

For the foregoing reasons, Applicant submits that all objections and rejections have been overcome. Applicant submits that all pending claims are in condition for allowance and allowance of the same is respectfully requested.

> Respectfully submitted, BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN

[0] Date: 1995

Keith G. Askoff Reg. No. 33,828 12400 Wilshire Boulevard Seventh Floor Los Angeles, California 90025 (408) 720-8598

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail with sufficient postage in an envelope addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231

on	July 10, 1995	
-	Date of Deposit	_
	Carolyn C. Caires	
	Name of Person Mailing Corres	pondence
<u>Ca</u>	elin C. Cairos	7/10/95
	Signature	Date



PATENT

# IN THE UNITED STATES PATENT AND TRADEMARK OFFICE.

In re Application of:

Jed Margolin

Serial No.: 08/274,394

Filed: July 11, 1994

For: PILOT AID USING SYNTHETIC REALITY

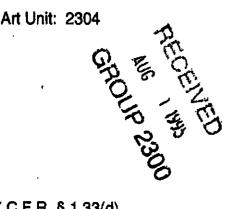
Commissioner of Patents and Trademarks Washington, D.C. 20231

#### CHANGE OF ADDRESS UNDER 37 C.F.R. § 1.33(d)

Dear Sir:

Pursuant to 37 C.F.R. § 1.33(d) Applicant hereby changes Applicant's correspondence address as follows:

Keith G. Askoff BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN 12400 Wilshire Boulevard, 7th Floor Los Angeles, CA 90025 (408) 720-8598



Examiner: T. Nguyen

Please address all future communications to the above address.

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Respectfully submitted, BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN

Date: July 10\_, 1995

Keith G. Askoff Reg. No. 33,828 12400 Wilshire Boulevard Seventh Floor Los Angeles, California 90025 (408) 720-8598

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail with sufficient postage in an envelope addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231

on	July 10, 1995	
	Date of Deposit	
	Carolyn C. Caires	· · · · · · · · · · · · · · · · · · ·
_	<ul> <li>Name of Person Mailing C</li> </ul>	orrespondence
$\underline{C}$	molync chinas	7110195
	Signature	Date

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08/274,394

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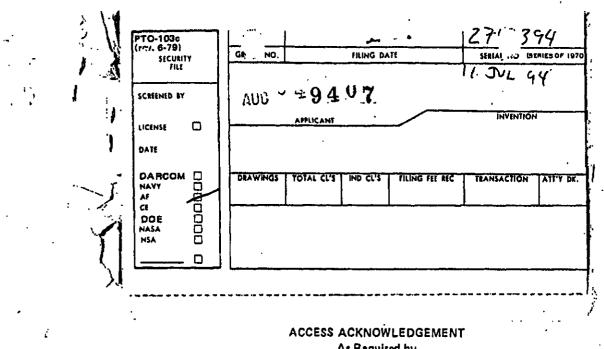
UNITED STATES DEPARTMENT OF COMMERCE Patent and Trademark Office Address: COMMISSIONER OF PATENTS AND TRADE

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		FIRST NAMED APPLICAN	NT ATTORNEY DOCKET N
08/274,394	07/11/94	MARGOLIN	J
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<b>،</b> '		B3ML/0803	c.c.aminça,
KEITH G. ASK			
		ILOR AND ZAFMAN NRD, 7TH FLOOR	ART UNIT PAPER NUMBER
LOS ANGELES			2304 10
	•		DATE MAILED: 08/03/95
Below is	s communication fi	rom the EXAMINER in charge of this a	ipplication
	COMMISSIONE	R OF PATENTS AND TRADEMARKS	
	• • •	ADVISORY ACTION	. •
,		ADVISONT ACTION	
THE PERIOD FOR	RESPONSE:		
a k is extended to r	un	or continues to run <u>3.0 mon</u>	The from the date of the final rejection
17 V V			date of this Advisory Action, whichever is later: 1
expires three in event however	, will the statutory pe	ariod for the response expire later than size	x months from the date of the final rejection.
Any extension	of time must be obtr	nined by filing a petition under 37 CFB 1.	136(a), the proposed response and the appropria
The date on wh	nich the response, th	he petition , and the lee have been filed it	s the date of the response and also the date for th
purposes of de	termining the period culated from the dat	of extension and the corresponding amo te of the originally set shortened statutory	ount of the fee. Any extension fee pursuant to 37 y period for response or as set forth in b) above.
	•	with 37 CFR 1.192(a).	
Applicant's response	te to the final rejection to the final rejection in condition for		considered with the following effect, but it is not de
and the state of t	•	• • • • • • •	and and the final rejection stands because:
$\mathbf{X}$	• •		
a. 🚺 There is presente		ing under 37 CFH 1,116(b) why the propo	osed amendment is necessary and was not earlie
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the non-allowa	•	, <u>,</u> , , , , , , , , , , , , , , , , ,	
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3 Upon the filing be as follows:	•	• •	
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Claims allows: Claims allowed Claims ebjase Claims rejected Howe	8 to: <u>29 - 90</u> d: <u>1- 28 au</u> iver;	rcome the following rejection(s):	-
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274 394 70-103c GROUP NO. HUNG DATE 14,394 SECURITY AUG ~ =94.97 SCREENED BY INVENTIO APPLICANT D LICENSE DATE 00 DARCOM 0 AWING TOTAL CL RANSACTION ATT'Y OK NAVY AF CE DOE NASA NSA ٥ TILEARED BY GROUP 220; SECURITY **RECOMMENDATION BY EXPERTS** (Every expert examining this application should indicate an express RE-COMMENDATION followed by their SIGNATURE, AGENCY AND DATE) Cand not find sugthing have that can not be believed from a Prophies 101 book Howen, the AF would have a lefite intent in the material. Poter SReath L/FIGP-1,513-215-8252 no coving recommended in Jordan Aplight ISACAP, 3 gan 25 SCREENED BY DARCOM DOE NASA LOG 185 OTHER ł PTO-1453 (12-80) 2. 



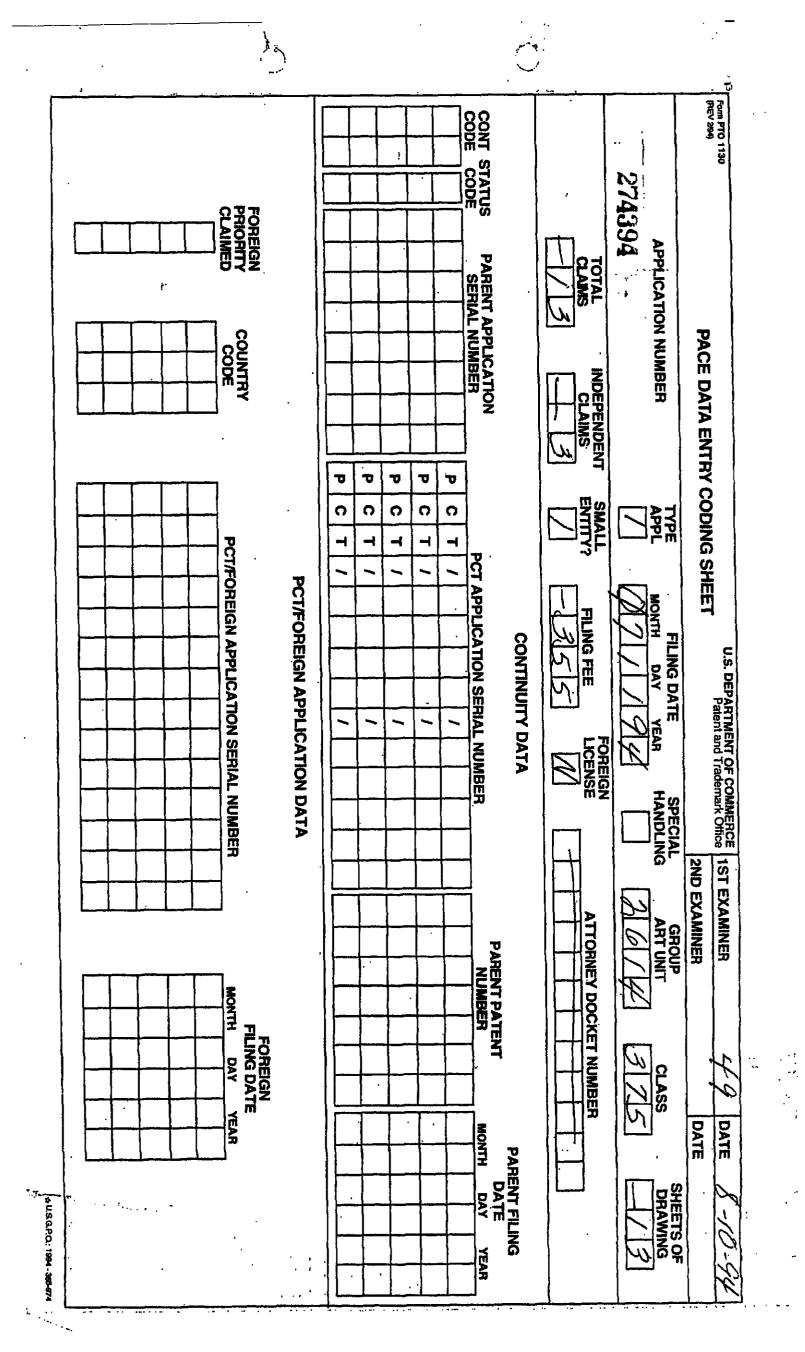
As Required by Title 35, United States Code (1952) Section 181

I hereby acknowledge that I have inspected the disclosure of the above identified application for patent in the administration of the law cited above, on behalf of the department or agency which I represent, and promise that any information acquired from said application will not be divulged, disclosed or used for any purpose other than in the administration of the cited law.

AGENCY REPRESENTED 9/23/44 JACP 10/3/91/ Wh/MA 2000 94 WL/EIGP-1 3 gain 25 MELSM (SMC) NAME DATE AGENCY REPRESENTED sahi ł. 

PATENT APP	LICATION FEE	· · · · · · · · · · · · · · · · · · ·	TION RECOR	RD	18/	17	43	<u>94</u>
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# PATENT APPLICATION SERIAL NO8/513298

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U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE FEE RECORD SHEET

PTO-1556 (5/87)

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Attorney's Docket No	02055, 2002			Patent (
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The Commissioner		Prior Applica		V
Patents and Trade Washington, D.C. BOX FWC		Examiner: Art Unit:	<u>Nguyan, T.</u> 2304	\? \?
		RULE 62		
-		· ·		
Sir: This is a re	equest for filing a file wrap	per		
<u>X</u> Cont	tinuation application		Divis	ional application
under 37 C.F.R. § 1	1.62 of pending prior applicat	tion serial no. <u>08/274.3</u>	394	ø
fledion <u>July 11, 199</u>	4	<u>.</u>		
of <u>Jed Margolin</u>	(inventor(s) c	urrently of record for prior	application)	······································
for PILOT AID USI	NG SYNTHETIC REALITY			
		(title)		
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Office to Addressee	this paper or fee is being depo " service under 37 CFR 1.10 o emarks, Washington, D.C. 20	in the date indicated above	es Postal Service "Ex and is addressed to	press Mail Post the Commissioner
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	<u>    X                                </u>	A check	in the amount of	\$590.00	is enclosed for the filing fee.	
	6,		In the amount of \$		is enclosed for the petition fee pursuant	
	<u> </u>	before (	n this application claims calculating the filing fee urposes).	(wherein at lea	of the prior application st one independent claim is retained for	
	8.	Please	enter the preliminary a	mendment encl	osed before calculating the filing fee.	
	9.	filed on_			in the present application the amendment under 37 C.F.R. § 1.116, but unentered, in	
1	X 10.	Amend page:	the specification by ins	erting the folio	wing before the first sentence on the first	
	<u>X</u>	(a)	- This is a <u>X</u> con serial no. <u>08/274.394</u>	ntinuation/	divisional of application	TN OLJI4K
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$\leq$			(list all prior application		······································	
•	<u>X</u> 11.	applica	ition be transferred to the application is assigned	is Rule 62 app	onvention priority made in the prior ication.	
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Ì	<u>    X                                </u>	The Po	ower of Attorney in the p	rior application	is to:	•
	<u>X</u> 13.	Edwin BLAKE 12400 Los An	ower of Attorney in the p (Name <u>H Tavlor</u> , Reg. No. 25,1 <u>LY, SOKOLOFF, TAYI</u> <u>Wilshire Bivd., Seventh</u> geles, California_9002: 207-3800	) 29, and certain OB & ZAFMA Eicor	(Reg. No.) other listed attorneys or agent(s) of:	
	<u>    X                                </u>	Edwin BLAKE 12400 Los An	(Name <u>H Taylor</u> , Reg. No. 25, 1 LY, SOKOLOFF, TAYI <u>Wilshire Blvd., Seventh</u> geles, California 9002 207-3800 The Power appears in	) 29, and certain OB & ZAFMAI Eloor 5 the original par	(Reg. No.) other listed attorneys or agent(s) of:	
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	X 13.	Edwin BLAKE 12400 Los An (310) 2 (a) (b)	(Name <u>H Taylor</u> , Reg. No. 25,1 <u>LY, SOKOLOFF, TAYI</u> <u>Wilshira Bivd., Seventh</u> <u>Igales, California_9002</u> 207-3800 The Power appears in <u>serial no.</u> The Power does not a <u>February 18, 1995</u> filed <u>July 11, 1994</u> A new Power has bee <u>Recognize as an asso</u> communications to: (Name <u>BLAKELY, SOKOLOF</u> 12400 Wilshire Bivd., Los Angeles, Californi	) 29, and certain OR & ZAFMAI Eloor 5- the original par- ppear in the original p	(Reg. No.) other listed attorneys or agent(s) of: bers of the prior application filed	
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- 14. Enclosed is a photocopy of a petition for an extension of time pursuant to 37 C.F.R. § 1.136 concurrently (or previously) submitted under separate cover for the above-referenced prior application.
- 15. Applicant(s) hereby petition(s) for an extension of time pursuant to Rule 1.136, if needed, for the above-noted prior application. The Commissioner is hereby authorized to charge any extension or petition fee under 37 C.F.R. § 1.17 that may be required for the above-referenced prior application to Deposit Account No. 02-2666. Two photocopies of this document are enclosed for filing in the prior application file and for Deposit Account purposes.
- 16. The filling of an application under 37 C.F.R § 1.62 will be construed to include a waiver of secrecy under 35 U.S.C. § 122 to the extent that any member of the public who is entitled under the provisions of 37 C.F.R. § 1.14 to access to or information concerning either the prior application or any continuing application filed under the provisions of 37 C.F.R. § 1.62 may be given similar access to, or similar information concerning, the other application(s) in the file wrapper. 37 C.F.R. § 1.62(f).
  - Accompanying this application is a statement requesting deletion of the name(s) of the person or persons who are not inventors of the invention being claimed in the continuation/divisional application. 37 C.F.R. § 1.62(a).

Respectfully submitted,

BLAKELY SOKOLOFF TAYLOR & ZAFMAN

Date: August 9, 1995

: 17.

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# IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

PATENT

AREC'ENVED AUG I 1995 GROLIP 2300

Examiner: T. Nguyen

Art Unit: 2304 |

In re Application of:

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Jed Margolin

Serial No.: 08/274,394

Filed: July 11, 1994

For: PILOT AID USING SYNTHETIC REALITY

<u>(</u> .

Commissioner of Patents and Trademarks Washington, D.C. 20231

# AMENDMENT AND RESPONSE

Dear Sir:

In response to the Office Action of May 9, 1995, please enter the following amendments and consider the following remarks.

IN THE CLAIMS

Please delete claims 29 - 30, without prejudice.

Please amend the following claims.

1. (Twice Amended) A pllot aid which uses an aircraft's position and attitude to transform data from a digital data base to present a pilot with a synthesized three dimensional projected view of the world comprising:

a position determining system for locating said aircraft's position in three dimensions;

a digital data base comprising terrain data, said terrain data representing real terrestrial terrain as at least one [or more] polygon[s].said terrain data generated from elevation data of said real terrestrial terrain;

an attitude determining system for determining said aircraft's orientation in three dimensional space;

a computer to access said terrain data according to said aircraft's position and to transform said terrain data to provide three dimensional projected image data according to said aircraft's orientation; <u>and</u>

a display for displaying said three dimensional projected image data.

5. (Twice Amended) The pilot aid of claim 1, further comprising a control panel to select <u>at least</u> one [or more] operating feature[s].

6. (Twice Amended) The pilot aid of claim [1] <u>5</u>, wherein said <u>at least</u> one [or more] operating feature[s] comprises <u>at least</u> one [or more] feature[s] selected from [the] <u>a</u> group consisting of panning a viewpoint of said three dimensional projected image, tilting a viewpoint of said three dimensional projected image, zooming a viewpoint of said three dimensional projected image, and providing a three dimensional projected image of a route ahead.

 $\sqrt{2}$   $\frac{\sqrt{2}}{\sqrt{2}}$  (Twice Amended) A pilot aid which uses an aircraft's position and attitude to transform data from a digital data base to present a pilot with a synthesized three dimensional projected view of the world comprising:

a position determining system for locating said aircraft's position in three dimensions;

a digital data base comprising terrain data, said terrain data representing <u>real</u> <u>terrestrial</u> terrain as <u>at least</u> one [or more] polygon[s]. <u>said terrain data generated from</u> <u>elevation data of said real terrestrial terrain</u>;

an attitude determining system for determining said aircraft's orientation in three dimensional space;

a computer to access said terrain data according to said aircraft's position and to transform said terrain data to provide three dimensional projected image data according to said aircraft's orientation; <u>and</u>

a mass storage memory for recording said aircraft position data and said aircraft's attitude data for allowing a flight of said aircraft over said terrain to be displayed at a later time.

or

(Control panel) The pilot aid of claim 7, further comprising a control panel to select at least one [or more] operating feature[s].

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12. (Once Amended) The pilot aid of claim 14, wherein said <u>at least</u> one [or more] operating feature[s] comprises <u>at least</u> one [or more] feature[s] selected from [the] <u>a</u> group consisting of panning a viewpoint of said three dimensional projected image, tilting a viewpoint of said three dimensional projected image, zooming a viewpoint of said three dimensional projected image, zooming a projected image of a route ahead, and providing a three dimensional projected image of a previous flight.

13. (Once Amended) A pilot aid which uses an aircraft's position and attitude to transform data from a digital data base to present a pilot with a synthesized three dimensional projected view of the world comprising:

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a position determining system for locating said aircraft's position in three dimensions;

a digital data base comprising terrain data, said terrain data representing <u>real</u> <u>terrestrial</u> terrain as <u>at least</u> one [or more] polygon[s]. <u>said terrain data generated from</u> <u>elevation data of said real terrestrial terrain;</u>

a first attitude determining system for determining said aircraft's orientation in three dimensional space;

a head mounted display worn by said pilot of said aircraft;

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a second attitude determining system for determining the orientation of said pilot's head in three dimensional space; <u>and</u>

a computer to access said terrain data according to said aircraft's position and to transform said terrain data to provide three dimensional projected image data to said head mounted display according to said aircraft's orientation and said pilot head orientation.

17. (Once Amended) The pilot ald as described in claim 1 wherein said [terrain data is generated from] elevation data [comprising] <u>comprises</u> an array of elevation points, wherein each said polygon representing said terrain defines a plane, wherein in a first region of terrain represented by <u>said at least</u> one [or more of said] polygon[s no] <u>each</u> elevation point within each said polygon is [below] <u>within a first distance of</u> said plane of each said polygon [by a first distance or more].

18. (Once Amended) The pilot aid as described in claim 7 wherein said [terrain data is generated from] elevation data [comprising] <u>comprises</u> an array of elevation points, wherein each said polygon representing said terrain defines a plane, wherein in a first region of terrain represented by <u>said at least</u> one [or more of said] polygon[s

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no] each elevation point within each said polygon is [below] within a first distance of said plane of each said polygon [by a first distance or more].

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- 30 25 19. (Once Amended) The pllot aid as described in claim 13 wherein said [terrain is generated from] elevation data [comprising] comprises an array of elevation points, wherein each said polygon representing said terrain defines a plane, wherein in a first region of terrain represented by said at least one [or more of said] polygon[s no] each elevation point within each said polygon is [below] within a first distance of said plane of each said polygon [by a first distance or more].

**Ý** ' (Once Amended) The pilot aid as described in claim 17 wherein in a second 20. region of said terrain represented by said at least one [or more of said] polygon[s no] each elevation point within each said polygon is [below] within a second distance of said plane of each said polygon in said second region [by a second distance or more], said second distance different from said first distance.

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(Once Amended) The pilot aid as described in claim 18 wherein in a second 21. region of said terrain represented by said at least one [or more of said] polygon[s no] each elevation point within each said polygon is [below] within a second distance of said plane of each said polygon in said second region [by a second distance or more], said second distance different from said first distance.

31.26 22. (Once Amended) The pilot aid as described in claim 19 wherein in a second region of said terrain represented by said at least one [or more of said] polygon[s no] each elevation point within each said polygon is [below] within a second distance of said plane of each said polygon in said second region [by a second distance or more], said second distance different from said first distance.

31 36 31. (Once Amended) The method as described in claim 23 wherein at least one [or more] additional adjacent one[s] of said plurality of elevation points [are] <u>is</u> examined, and wherein said polygon is expanded to include said <u>at least</u> one [or more] additional one[s] of said plurality of elevation points [which do] <u>that does</u> not cause any of said elevation points within said expanded polygon <u>not</u> to be [below] within said first distance of said plane of said expanded polygon [by said first distance or more].

32. (Once Amended) The method as described in claim 28 wherein <u>at least</u> one [or more] additional adjacent one[s] of said plurality of elevation points [are] is examined, and wherein said polygon is expanded to include said <u>at least</u> one [or more] additional one[s] of said plurality of elevation points [which do] <u>that does</u> not cause any of said elevation points within said expanded polygon to be above said plane of said expanded polygon and [do] <u>does</u> not cause any of said elevation points within said expanded polygon <u>not</u> to be [below] <u>within said first distance of</u> said plane of said expanded polygon [by said first distance or more].

3<sup>rd</sup> 29 36. (Once Amended) A method of using an aircraft's position and attitude to transform data from a digital data base to present a pilot with a synthesized three dimensional projected view of the world comprising:

locating said aircraft's position in three dimensions;

providing a data base comprising terrain data, said terrain data representing real terrestrial terrain as at least one [or more] polygons, said terrain data generated from elevation data of said real terrestrial terrain;

determining said aircraft's orientation in three dimensional space; accessing said terrain data according to said aircraft's position;

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transforming said terrain data to provide three dimensional projected image data according to said aircraft's orientation; and[,]

displaying said three dimensional projected image data.

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30 37. (Once Amended) The method of claim 36 further comprising selecting <u>at</u> <u>least</u> one [or more] operating feature[s], wherein said <u>at least</u> one [or more] operating feature[s] comprises <u>at least</u> one [or more] feature[s] selected from [the] <u>a</u> group consisting of panning a viewpoint of said three dimensional projected image, tilting a viewpoint of said three dimensional projected image, zooming a viewpoint of said three dimensional projected image, and presenting a three dimensional projected image of a route ahead.

38. (Once Amended) The method as described in claim 36 wherein said terrain data base is produced by a method comprising the steps of:

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providing a plurality of elevation points, each of said plurality of elevation points representing an elevation of a point on a terrain;

defining a polygon having <u>at least</u> one [or more vertices] <u>vertex</u> defined by <u>at</u> <u>least</u> one [or more] of said elevation points;

examining an adjacent one of said plurality of elevation points to determine if expanding said polygon to an expanded polygon to include said adjacent one of said plurality of elevation points causes <u>at least</u> one [or more] of said plurality of elevation points within said expanded polygon <u>not</u> to be [below] <u>within a first distance of</u> a plane of said expanded polygon [by a first distance]; and[,]

expanding said polygon to include said adjacent one of said plurality of elevation points if [none] <u>each</u> of said elevation points within said expanded polygon is [below] within said first distance of said plane [by said first distance or more].

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<sup>37</sup> 36. (Once Amended) The method as described in claim 36 wherein said adjacent one of said plurality of elevation points is further examined to determine if <u>at</u> <u>least</u> one [or more] of said plurality of elevation points within said expanded polygon is above said plane of said expanded polygon, and said polygon is expanded if none of said elevation points within said expanded polygon is above said plane of said expanded polygon and if [none] <u>each</u> of said elevation points within said expanded polygon is [below] <u>within said first distance of</u> said plane <del>by</del> [said first distance or more].

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### **REMARKS**

In a telephonic interview on July 7, 1995 regarding the Office Action of May 9, 1995, the Examiner and the undersigned discussed some of the 35 U.S.C. § 112, second paragraph rejections, and the 35 U.S.C. § 103 rejections. In a telephonic interview of July 7, 1995 the Examiner and the undersigned discussed claims 17 and 20, which were not previously examined based on the prior art. The Examiner agreed to withdraw the finality of the Office Action of May 9, 1995.

With respect to the rejection under 35 U.S.C. § 112, second paragraph for the phrase "one or more" as described in paragraphs 4.1, 4.2, 4.3, 4.4, 4.5, and 4.8 of the Office Action, as discussed in the above-referenced telephonic interview, Applicant has amended the claims to recite "at least one" and to make grammatical changes consistent with the amended terminology.

With respect to the suggestion in paragraph 4.1 of the Office Action to add the word "and," Applicant has amended claims 1, 7, and 13 to add the word "and" at the appropriate place. With respect to antecedent basis for "the group" as in claims 6, 12, and 37, as noted in paragraph 4.3 of the Office Action, Applicant has amended claims containing this phrase to read "a group."

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With respect to paragraph 4.4 of the Office Action of May 9, 1995 the Examiner requests verification of the first region of terrain. As described in the specification on, for example, page 30, lines 2 - 14, the number of polygons required to represent a portion of terrain will be dependent upon the definition of flatness (flatness criteria). If the elevation points within a polygon must be within a small distance from the plane of the polygon, more polygons will be required then when the elevation points may be within a greater distance of the plane of the polygon. As described in the specification, regions of high interest (such as airports and surrounding areas) may be represented with polygons having all points within a small distance from the plane of the polygon, while other areas may be represented by polygons having all elevation points within a larger distance from the plane of the polygon. Because the former regions will typically require more polygons, the terrain will be represented more accurately. Thus, for example, the airport may be a first region, while areas removed from the airport may be a second region.

With respect to the phrase "distance or more" in the claims discussed in paragraphs 4.4, 4.5, and 4.8 of the Office Action, Applicant has rephrased the claims. For example, claims 17 - 19 have been amended to recite that each elevation point within each polygon is within a first distance of the plane of the polygon. That is, for example, as described above, the elevation points within a first region, such as an airport, may be within 10 feet of the plane of the polygon. Of course, the invention is not limited to these examples. In claims 20 - 22, Applicant has recited that each elevation point within each polygon in the second region is within a second, different distance from the plane. Again, by way of example, in areas removed from the airport, the elevation points may be required to be within only 50 feet of the plane of the polygon. With respect to claims 31 and 32, Applicant has amended the claims to recite that the polygon is expanded to include the recited at least one addition one of the plurality of elevation points that does not cause any of the elevation points within

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the expanded polygon not to be within the first distance of the plane of the polygon. Similar amendments have been made to claims 38 and 39.

With regard to paragraph 4.6 of the Office Action of May 6, 1995, the Examiner requests clarification as to "no elevation point." As described generally above, a criteria may set such that a polygon contains no elevation points that are beyond a certain distance from the plane, or alternatively stated are not within a certain distance. In other words, in a polygon near an airport, no elevation point in the area represented by a polygon is above the plane of the polygon. In this way, a pilot may be ensured that in the real world scene represented by the polygons, no elevation point is above the plane of the polygon.

With respect to paragraph 4.7 of the Office Action, Applicant has, as suggested, deleted the comma.

In paragraph 4.8 of the Office Action, the Examiner asks for verification regarding examining an adjacent one of the plurality of elevation points and expanding the polygon, as in lines 7 - 14 of claim 38. One embodiment of the method of the present invention is described, for example, in conjunction with figures 12A - 12F, and 13A - 13F of the specification. As shown therein, an initial polygon having three points is defined. Next, an adjacent elevation point is selected. A determination is made as to whether the point belongs in the polygon according to the above-discussed flatness criteria. If the expanded polygon meets the flatness criteria, the point is added, as shown in the Figures. If it does not, then the point is not added to the polygon.

Claims 1 - 12 were rejected under 35 U.S.C. § 103 as being unpatentable over *Beckwith et al.* in view of *Behensky et al.* or one of two brochures form *Atari Game Corporation.* In responding to Applicant's arguments, the Examiner states that Applicant's argument regarding the present invention representing real terrain is not found in the claims. Similarly, the Examiner states that constructing the polygon based

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on elevation points is not found in the claims. Applicant has amended all independent claims to include the limitations that the terrain data represents real terrestrial terrain and to recite that the terrain data is based on elevation data of the real terrestrial terrain. Applicant submits that these amendments clarify the distinction between the claimed invention and the references applied by the Examiner.

With respect to *Beckwith et al.*, Applicant submits that *Beckwith et al.* does not accurately perform a transformation of elevation points. Rather, *Beckwith et al.* uses a two-dimensional array of elevation points. The data address gives the x, y coordinates of the point, while the data gives the elevation. *Beckwith et al.* does not create a true 3-D scene. Rather, *Beckwith et al.* simply changes direction of data read out to correspond to the plane's orientation. This method creates a very crude representation of the terrain, particularly when, for example, the heading of the plane is not along a row, column, or diagonal of the data.

With reference to *Behensky et al.* and the *Atari brochures*, in contrast to the claimed invention, the references show a scene that consists of a completely made-up universe. In contrast to the claimed invention they do not show polygons based on elevation data of real terrestrial terrain. Furthermore, as described earlier, note that the display is significantly different from what is needed in the present invention. For example, features such as road markings, road signs, vehicles, etc. are present in these references, which are not applicable to the present invention as claimed. Note that the references, even when considered together, do not contain any motivation, either express or implied, that the depiction of the fictional universe therein be used for producing a display of real terrestrial data based on elevation data of the real terrestrial terrain. Furthermore, there is no teaching in the references of how this would be accomplished. Additionally, Applicant submits that it is not obvious that the polygons used for the fictional universe of *Behensky et al.* and the *Atari games* would be useful in the system of *Beckwith et al.* Although the Examiner states that it would

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be obvious to combine Behensky et al. with the systems of Beckwith et al. to provide a reduction of data base storage, there is no such teaching in the references. It is only with the teaching of the present invention, to construct the polygons in the manner described, and to use the described flatness criteria, that one of ordinary skill in the art is enabled to practice the present invention. Absent this teaching, nothing in the references teaches that the polygons of Behensky et al. would result in significant reduction of data base storage in other, undisclosed systems. Because there is no such teaching in the references, Applicant submits this assertion must be within the personal knowledge of the Examiner. Therefore, pursuant to 37 C.F.R. § 1.107(b), Applicant respectfully requests an affidavit from the Examiner attesting to the fact that the disclosure of polygons in Behensky et al. teaches one of ordinary skill in the art that the use of these polygons to represent data in other systems results in the reduction of data base storage, as Behensky et al., in addition to not teaching the use of polygons for real terrain data, does not teach that the use of polygons would result in a reduction of data base storage. Applicant submits that any such teaching comes only from the present specification.

In conclusion, Applicant has made numerous amendments in an earnest attempt to clear up all 35 U.S.C. § 112, second paragraph issues. Should the examiner believe any 35 U.S.C. § 112 issues remain, Applicant would appreciate a call to the undersigned so that any remaining issues my be dealt with by Examiner's amendment, if possible. Additionally, Applicant has amended the claims to recite that the terrain data represents real terrestrial terrain, and to recite that it is generated from elevation data of the real terrestrial terrain. For the reasons described above, Applicant submits the present invention, as currently claimed, is unobvious over the references of record.

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For the foregoing reasons, Applicant submits that all objections and rejections have been overcome. Applicant submits that all pending claims are in condition for allowance and allowance of the same is respectfully requested.

Date: <u>Auly 10</u>, 1995

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BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN

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Respectfully submitted,

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I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail with sufficient postage in an envelope addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231

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P002C IN THE UNITED STATES PATENT AND TRADEMARK OFFICE は \_5 In Re Application of: Examiner: Not assigned yet Jed Margolin Art Unit: 2304 Serial No.: 08/513,298 Filed: August 9, 1995 For: PILOT AID USING SYNTHETIC

Hon. Commissioner of Patents and Trademarks Washington, D.C. 20231

REALITY

PRELIMINARY AMENDMENT

Sir:

IN THE DOCKET NUMBER

Please change the attorney docket number to:

--02055.P002C--

(i. e. add a "C" at the end.)

# IN THE CLAIMS

1

Please enter the amendment mailed on July 10, 1995, submitted under 37 C. F. R. § 1.116, but unentered in the parent application.

-1.

RECEIVED

NOV 0-7. 1995 **GROUP 2300** 

304 29;

### REMARKS

Please consider the remarks in the above referenced amendment, submitted but unentered in the parent application.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN

0 4 den 11, 1995 Date:

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Keith G. Askoff

Reg. No. 33,828

12400 Wilshire Boulevard Seventh Floor Los Angeles, California 90025-1026 (408) 720-8598

#### FIRST CLASS CERTIFICATE OF MAILING (37 C.F.R. § 1.8(g))

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail with sufficient postage in an envelope addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231

on	October 18, 1995	•
	Date of Deposit	
	Edith Fuentes	
	Name of Person Mailing Correspondence	•
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Part III DETAILED ACTION

#### Notice to Applicants

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1. This office action is responsive to the preliminary amendment filed on October 20, 1995. As per request, the amendment mailed on July 10, 1995 of the parent application, serial number 08/274,394 which was abandoned on October 16, 1995, has been enter.

In the amendment filed on July 10, 1995, claims 1, 5-7, 11 13, 17-22, 31-32, 36-39 have been amended. Claims 29-30 have been canceled. Thus, claims 1-28 and 31-39 are pending.
 The rejections under 35 U.S.C. § 112, second paragraph, have been withdrawn upon the amended claims.

#### Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. § 103 which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Subject matter developed by another person, which qualifies as prior art only under subsection (f) or (g) of section 102 of this title, shall not preclude patentability under this

section where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person. 17-28, 31-35 and 38-39

5. Claims 1-12, 14-28 and 31-39 are rejected under 35 U.S.C. § 103 as being unpatentable over Beckwith et al (4,660,157) in view of Behensky et al. (5,005,148) or a brochure from Atari Game Corp. (Hard Driving') or a brochure from Atari Game Corp. (Steel Talons) and further in view of Ulrich (an article entitle "Tactical Mapping in Combat Aircraft"), or Jacobs et al. (an article entitle "Fractal Image Compression Using Iterated Transforms Applications To DTED"), or Raymer et al. (Advance Terrain Data Processor), or Patrick (Itars Robust Demonstration System Integration).

5.1. With respect to claims 1, 5-7, 11-12, 14-16 and 36-37, Beckwith et al. discloses a digital system for producing a real time video display in perspective of terrain over which an aircraft is passing on the basis of compressed digital data stored on a cassette tape (see at least an abstract). Beckwith et al. discloses that the system includes a position determining means for locating the aircraft's position in three dimensions and an attitude determining means for determining the aircraft's orientation in three dimensional space (see at least figure 1 and columns 5 and 6). Beckwith et al. further discloses that the system includes a digital data base means for storing a compressed terrain data (see at least the abstract). Beckwith et al. also discloses a computer means for reading compressed

terrain data from the digital data base means in a controlled manner based on the instantaneous geographical of the aircraft as provided by the aircraft navigation computer system, reconstructing the compressed data by suitable processing and writing the reconstructed data into a scene memory, and then providing a 3D perspective on the display (see at least columns 2 and 3).

Beckwith et al. does not explicitly disclose that a digital data base means containing polygon data representing terrain and manmade structures. However, Behensky et al. suggests a driving simulator for a video game which includes the road and other terrain are produced by mathematically transforming a threedimensional polygon data base (see at least column 2, lines 33-The suggestion of Behensky et al. in at least column 2 38). would have motivated one of ordinary skill in the art to combine with the system of Beckwith et al. in order to provide a significant reduction of data base storage and a larger geographic areas can be stored so that it is not necessary to generate a data base of each mission. Similarly, the digital data base means containing polygon data representing terrain and manmade structures is also taught in a brochure from Atari Game Corp. (Hard Driving') or a brochure from Atari-Game Corp. (Steel Talons).

Behensky et al., the brochures of Atari Game Corp. do not explicitly disclose that the terrain data is generated from

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elevation data of the real terrestrial terrain. However, the feature is well known and old (see Ulrich, Raymer et al., Jacobs et al., and Patrick, for examples ). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the teaching of Ulrich, Raymer et al., Jacobs et al., and Patrick with the system of Beckwith in order to improve the system for pilot aid by providing displaying large qantitates of cartographic and mission data including terrain elevation data and cultural feature data.

Thus, because of the motivation set forth above, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings of Behensky et al. or the brochure from Atari Game Corp. (Hard Driving') or the brochure from Atari Game Corp. (Steel Talons) with the system of Beckwith et al., and Ulrich, Raymer et al. or Jacobs et al. or Patrick.

5.2. With respect to claims 2-3 and 8-9, Beckwith et al. discloses the claimed invention as discussed above but does not explicitly discloses that the position determining means comprises a standard system for retrieving and processing data from the global positioning system and the attitude determining means comprises a standard avionics systems. However, the use of the standard system for retrieving and processing data from global positioning system and the standard avionics systems are well known effective and efficient means for determining the

position and the orientation of the aircraft. For examples, the Maher patent (4,485,383) shows a receiver for receiving global positioning system and the Timothy patent shows a method for determining the orientation of a moving object form a single GPS receiver and producing roll, pitch, and yaw information. It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize the global positioning system and the standard avionics system in such a system as taught through Beckwith et al. because it would produce high degree of accuracy in determining the position and orientation of the aircraft including roll, pitch, and yaw information.

5.3. With respect to claims 4 and 10, Beckwith et al. does not specifically disclose that the digital data base means comprises a CD rom disc and CD rom drive. However, the use of CD rom disc and CD rom drive for storing data is well known effective and efficient means for storing any data. It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize CD rom disc and CD rom drive in such a system as taught through Beckwith et al. because it would permit high degree of accuracy in the storing and restoring data, random access to the data so that the requirements for cache storage are reduced.

5.4. With respect to claims 17-28, 31-35 and 38-39, both Patrick et al. and Raymer et al. articles disclose the detail about elevation data.

6. Claim 13 is rejected under 35 U.S.C. § 103 as being unpatentable over Beckwith et al and Behensky et al. as applied to claims 1-12 above, and further in view of the sales brochure from the Polhemus company.

Beckwith et al. and Behensky et al. disclose the claimed invention except for a head mounted display means worn by the pilot and an attitude determining means for determining the orientation of the pilot's head in three dimensional space. However, the sales brochure from the Polhemus company suggests the commercial available of a position and orientation sensor which can be used on a head-mounted display. The suggestion of the Polhemus company would have motivated one of ordinary skill in the art to combine the teaching of Polhemus company with the system of Beckwith et al. in order to allow the pilot to have a complete range of motion to receive a synthesized view of the Thus, world, a complete unhindered by the aircraft structure. because of the motivation set forth above, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teachings in Polhemus's brochure and Beckwith et al. patent.

7. All claims are rejected.

#### Remarks

8. Applicant's arguments filed on July 14, 1995 have been fully considered. Upon the amended claims which contain new issue and the further update search, new ground of rejection has been set forth above.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Tan Nguyen, whose telephone number is (703) 305-9755. The examiner can normally be reached on Monday-Thursday from 7:30 AM-6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kevin J. Teska, can be reached on (703) 305-9704. The fax phone number for this Group is (703) 305-9564.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-3800.

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TAN NGUYEN December 16, 1995

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#### 02055.P002C

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BST&Z

In re Application of: Jed Margolin

Application No.: 08/513,298

Filed: August 9, 1995

For: Pilot Aid Using Synthetic Reality

This is a Continuation of: Serial No: 08/274,394 'Filed: July 11, 1994 Examiner: Nguyen, T. Art Unit: 2304 17/E pl 4-22

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OFFICIAL

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Hon. Commissioner of Patents and Trademarks Washington, D.C. 20231

#### AMENDMENT AND REMARK

Sir:

This amendment and remark is responsive to the Examiner Interview Summary mailed on March 15, 1996 and the telephonic interview with the Examiner on April 18, 1996. During the interview on April 18, 1996, the Examiner indicated that the application would be allowed if a response was filed with the remark contained below. Although the Examiner and Applicant did not discuss the following amendments, Applicant believes these amendments have no affect on the allowability of this case. If the Examiner determines that these amendments affect the allowability of this case, Applicant requests the Examiner contact the Applicant. Applicant would like to thank the Examiner for the thorough search performed in this case, as well as the Examiner's effort in understanding the invention claimed. Applicant looks forward to receiving the notice of allowance in the next couple of weeks.

I hereby certify that this correspondence is being transmitted by facsimile to the United States Patent and Trademark Office in accordance with 37 CFR \$ 1.6(d), on the date shown below.

Connie West Connie West. Signature: Date: April 19, 1996

#### 04/19/96 FRI 09:19 FAX 4087209397

# AMENDMENT

**B S T L** Z

#### In the Claims:

Please replace "23" in line 1 of claim 31 with --38--. Please replace "23" in line 1 of claim 32 with --38--. Please delete "by" from the last line of claim 39.

#### REMARK

Claims 1-28 and 31-39 remain in the application. No claims have been canceled. Claims 31 and 32 have been amended.

Prior to this amendment, claims 31 and 32 were mistakenly left dependent upon the wrong claim. By this amendment, claims 31 and 32 are now dependent on allowable claim 38. For the Examiner's convenience, Applicant points out that claims 33 and 35 are dependent on claim 31, while claim 34 is dependent on claim 32. If the Examiner determines that these amendments affect the allowability of this case, Applicant requests the Examiner contact the Applicant, who will promptly fix or cancel these claims,

# 35 U.S.C. §103 rejection, over Beckwith in view of Behensky

The Examiner has rejected Claims 1-12, 14-28, and 31-39 under 35 U.S.C. §103 as being obvious over <u>Beckwith. et al.</u> ("<u>Beckwith</u>") in view of <u>Behensky. et al.</u> ("Behensky") or a brochure from Atari Game Corp. (Hard Driving) or a brochure from Atari Game Corp. (Steel Talons) and further in view of <u>Ulrich</u>, or <u>Jacobs et al.</u>, or <u>Raymer</u> <u>et al.</u> or <u>Patrick</u>. As to <u>Beckwith</u>, <u>Behensky</u>, and the two Atari brochures, the Applicant incorporates herein by reference the arguments made in the Response After Final submitted in the parent application on July 10, 1995, and entered in this application by the Preliminary Amandment filed on October 18, 1995. As stated in the Response filed on July 10, 1995, the <u>Beckwith</u>, <u>Behensky</u>, and two Atari Game Corp. brochures, taken individually or in combination, do not teach or make obvious a polygon database

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representing real terrestrial terrain where that polygon database was generated from elevation data of real terrestrial terrain (see Claim 1, 7, and 36). As agreed upon by the Bxaminer and Applicant, <u>Ulrich</u>, <u>Jacobs et al.</u>, <u>Raymer et al.</u>, and <u>Patrick</u>, taken individually or in combination, also do not teach or make obvious the polygon database contained in claims 1, 7, and 36. Since none of the references cited in this rejection, individually or in combination, teach or make obvious the invention as claimed, Applicant respectfully requests the Examiner allow claims 1, 7, and 36 as agreed upon by the Examiner and Applicant. Although Applicant argues around references cited in this rejection, Applicant does not concede that there is a suggestion to combine these references.

Claims 2-6, 8-12, 14-15, 17-18, 20-21, 23-24, 26-28, 31-35, and 37-39 of Applicant's present invention are each dependent on one of allowable base claims 1, 7, and 36. For at least these reasons, it is respectfully submitted that the rejected claims are allowable over the cited prior art.

# 35 U.S.C. §103 rejection, over <u>Beckwith</u> in view of <u>Behensky</u>, and further in view of the sales brochure from the Polhemus Company

The Examiner has rejected Claim 13 under 35 U.S.C. §103 as being obvious over Beckwith and Behensky in view of the sales brochure from the Polhemus Company. As previoually stated, the Beckwith and Behensky references, taken individually or in combination, do not teach or make obvious a polygon database representing real terrestrial terrain where that polygon database is generated from elevation data of real terrestrial terrain (see Claim 13). As stated in the Office Action mailed January 22, 1996, the sales brochure from the Polhemus Company "suggests the commercial available [sic] of a position and orientation sensor which can be used on a head mounted display". The brochure from Polhemus Company clearly does not teach or make obvious the above-described polygon database. Since none of the references cited in this rejection, individually or in combination, teach or make obvious the invention as claimed, Applicant respectfully

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request the Examiner allow claim 13 as agreed upon by the Examiner and Applicant. Although Applicant argues around references cited in this rejection, Applicant does not concede that there is a suggestion to combine these references.

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Claims 16, 19, 22, and 25 are each dependent on independent claim 13. For at least these reasons, it is respectfully submitted that these rejected claims are allowable over the cited prior art.

#### Conclusion

As agreed upon by the Examiner and the Applicant, the rejections have been overcome and the claims are now in condition for allowance. Accordingly, Applicant respectfully requests reconsideration of this application, withdrawal of the objection, and allowance of the claims.

#### Invitation for a telephone interview

The Examiner is invited to call the undersigned at 408-720-8598 if there remains any issue with allowance of this case.

#### Charge our Deposit Account

Please charge any shortage to our Deposit Account No. 02-2666.

1996 Date:

Respectfully set FEATALOR & ZAFMAN

Daniel M. De Vos Reg. No. 37,813

12400 Wilshire Boulevard Seventh Floor Los Angeles, California 90025-1026 (408) 720-8598

#### Attorney Docket # 02055.P002C

Application No.: 08/513,298

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#### I. EXAMINER'S STATEMENT OF REASONS FOR ALLOWANCE

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II. This communication is an Examiner's reasons for allowance in response to application filed on August 09, 1995, assigned serial 08/513,298 and titled "PILOT AIDED USING SYNTHETIC REALITY".

III. The following is an Examiner's statement of reasons for the indication of allowable subject matter:

1. After carefully reviewing the application in light of the prior art of record, the amended claims and additional search of all the possible areas relevant to the present application a set of related prior art have been found, but those prior art references are not deemed strong to make the application unpatentable. Thus, it is found that the application is now in condition for allowance.

2. Although the prior art disclose several claimed limitations, none of the references teach a pilot aid which uses an aircraft's position and attitude to transform data from a digital data base to present a pilot with a synthesized three dimensional projected view of the world which includes a digital data base comprising terrain data representing real terrestrial terrain as at least one polygon and said terrain data generated from elevation data of the real terrestrial terrain (claims 1, 7, 13 and 36).

3. The closest references have been found were Beckwith et al., Behensky et al., Ulrich , Jacobs et al., Raymer et al., Patrick. However, taken individually or in combination, they do not teach or make obvious a polygon database representing real terrestrial terrain where that polygon database was generated from elevation data of real terrestrial terrain.

4. Claims 1-28 and 31-39 are allowable over the prior art of record (now renumbered as 1-37).

IV. Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Tan Nguyen, whose telephone number is (703) 305-9755. The examiner can normally be reached on Monday-Thursday from 7:30 AM-6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kevin J. Teska, can be reached on (703) 305-9704. The fax phone number for this Group is (703) 305-9564.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 305-3800.

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TAN NGUYEN June 17, 1996

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#### ISSUE FEE TRANSMITTAL PART B

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A 5 ्रम् MAILING INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE. Blocks 2 through 6 should be completed where appropriate. All further correspondence including the Issue Fee Receipt, the Patent, advance orders and notification of maintenance lees will be malled to addressee entered in Block 1 unless you direct otherwise, by: (a) specifying a new correspondence address in Block 3 below; or (b) providing the PTO with a separate "FEE ADDRESS" for maintenance fee notifications with the payment of Issue Fee or thereafter. See reverse for Certificate of Mailing. şj.

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A. A. This application is NOT assigned.		Any Deliciencies in Enclosed Fees
💤 🗖 Assignment is being submitted under separate cover. Assignments about	d be	The COMMISSIGNER OF PATENTS AND TRADEWARKS Is requested to apply the lasting the application of the application formatiled above.
directed to Box ASSIGNMENTS. PLEASE NOTE: Unless an assignce is identified in Block 5, no assigned	) data will appear on the patent.	(Authorized Signaydre) (Dele)
Inclusion of assignes data is only appropriate when an assignment has b PTO or is being submitted under separate cover. Completion of this form		Debie 14 08- Vol 100 NO 37 813 6/26/96
en assignment.		NOTE: The Issue Fee will not be accepted from anyone other than the
		applicant; a registered attorney or agent; or the assignee or other pany in interest as shown by the records of the Patent and Trademark Office.
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# C-CHARGE TO DEPOSIT ACCOUN

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7-11-94 TOTAL CLAIMS 08/513,298 <u>.06//09</u>

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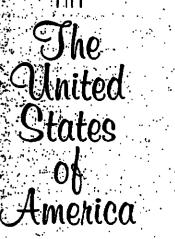
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PTO UTILITY GRANT Paper Number,

#### The Commissioner of Patents and Trademarks

Has received an application for a patent for a new and useful invention. The title and description of the invention are enclosed. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law.

Therefore, this

(RIGHT INSIDE)

# **United States Patent**

Grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America for the term set forth. below, subject to the payment of maintenance fees as provided by law.

If this application was filed prior to June 8, 1995, the term of this patent is the longer of seventeen years from the date of grant of this patent or twenty years from the earliest effective U.S. filing date of the application, subject to any statutory extension.

If this application was filed on or after June 8, 1995, the term of this patent is twenty years from the earliest effective U.S. filing date of the application, subject to any statutory extension.

Buce Units Commissioner of Patents and Trademarks Danch (1) 2 Monton



UNITED STATES DEPARTMENT OF COMMERCE Patent and Trademark Office.

ASSISTANT SECRETARY AND COMMISSIONER OF PATENTS AND TRADEMARKS Washington, D.C. 20231

# CHANGE OF ADDRESS/POWER OF ATTORNEY

FILE LOCATION 9200 SERIAL NUMBER 08513298 PATENT NUMBER 5566073 THE CORRESPONDENCE ADDRESS HAS BEEN CHANGED TO CUSTOMER # 23497 THE FEE ADDRESS HAS BEEN CHANGED TO CUSTOMER # 23497 ON 08/11/00 THE ADDRESS OF RECORD FOR CUSTOMER NUMBER 23497 IS:

> JED MARGOLIN 3570 PLEASANT ECHO DRIVE SAN JOSE CA 95148-1916

PTO INSTRUCTIONS: PLEASE TAKE THE FOLLOWING ACTION WHEN THE CORRESPONDENCE ADDRESS HAS BEEN CHANGED TO CUSTOMER NUMBER: RECORD, ON THE NEXT AVAILABLE CONTENTS LINE OF THE FILE JACKET, 'ADDRESS CHANGE TO CUSTOMER NUMBER'. LINE THROUGH THE OLD ADDRESS ON THE FILE JACKET LABEL AND ENTER ONLY THE 'CUSTOMER NUMBER' AS THE NEW ADDRESS. FILE THIS LETTER IN THE FILE JACKET. WHEN ABOVE CHANGES ARE ONLY TO FEE ADDRESS AND/OR PRACTITIONERS OF RECORD, FILE LETTER IN THE FILE JACKET. THIS FILE IS ASSIGNED TO GAU 2304.

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