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UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.	104098.010300
First Inventor	Nikolay L. Lapa
Title	System and Method for Three-Dimensional Measurement of The Shape of Material ...
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APPLICATION ELEMENTS

See *MPEP chapter 600 concerning utility patent application contents.*

1. ☐ **Fee Transmittal Form** (e.g., PTO/SB/17)
   (Submit an original and a duplicate for fee processing)
2. ☒ **Applicant claims small entity status.** See 37 CFR 1.27.
3. ☒ **Specification** [*Total Pages* 18]
   Both the claims and abstract must start on a new page
   (For information on the preferred arrangement, see MPEP 608.01(a))
4. ☒ **Drawing(s)** (35 U.S. C. 113) [*Total Sheets* 15]
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   b. ☐ A copy from a prior application (37 CFR 1.63(d))
   (for continuation/divisional with Box 18 completed)
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   Signed statement attached deleting inventor(s) name in the prior application, see 37 CFR 1.63(d)(2) and 1.33(b).
6. ☐ **Application Data Sheet.** See 37 CFR 1.76
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ACCOMPANYING APPLICATION PARTS

9. ☐ **Assignment Papers** (cover sheet & document(s))
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    (if foreign priority is claimed)
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17. ☐ Other: _____

18. If a CONTINUING APPLICATION, *check appropriate box, and supply the requisite information below and in the first sentence of the specification following the title, or in an Application Data Sheet under 37 CFR 1.76:*

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Prior application information: Examiner _____ *Art Unit:* _____

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Signature		Date	August 28, 2007
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Docket No. 104098-010300

UTILITY PATENT APPLICATION

FOR

SYSTEM AND METHOD FOR THREE-DIMENSIONAL MEASUREMENT OF THE SHAPE OF MATERIAL OBJECTS

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SYSTEM AND METHOD FOR THREE-DIMENSIONAL MEASUREMENT OF THE SHAPE OF MATERIAL OBJECTS

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

[0001] The disclosure relates to the three-dimensional ("3D") measurement of material objects.

BACKGROUND DISCUSSION

[0002] There are known devices and methods for performing non-contact measurement of a 3D surface shape of a material object, such as through the use of a structured-light triangulation method. The triangulation method of measuring the surface shape of material objects utilizes the projection of light onto the surface of the object that is, generally, an amplitude-modulated, time-modulated and/or wavelength-modulated ("structured light"). An image of structured light projected onto the surface of an object (hereinafter referred to as "the image") is captured by a camera in a direction different from the direction that the structured light is projected. The image is then analyzed to calculate the shape of the object's surface. A number of parameters impact analysis results, such as parameters of the particular system that forms the structured light and scans the image, the shape of the surface, the distance between the surface of the object and the components of the system, the orientation of the object in relation to the components of the system. Since generally most of the parameters listed are either previously known or easily identified, with the exception of the shape of the object, the distance between the surface of the object and the components of the system, the orientation of the object in relation to the components of the system, it is possible to determine the shape of the object's surface using a triangulation method to analyze the image.

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SUMMARY

[0003] In accordance with one or more embodiments, a system and method are provided for the 3D measurement of the shape of material objects using non-contact structured light triangulation. The system includes a light projector for projecting a structured light pattern onto the surface of any object and a camera for capturing an image of the structured light pattern acting on the surface of the object. The system further includes computing device for determining the 3D measurement of the surface shape of the illuminated object through a triangulation algorithm employed based on a calculated correspondence between the projected structured light and the captured image. The structured light includes coded elements that lie within planes passing through vertices of the central projection areas of both the projector and the camera, where such planes also that pass through the space of the object being measured. This arrangement allows a correspondence between the coded elements in the structured light and the captured image to be easily identified by restricting the number of directions in which the structured light can be deformed to one known direction, thereby providing a system and method of quickly and accurately obtaining the 3D measurement of the surface shape of objects using a non-contact structured-light triangulation methodology.

DRAWINGS

[0004] The above-mentioned features and objects of the present disclosure will become more apparent with reference to the following description taken in conjunction with the accompanying drawings wherein like reference numerals denote like elements and in which:

[0005] FIG. 1 is a block diagram representation of a system for the 3D measurement of the shape of material objects in accordance with one or more embodiments of the present disclosure.

[0006] FIG. 2 is a geometric diagram of the layout and relation between a projector, a camera and a measured object using triangulation.

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[0007] FIG. 3 is an example of a slide and the corresponding image in a structured light triangulation system.

[0008] FIGS. 4A-4C are representative examples of structured light patterns used in a structured light triangulation system.

[0009] FIG. 5 is an illustration of projector and camera meridians in accordance with one or more embodiments of the present disclosure.

[0010] FIG. 6 is a partial perspective view of the geometric rule of meridian positioning in the system for the 3D measurement of the shape of material objects in accordance with one or more embodiments of the present disclosure.

[0011] FIG. 7 is a representative example of geometric relative positioning of the projector with respect to the camera in the system for the 3D measurement of the shape of material objects in accordance with one or more embodiments of the present disclosure.

[0012] FIG. 8 is an illustration of the projector and camera meridian positions for the relative projector and camera positioning of FIG. 7.

[0013] FIG. 9 is a representative example of geometric relative positioning of the projector with respect to the camera in the system for the 3D measurement of the shape of material objects in accordance with one or more embodiments of the present disclosure.

[0014] FIG. 10 is an illustration of the projector and camera meridian positions for the relative projector and camera positioning of FIG. 9.

[0015] FIG. 11 is a representative example of geometric relative positioning of the projector with respect to the camera in the system for the 3D measurement of the shape of material objects in accordance with one or more embodiments of the present disclosure.

[0016] FIG. 12 is an illustration of the projector and camera meridian positions for the relative projector and camera positioning of FIG. 11.

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[0017] FIG. 13 is an illustration of a representative light structure generated by the in the system for the 3D measurement of the shape of material objects in accordance with one or more embodiments of the present disclosure.

[0018] FIG. 14 is an illustration of a representative captured image taken from a planar object corresponding to the light structure of FIG. 13 for the relative projector and camera positioning of FIG. 7 in accordance with one or more embodiments of the present disclosure.

[0019] FIG. 15 is an illustration of a representative captured image taken from a non-planar object corresponding to the light structure of FIG. 13 for the relative projector and camera positioning of FIG. 7 in accordance with one or more embodiments of the present disclosure.

DETAILED DESCRIPTION

[0020] In general, the present disclosure includes a system and method for the 3D measurement of the shape of material objects. Certain embodiments of the present disclosure will now be discussed with reference to the aforementioned figures, wherein like reference numerals refer to like components.

[0021] Referring now to FIG. 1, a block diagram illustration of a system 100 for the 3D measurement of the shape of material objects is shown generally in accordance with one or more embodiments. The system 100 includes an optical unit 102 and a computing device 104. The optical unit 102 produces structured light with one or more projectors 106. In one embodiment, the projector 106 is a slide projector including a light source 126 and a light modulating device 122 for modulating the light emitted from the light source 126. The light modulating device 122 may be a slide-type including a slide, a liquid crystal display (LCD)-type including a liquid crystal screen, or other device for creating structured light, where such device will be hereinafter referred to as slide 122. The projector further includes a lens 181 having a vertex 124 for projecting a slide image as structured light 113 about a light cone 114 onto the surface 110 of an object 111 being measured. In accordance with this and other embodiments, the structured

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light 113 can also be generated using other methods, such as interferential, moir and diffractive light generation methods.

[0022] In one or more embodiments, the projector 106 projects structured light in a wavelength selected from one of optical, visible and infrared wavelengths. In one or more embodiments, the projector 106 comprises a flashlight. In one or more embodiments, the projector 106 is a continuous light source.

[0023] The optical unit 102 includes a camera 108 or other image detecting device for capturing an image of the structured light 113 acting on the surface 110 of the object 111. In one or more embodiments, the camera 108 includes a lens 180 having a vertex 130, a matrix radiation receiver 128 and a camera driver 132. The lens 180 forms the image on the surface of the matrix radiation receiver 128. The camera driver 132 functions as an electronic signal management and processing unit which controls operation of the matrix radiation receiver 128 and can convert the image captured by the receiver 128 to another format (e.g., VGA, bmp, jpeg, etc.) as desired or required before the captured image is transferred to the camera output 134. The camera 108 includes a field of view 118 that encompasses a portion of the surface 110 of the object 111. The projector 106 includes a central projector optical axis 112 and the camera 108 includes a central camera optical axis 116, such that the triangulation angle 120 is the angle extending between where the projector optical axis 112 and the camera optical axis 116 intersect.

[0024] The computing device 104 analyzes the captured image received from the camera output 134 to perform the desired calculations, such as but not limited to the 3D shape of the surface 110 of the object 111, the distance to the object 111 and the orientation of the surface 110 being captured. The computing device 104 can also to control the projector 106 and the camera 108 and their various components included therein.

[0025] Referring now to the geometric layout diagram of FIG. 2, the functioning of the optical unit 100 will be described in greater detail with respect to one or more embodiments. The center 124 of the entrance and exit pupils of the projection lens 181 of the projector 106 are in one or more embodiments the vertex of the projected

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structured light 113, while the center 130 of the entrance and exit pupils of the lens 180 of the camera 108 are in one or more embodiments the vertex of the camera field of view 118.

[0026] Through the use of a triangulation method, a plurality of points in the slide 122 are projected onto the surface 110 of an object 111 and then mapped one-to-one to respective points in the captured image that is captured by the camera 108. The position of each point in the captured image depends on a variety of factors, such as the distance to the surface 110 of object 111 and the shape and orientation of the surface 110 in relation to the optical unit 102. In order to reconstruct the shape and position of the surface 110 being measured, each point in the captured image is associated with a respective point in the slide 122 and then the shape, position and/or orientation of the surface 110 is derived from the coordinates of the points using triangulation techniques known to those skilled in the art. FIG. 2 illustrates one possible method of calculating the shape of a surface 110 at a certain point based on the corresponding points on the slide 122 and on the captured image at the receiver 128.

[0027] Referring now to FIG. 3, an illustrative example is provided showing a perspective view of how a projected image and a captured image are utilized to determine the shape of the surface 110 of an object 111. A slide 122 having a pattern of lines 162 performs amplitude modulation of the projected light from the light source 126 to project the pattern as structured light 113 from the projector 106 onto the surface 110 of the object 111. A pattern of lines 186 then appears on the surface 110. The camera 108 records the corresponding resulting captured image 140 of the structured light 113 acting on the surface 110. In this example, the complexity of calculating the shape of the surface 110 resides in the complexity of identifying correspondence between lines 185 in the pattern in the captured image 140 and lines 162 in the pattern in the slide 122. It can sometimes be difficult to determine the proper correspondence between lines in the image 140 and the slide 122 because all lines have similar appearance and it is difficult to tell which line 162 in the slide 122 generated a given line 185 in the captured image 140. Further, as the shape of the object 11 becomes more

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complex, the more frequently the lines can break and the more complex the task becomes of finding correspondence between the slide 122 and the captured image 140.

[0028] In order to simplify the task of searching for correspondence between points in the captured image 140 and the slide 122, the projected light 113 can be structured to represent an assemblage of distinct elements that can be identified in the captured image 140. The introduction of this heterogeneity into the captured image 140 is termed "coding." FIGS. 4A-4C illustrates several representative examples of coded structured light 113 that can be projected onto the surface 110 of the object 111.

[0029] Despite the presence of coding, the task of identifying elements of structured light in an image captured by the camera 108 is still complex, especially due to the presence of perspective deformation caused by the finiteness of the distance between the object's surface 110 and the projector 106 and the camera 108. Perspective deformation distorts the captured image 140 of the structured light 113 in two directions and depends on the shape of the surface 110 in each point of the captured image 140. As a result, each element of the projected structured light 113 may unpredictably shift, turn or twist its shape in the captured image 140, so that its identification will require a two-dimensional search in the captured image 140 considering all of its possible deformations (turn, shape deformation). The complexity associated with such a search often leads to frequent errors in the detection of structured light elements in the captured image 140, which results in errors measuring the shape of the object's surface 110. The searching task also requires resource-intensive search algorithms, which protracts registration time or requires a more powerful, and hence larger and more expensive, computational system or computing device 104.

[0030] In one or more embodiments, the system 100 simplifies the task of detecting elements of structured light 113 in the image 140 captured by the camera 108 by restricting the number of directions in which the structured light 113 can be deformed to one known direction, organizing a code sequence of structured light 113 in that direction, and by using special structured light coding methods, thereby achieving more effective and efficient 3D imaging.

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[0031] Based on affine epipolar geometry, if two cameras are looking at the same object or scene, it is possible to draw a straight line through each point in the image of the one camera, with all points of the object or scene corresponding to that line lying along a straight line in the image of the other camera, regardless of the shape of the object or scene. This principle can be applied to surface shape scanning using structured-light triangulation to determine the 3D shape of a material object.

[0032] In one or more embodiments, the system 100 and associated method for the 3D measurement of the shape of material objects uses the assumption that, regardless of the position of the projector 106 and the camera 108 in relation to each other, it is possible to draw a straight line 187 through each point of the slide 122, such that, when the projected pattern in the structured light 113 is projected on the surface 110 of the object 111, a corresponding straight line 188 exists in the image 140 captured by the camera 108, regardless of the shape of the surface 110 being captured. Any pair of such lines 187 and 188 forms a one-to-one correspondence, where such lines will be referred to as "meridians" hereafter and, in particular, as "camera meridians 188" for the captured image by the camera 108 and as "projector meridians 187" for the projected structured light 113 from the projector 106, as illustrated by way of example in FIG. 5. In one embodiment, the projector meridians 187 and camera meridians 188 are representative lines that can be represented on the surfaces of the slide 122 and the matrix radiation receiver 128, but they are not actually part of the pattern that is projected onto the object 111 and captured by the camera 108.

[0033] In one or more embodiments, as illustrated in FIG. 6, the position of the meridians 187 is determined by projecting the structured light 113 from the projector lens 181 onto the surface 110 of the object 111, where each of the projector meridians 187 will lie in a plane 125 that extends from the vertex 124 of the structured light 113 projected from the projector 106 to the surface 110. Each of the camera meridians 188 in the matrix radiation receiver 128 will also lie in a respective one of the planes 125 that also extends from the vertex 130 of the camera field of view 118 of the camera 108 in the space of the object 111. The projector and camera meridians 187 and 188 lying in the same plane 125 in the space of the object 111 form a corresponding pair.

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[0034] As such, there are direct interrelationship between the projector and camera meridians 187 and 188 and the planes 125 that extend from the vertices 124 and 130. The planes 125 could be considered similar to a light track for the projector and camera meridians 187 and 188 in the space of the object 111. In other words, the projector and camera meridians 187 and 188 can be considered images of the planes 125 on the slide 122 and matrix radiation receiver 128 surfaces made by the projector and camera lenses 180 and 181.

[0035] While any number of possible orientations between the projector 106, the camera 108 and the object 111 are possible, several exemplary positioning arrangements will now be described to illustrate the relation of the projector and camera meridians 187 and 188 in relation to the positioning of the projector 106 and the camera 108.

[0036] Referring to FIG. 7, in one or more embodiments, a line 150 connecting the vertex 124 of the structured light 113 projected from the projector 106 with the vertex 130 of the field of view 118 of the camera 108 is perpendicular to the projector optical axis 112. In this embodiment, the projector meridians 187 are strictly parallel, where an illustration of the projector and camera meridians 187 and 188 corresponding to this embodiment are provided in FIG. 8.

[0037] Referring to FIG. 9, in one or more embodiments, a line 152 connecting the vertex 124 of the structured light 113 projected from the projector 106 with the vertex 130 of the field of view 118 of the camera 108 is perpendicular to the camera optical axis 116. In this embodiment, the camera meridians 187 are strictly parallel, where an illustration of the projector and camera meridians 187 and 188 corresponding to this embodiment are provided in FIG. 10.

[0038] Referring to FIG. 11, in one or more embodiments, a line 154 connecting the vertex 124 of the central projection 113 of the projector 106 with the vertex 130 of the central projection 118 of the camera 108 is not perpendicular to either the projector optical axis 112 or the camera optical axis 116. In this embodiment, neither the projector meridians 187 nor the camera meridians 188 are required to be strictly parallel, as illustrated in FIG. 12.

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[0039] In one or more embodiments, the structured light 113 projected by the projector 106 can be organized to restrict the number of possible directions and deformations in the captured image, thereby simplifying the task of identifying structured light elements in the captured image and, in certain cases, achieving complete linearization of the surface shape calculation algorithm. In one embodiment, the number of possible directions and deformations is restricted to one among the meridians.

[0040] In one or more embodiments, the slide 122 is selected such that structured light 113 is formed possessing at least two coded elements that lie within a plane 125 passing through the vertices 124, 130 of the projector 106 and the camera 108. In one or more embodiments, the structured light 113 can be formed as a pattern including a plurality of different groups of coded elements, wherein all of the coded elements in each group of coded elements lie within the same respective plane 125 passing through the vertices 124, 130 of the projector 106 and the camera 108. Different groups of coded elements will lie in different planes 125. In one or more embodiments such coded elements could be represented by regions with of varying shape, form and/or length. For example, referring to the illustrative embodiment shown in FIG. 13, the structured light 113 is formed as a structure 160 possessing two coded elements 164 and 165 represented by regions of different thickness. The coded elements are located one by one along the plurality of parallel lines 162 so that their sequence within each line 162 forms a solid line with varying thicknesses of varying lengths. At the same time, all the coded elements lie on a plurality of parallel meridians 187 that jointly with lines 162 form a grid. In this manner, a group including a sequence of coded regions 164 and 165 of different thicknesses along each meridian 187 will form a unique sequence relative to the sequences of coded regions 164 and 165 in the other adjacent meridian 187. It is understood that other types of patterns can be generated to generate the coded elements or coded regions 164 and 165 in the structured light 113.

[0041] Using such a light structure 160 of FIG. 13, portions of representative captured images 140 recorded by the camera 108 based on the relational positioning of the projector 106 and camera 108 of FIG. 7 are illustrated in FIGS. 14 and 15 for representative planar objects (FIG. 14) and non-planar objects (FIG.15). From these

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figures, it can be seen that groups of coded elements 164 and 165 each lie on a respective projector meridian 187 in the slide 122 and will also lie with a respective camera meridian 188 in the image 140 (where the projector meridians 187 and the camera meridians 188 are illustrated as vertical lines in these figures). The particular shape of the surface 110 of the object 111 being analyzed will cause the coded elements 164 and 165 in the image 140 to move only in a direction along the length of the camera meridians 188. A desired 3D measurement of the surface 110 can then be made by analyzing the movement and/or position of coded elements 164 along the camera meridians 188 with respect to the position of the respective coded elements 164 and 165 in the slide 122 and also with respect to the movement and/or position of the other coded elements 164 and 165 in the same group of coded elements 164 or 165 along the same or different camera meridians 188.

[0042] The structure 160 may be used for any of embodiments described herein. To be used for a particular embodiment, the structure 160 should be fit into a field of the slide 122 by zooming, shifting or otherwise altering the structure 160. In addition, the structure 160 may be distorted as necessary so that groups of coded elements 164 and 165 of the structure 160 coincide with meridians chosen for the particular embodiment.

[0043] The computing system 104 may comprise a general-purpose computer system which is suitable for implementing the method for the 3D measurement of the shape of material objects in accordance with the present disclosure. The computing system 104 is only one example of a suitable computing environment and is not intended to suggest any limitation as to the scope of use or functionality of the invention. In various embodiments, the present system and method for the 3D measurement of the shape of material objects is operational with numerous other general purpose or special purpose computing system environments or configurations. Examples of well known computing systems, environments, and/or configurations that may be suitable for use with the invention include, but are not limited to, personal computers, server computers, hand-held or laptop devices, multiprocessor systems, microprocessor-based systems, programmable consumer electronics, networked PCs, minicomputers, mainframe

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computers, distributed computing environments that include any of the above systems or devices, and the like.

[0044] In various embodiments, the triangulation algorithms and the method for the 3D measurement of the shape of material objects may be described in the general context of computer-executable instructions, such as program modules, being executed by a computer. Generally, program modules include routines, programs, objects, components, data structures, etc. that perform particular tasks or implement particular abstract data types. These algorithms and methods may also be practiced in distributed computing environments where tasks are performed by remote processing devices that are linked through a communications network. In a distributed computing environment, program modules may be located in both local and remote computer storage media including memory storage devices. In one embodiment, the computing system 104 implements 3D shape measurement of objects by executing one or more computer programs. The computer programs may be stored in a memory medium or storage medium such as a memory and/or ROM, or they may be provided to a CPU through a network connection or other I/O connection.

[0045] The system and method formed in accordance with the embodiments described herein provide for the 3D measurement of the shape of material objects using non-contact structured light triangulation. Such a system and method are capable of quickly and accurately measuring the coordinates of a point cloud (i.e., light structure) projected on the surface of complex-shaped material objects in one coordinate system referenced to the system. These teachings can be applied to a whole range of scientific and engineering problems that require accurate data about the surface shape of an object, distance to the surface, or its spatial orientation. The present system and method has useful applications in many fields, including but not limited to digital imaging, the control of part shapes, computer animation, capturing the shape of objects that have cultural, historical or scientific value, shape recognition, topography, machine vision, medical procedures, special positioning of devices and robots, etc.

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CLAIMS

1. A system for the 3D measurement of the shape of a material object, comprising:

a light projector for projecting a structured light pattern onto a surface of an object, wherein the light projector includes a vertex for the projected structured light pattern;

an image detecting device for capturing an image of the structured light pattern acting on the surface of the object, wherein the image capturing device includes a vertex for a field of view of the image detecting device; and

a computing device for determining a measurement relating to the surface of the object using a triangulation algorithm based on a correspondence between the projected structured light pattern and the captured image,

wherein the structured light pattern includes at least two coded elements that lie within a plane passing through the vertices of the light projector and the image detecting device and a portion of the object being measured.

2. The system of claim 1, wherein the structured light pattern includes a plurality of different groups of coded elements, wherein all of the coded elements in at least one group of coded elements lie within the same respective plane passing through the vertices of the light projector and the image detecting device and a portion of the object being measured.

3. The system of claim 2, wherein each group of coded elements lies within a different respective plane passing through the vertices of the light projector and the image detecting device and a portion of the object being measured.

4. The system of claim 3, wherein the projector further includes a central optical axis, further wherein the light projector and the image detecting device are

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arranged such that a line extending between the vertex of the light projector and the vertex of the image detecting device is perpendicular to the optical axis of the projector.

5. The system of claim 3, wherein the image detecting device further includes a central optical axis, further wherein the light projector and the image detecting device are arranged such that a line extending between the vertex of the light projector and the vertex of the image detecting device is perpendicular to the optical axis of the image detecting device.

6. The system of claim 3, wherein the projector further includes a central optical axis and the image detecting device further includes a central optical axis, further wherein the light projector and the image detecting device are arranged such that a line extending between the vertex of the light projector and the vertex of the image detecting device is not perpendicular to either optical axis of the projector and the image detecting device.

7. The system of claim 3, wherein the light projector projects structured light in a wavelength selected from one of optical, visible and infrared wavelengths.

8. The system of claim 3, wherein the light projector is a continuous light source.

9. The system of claim 3, wherein the structured light pattern includes a plurality of coded elements that can be variably grouped together such that all of the coded elements in each group lie in a respective plane passing through the vertices of the light projector and the image detecting device and a portion of the object being measured and such that all of the coded elements in each group form a unique sequence relative to the sequences of coded elements in other adjacent groups of coded elements.

10. The system of claim 3, wherein the computing device determines a three-dimensional shape of the surface.

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11. A method for the 3D measurement of the shape of a material object, comprising:

projecting a structured light pattern from a light projector onto a surface of an object, wherein the light projector includes a vertex for the projected structured light pattern;

capturing an image of the structured light pattern acting on the surface of the object with an image detecting device, wherein the image detecting device includes a vertex for a field of view for the image detecting device; and

determining a measurement relating to the surface of the object using a triangulation algorithm based on a correspondence between the projected structured light pattern and the captured image,

wherein the structured light pattern includes at least two coded elements that lie within a plane passing through the vertices of the light projector and the image detecting device and a portion of the object being measured.

12. The method of claim 11, wherein the structured light pattern includes a plurality of different groups of coded elements such that all of the coded elements in at least one group of coded elements is projected to lie within the same respective plane passing through the vertices of the light projector and the image detecting device and a portion of the object being measured.

13. The method of claim 12, wherein each group of coded elements lies within a different respective plane passing through the vertices of the light projector and the image detecting device and a portion of the object being measured.

14. The method of claim 13, wherein the projector further includes a central optical axis, further comprising arranging the light projector and the image detecting device such that a line extending between the vertex of the light projector and the vertex of the image detecting device is perpendicular to the optical axis of the projector.

15. The method of claim 13, wherein the image detecting device further includes a central optical axis, further comprising arranging the light projector and the

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image detecting device such that a line extending between the vertex of the light projector and the vertex of the image detecting device is perpendicular to the optical axis of the image detecting device.

16. The method of claim 13, wherein the projector further includes a central optical axis and the image detecting device further includes a central optical axis, further comprising arranging the light projector and the image detecting device such that a line extending between the vertex of the light projector and the vertex of the image detecting device is not perpendicular to either optical axis of the projector and the image detecting device.

17. The method of claim 13, further comprising projecting structured light in a wavelength selected from one of optical, visible and infrared wavelengths.

18. The method of claim 13, further comprising projecting the structured light from a continuous light source.

19. The method of claim 13, wherein the structured light pattern includes a plurality of coded elements that can be variably grouped together such that all of the coded elements in each group lie in a respective plane passing through the vertices of the light projector and the image detecting device and a portion of the object being measured and such that all of the coded elements in each group form a unique sequence relative to the sequences of coded elements in other adjacent groups of coded elements.

20. The method of claim 13, further comprising determining a three-dimensional shape of the surface.

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SYSTEM AND METHOD FOR THREE-DIMENSIONAL MEASUREMENT OF THE SHAPE OF MATERIAL OBJECTS

ABSTRACT

A system and method are provided for the 3D measurement of the shape of material objects using non-contact structured light triangulation. The system includes a light projector for projecting a structured light pattern onto the surface of any object and a camera for capturing an image of the structured light pattern acting on the surface of the object. The system further includes computing device for determining the 3D measurement of the surface shape of the illuminated object through a triangulation algorithm employed based on a calculated correspondence between the projected structured light and the captured image. The structured light includes coded elements that lie within planes passing through vertices of the central projection areas of both the projector and the camera also that pass through the space of the object being measured.

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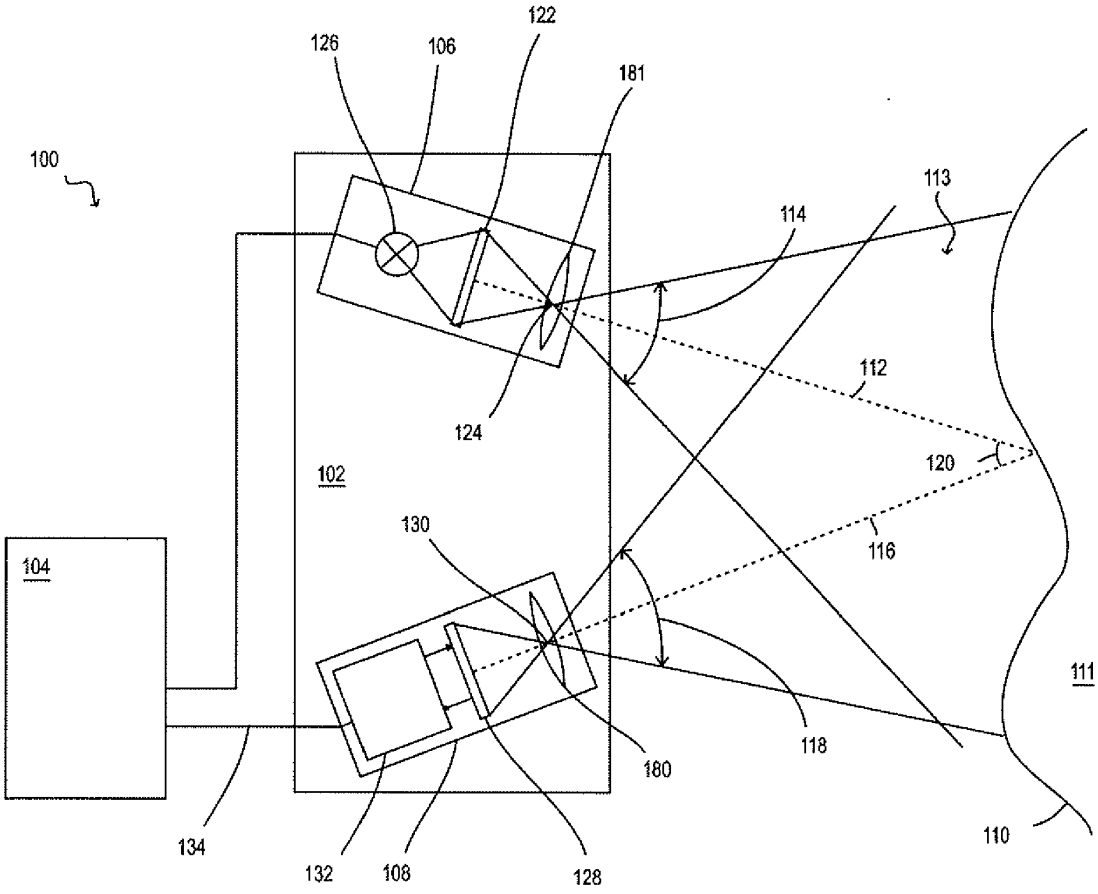


Fig. 1

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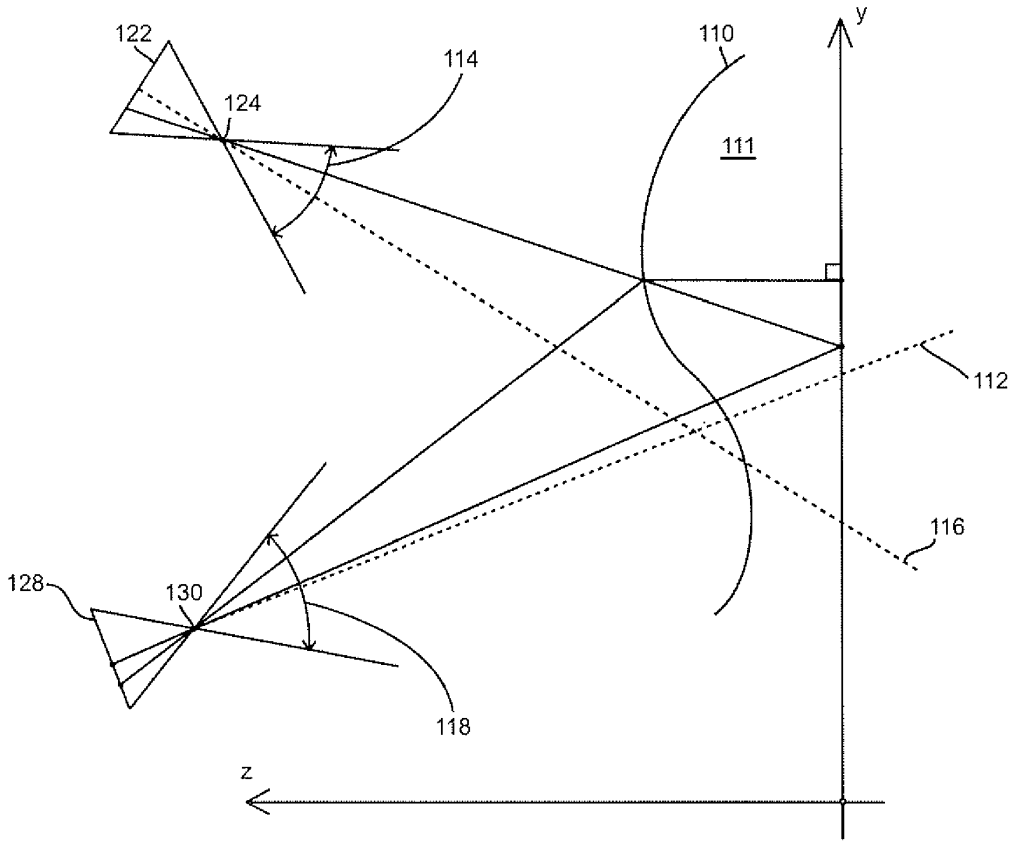


Fig. 2

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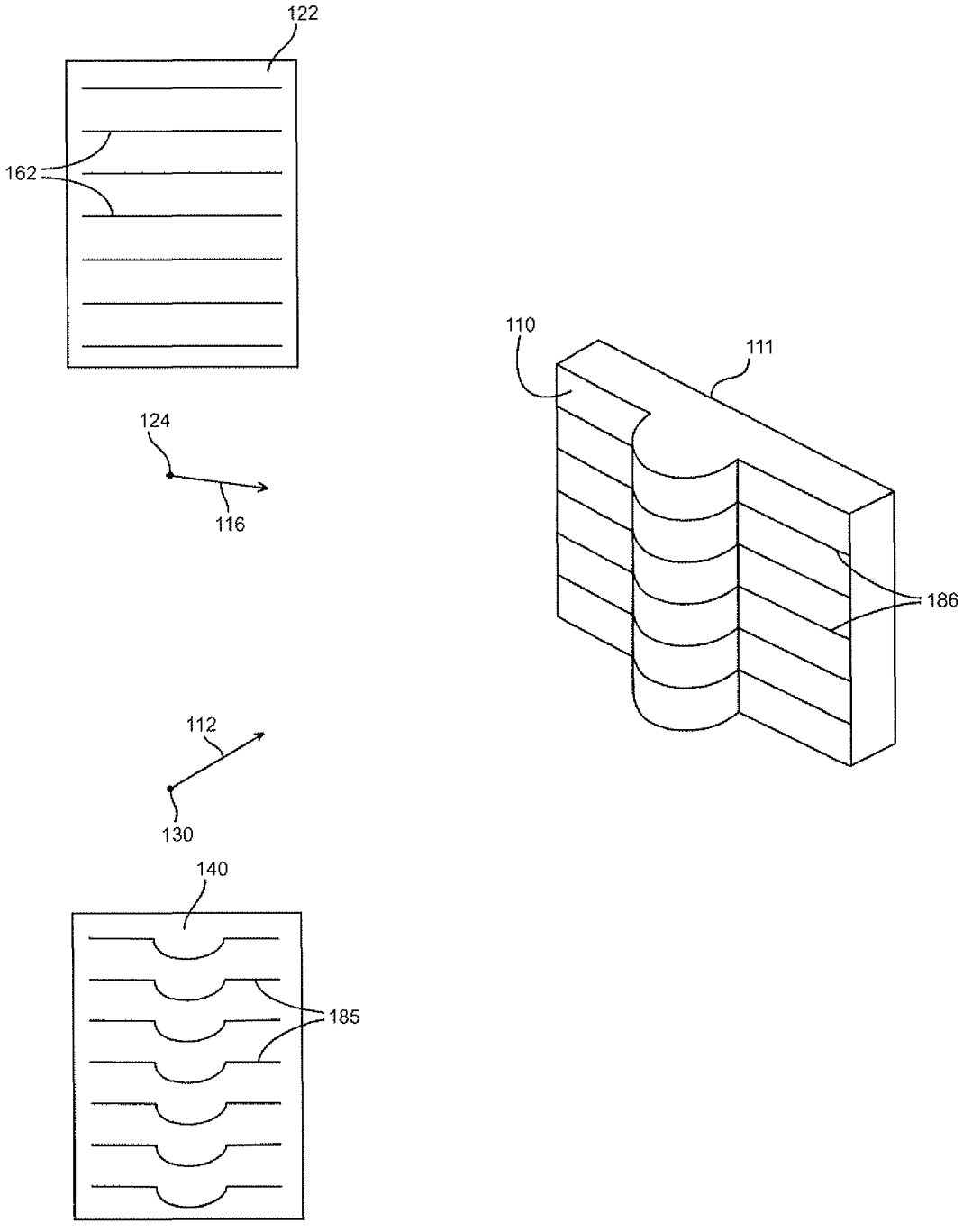


Fig. 3

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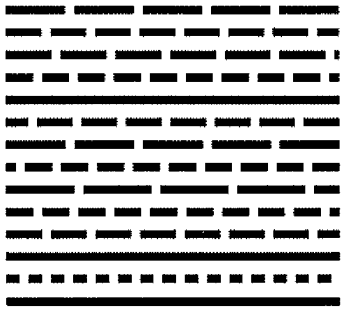


Fig. 4a

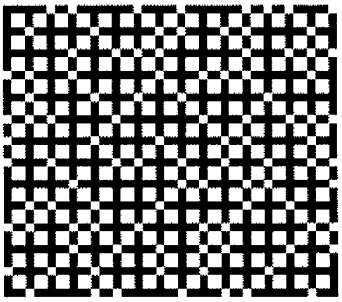


Fig. 4b

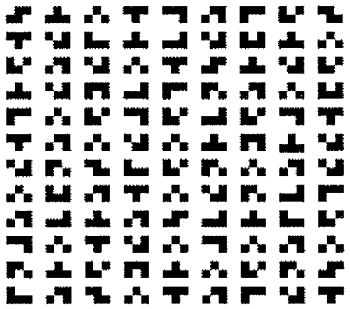


Fig. 4c

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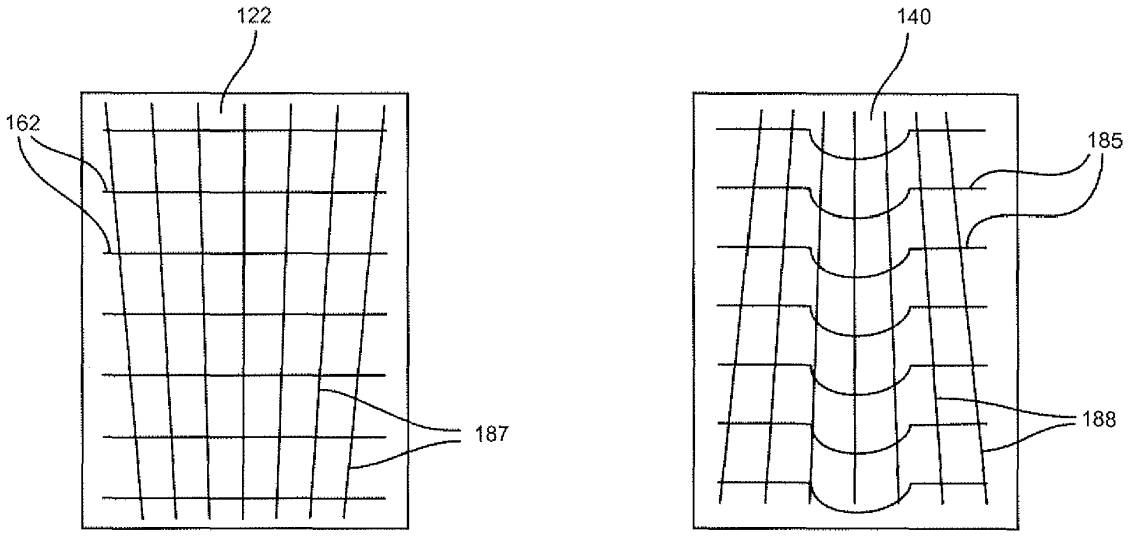


Fig. 5

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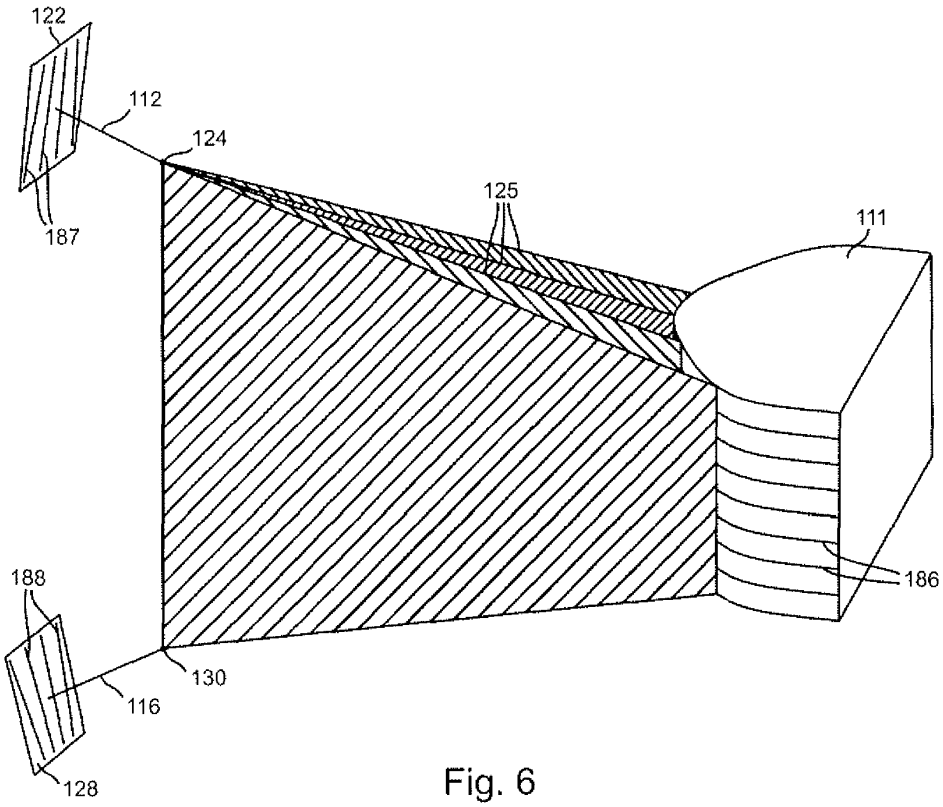


Fig. 6

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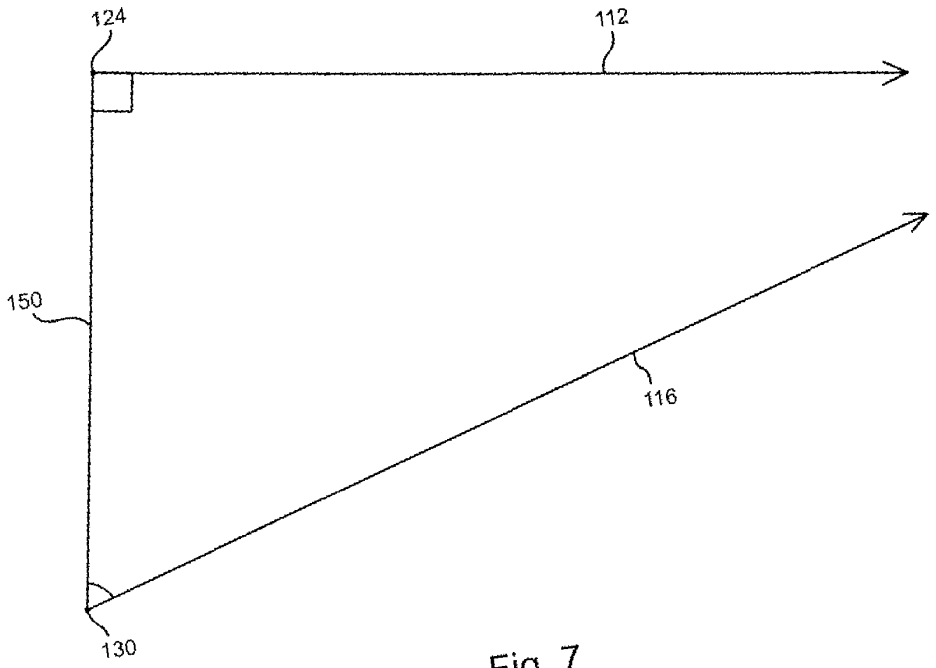


Fig. 7

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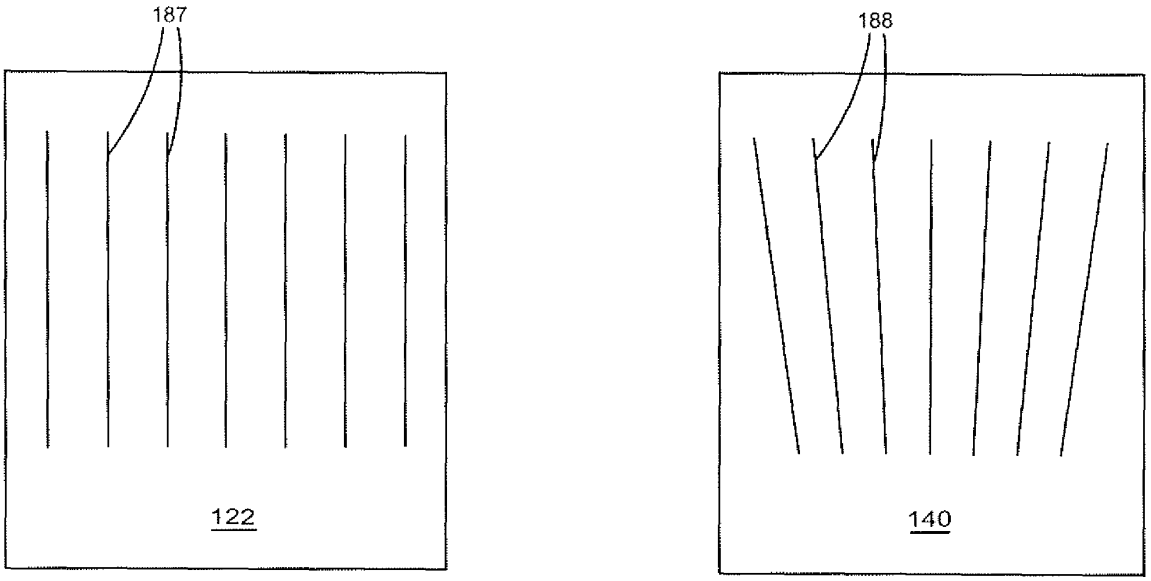


Fig. 8

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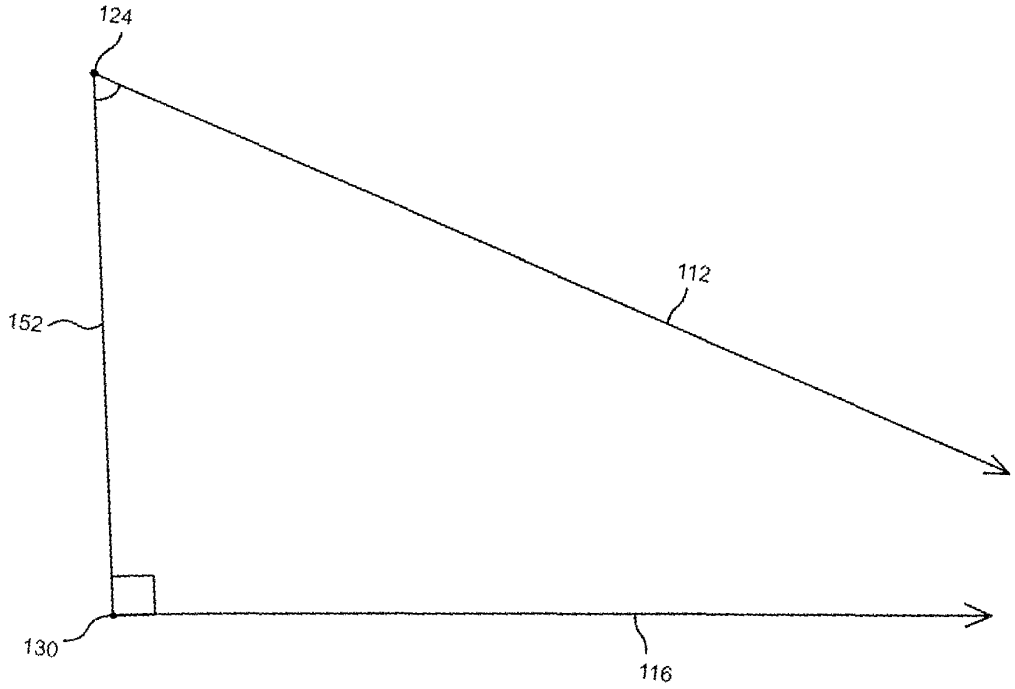


Fig. 9

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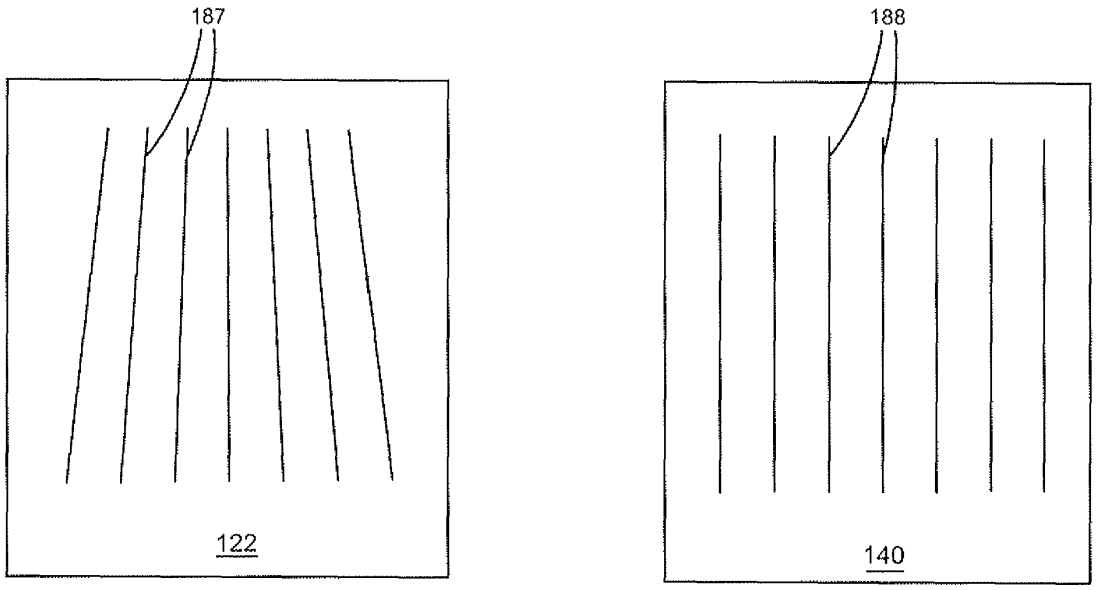


Fig. 10

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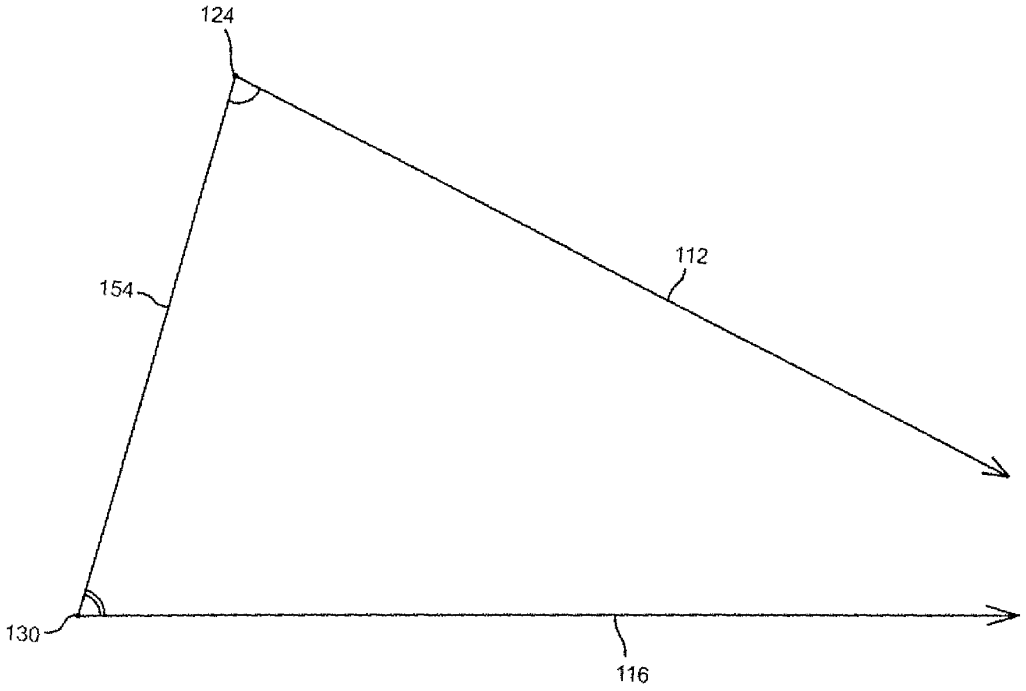


Fig. 11

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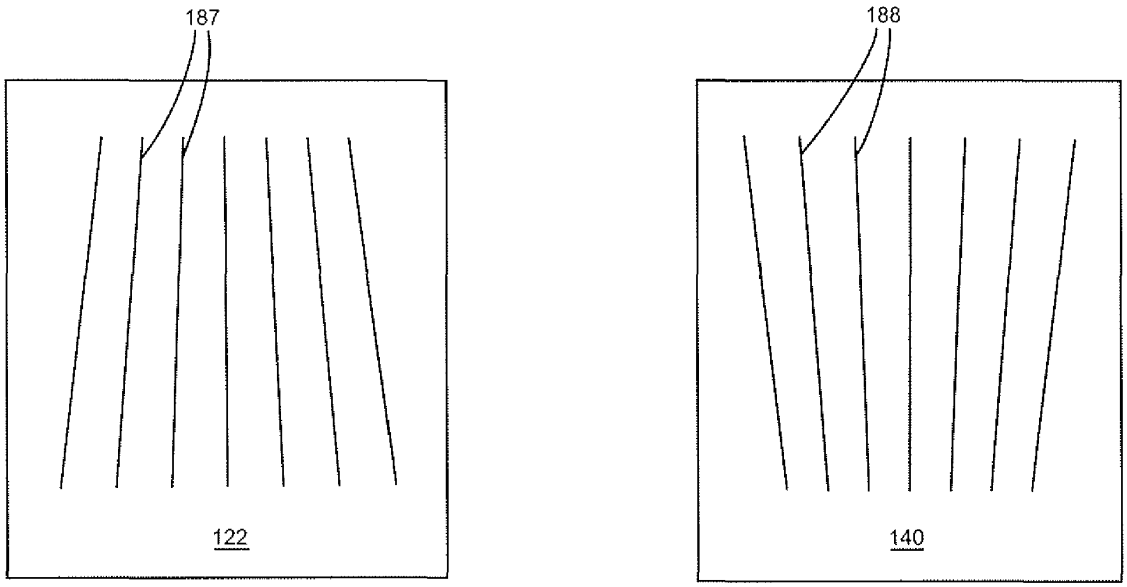


Fig. 12

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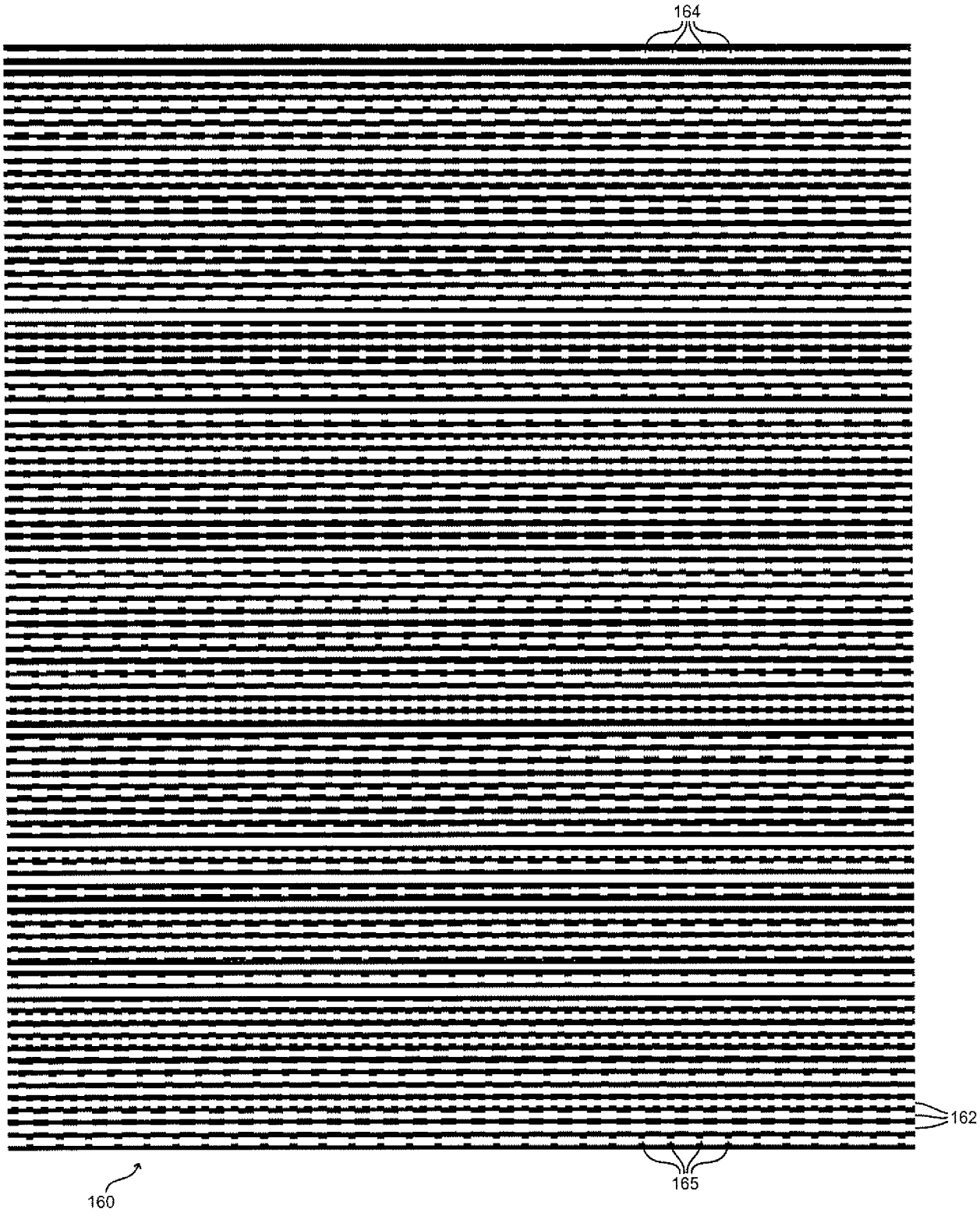


Fig. 13

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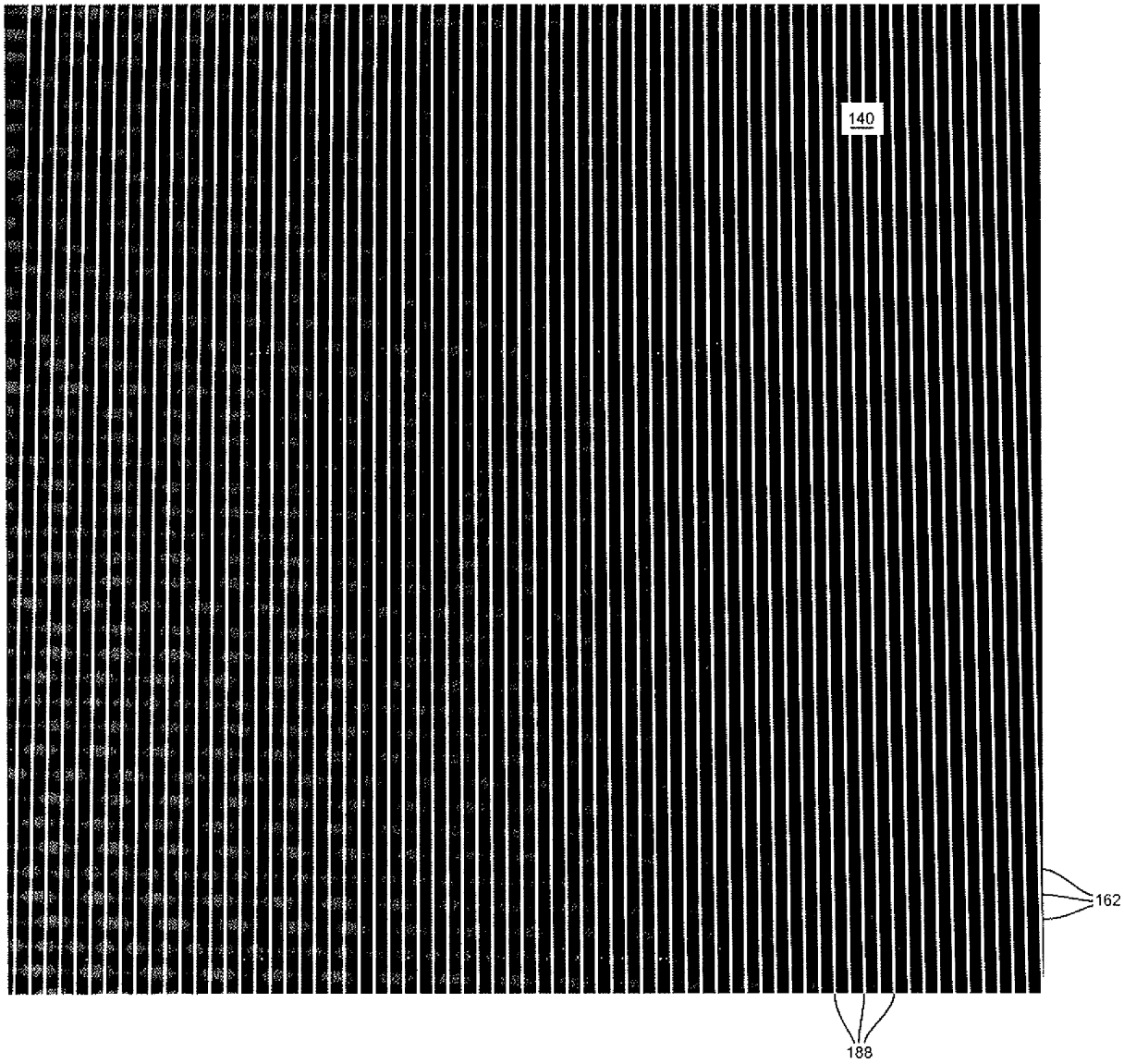


Fig. 14

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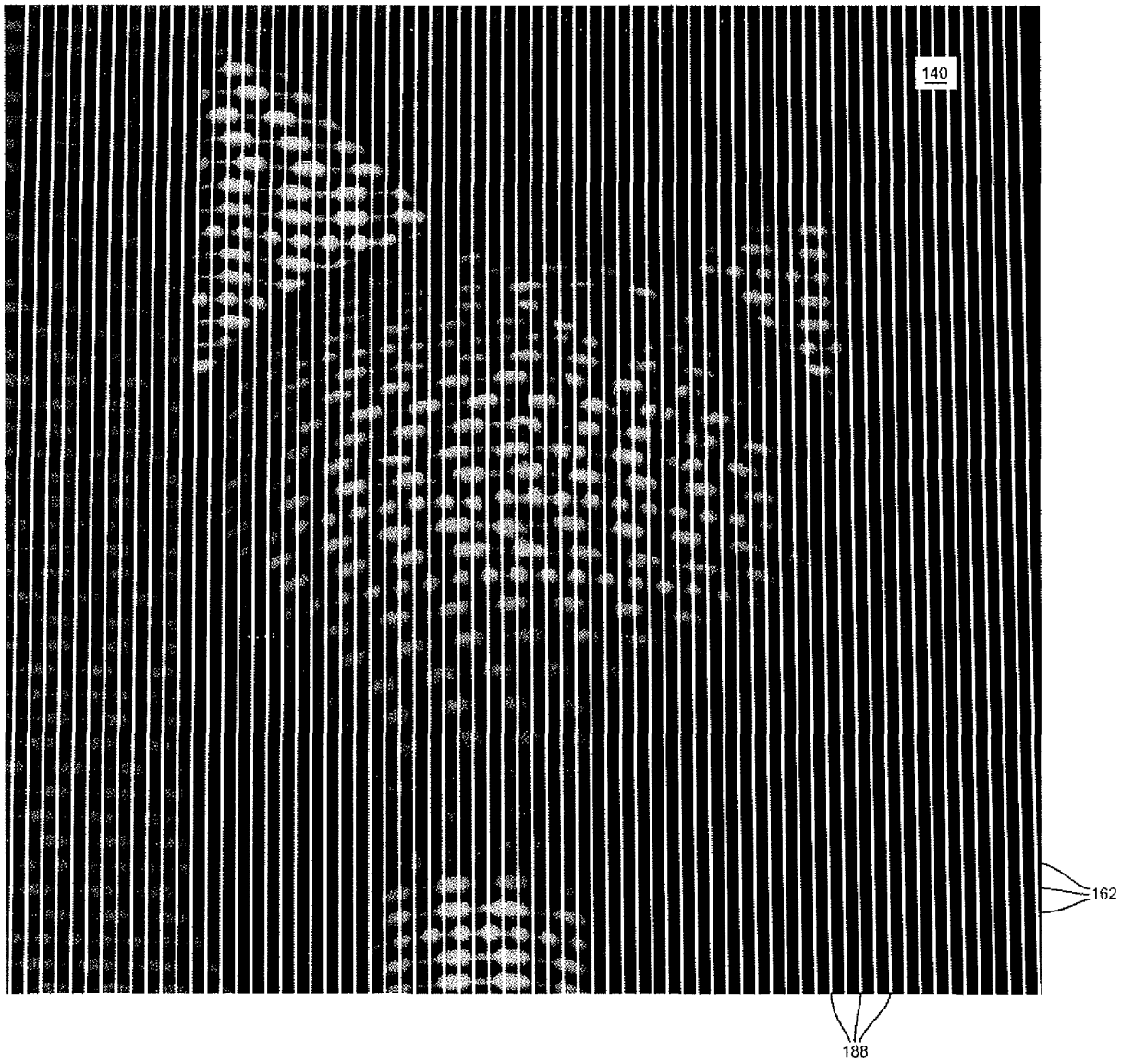


Fig. 15

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Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	System and Method for Three-Dimensional Measurement of The Shape of Material Objects
First Named Inventor/Applicant Name:	Nikolay L. Lapa
Filer:	Bradley D. Blanche/Angela Williams
Attorney Docket Number:	104098.010300

Filed as Small Entity

Utility Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Utility filing Fee (Electronic filing)	4011	1	75	75
Utility Search Fee	2111	1	250	250
Utility Examination Fee	2311	1	100	100
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

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Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**425**

Electronic Acknowledgement Receipt	
EFS ID:	2134654
Application Number:	11846494
International Application Number:	
Confirmation Number:	1491
Title of Invention:	System and Method for Three-Dimensional Measurement of The Shape of Material Objects
First Named Inventor/Applicant Name:	Nikolay L. Lapa
Customer Number:	33717
Filer:	Bradley D. Blanche/Angela Williams
Filer Authorized By:	Bradley D. Blanche
Attorney Docket Number:	104098.010300
Receipt Date:	28-AUG-2007
Filing Date:	
Time Stamp:	20:32:28
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment was successfully received in RAM	$425
RAM confirmation Number	3317
Deposit Account	502638
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.16 and 1.17	

File Listing:

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Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part /.zip	Pages (if appl.)
1		Artec010300PatentApp.pdf	2817007 4f6dd14ebac5d1def99569b6cb21982e ad15aca6	yes	36

Multipart Description/PDF files in .zip description		
Document Description	**Start**	**End**
Transmittal of New Application	1	1
Specification	2	14
Claims	15	18
Abstract	19	19
Drawings	20	34
Oath or Declaration filed	35	36

Warnings:

Information:

2	Fee Worksheet (PTO-06)	fee-info.pdf	8415 4708be5443c1e0957e93128a3939cbf3 685e0e73	no	2

Warnings:

Information:

Total Files Size (in bytes):	2825422

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National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
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Electronic Acknowledgement Receipt	
EFS ID:	2134654
Application Number:	11846494
International Application Number:	
Confirmation Number:	1491
Title of Invention:	System and Method for Three-Dimensional Measurement of The Shape of Material Objects
First Named Inventor/Applicant Name:	Nikolay L. Lapa
Customer Number:	33717
Filer:	Bradley D. Blanche/Angela Williams
Filer Authorized By:	Bradley D. Blanche
Attorney Docket Number:	104098.010300
Receipt Date:	28-AUG-2007
Filing Date:	
Time Stamp:	20:32:28
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment was successfully received in RAM	$425
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The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.16 and 1.17	

File Listing:

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Exhibit 1002

Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part /.zip	Pages (if appl.)
1		Artec010300PatentApp.pdf	2817007 4f6dd14ebac5d1def99569b6cb21982e ad15aca6	yes	36

Multipart Description/PDF files in .zip description		
Document Description	**Start**	**End**
Transmittal of New Application	1	1
Specification	2	14
Claims	15	18
Abstract	19	19
Drawings	20	34
Oath or Declaration filed	35	36

Warnings:

Information:

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Warnings:

Information:

Total Files Size (in bytes):	2825422

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National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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Attorney Docket No. 104098.010300

United States Design Patent Application
COMBINED DECLARATION AND POWER OF ATTORNEY

As common agent for assignee of the below named inventor I hereby declare that: my residence, post office address and citizenship are as stated below next to my name; that

I verify that assignor is the original, first and sole inventor (if only one name is listed below) or a joint inventor (if plural inventors are named below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

SYSTEM AND METHOD FOR THREE-DIMENSIONAL MEASUREMENT OF THE SHAPE OF MATERIAL OBJECTS

The specification of which
a. ☒ is attached hereto
b. ☐ was filed on _____ as application serial no. _____, which I have reviewed.

I hereby state that I have reviewed and understand the contents of the above-identified specification on behalf of assignor, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information on behalf of assignor which is material to the patentability of this application in accordance with Title 37, Code of Federal Regulations, § 1.56 (attached hereto).

I hereby claim foreign priority benefits on behalf of assignor under Title 35, United States Code, § 119/365 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on the basis of which priority is claimed:

a. ☒ no such applications have been filed.
b. ☐ such applications have been filed as follows:

FOREIGN APPLICATION(S), IF ANY, CLAIMING PRIORITY UNDER 35 USC § 119			
COUNTRY	APPLICATION NUMBER	DATE OF FILING (day, month, year)	DATE OF ISSUE (day, month, year)
ALL FOREIGN APPLICATION(S), IF ANY, FILED BEFORE THE PRIORITY APPLICATION(S)			
COUNTRY	APPLICATION NUMBER	DATE OF FILING (day, month, year)	DATE OF ISSUE (day, month, year)

I hereby claim the benefit under Title 35, United States Code, § 120/365 of any United States and PCT international application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, § 1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application.

a. ☐ no such applications have been filed.
b. ☐ such applications have been filed as follows:

U.S. APPLICATION NUMBER	DATE OF FILING (day, month, year)	STATUS (patented, pending, abandoned)

I hereby claim the benefit under Title 35, United States Code § 119(e) of any United States provisional application(s) listed below:

a. ☒ no such applications have been filed.
b. ☐ such applications have been filed as follows:

	DATE OF FILING (Day, Month, Year)

286165530 v1

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I hereby on behalf of assignor appoint all attorney and/or patent agent associated with the following customer number, to prosecute this application and to transact all business in the Patent and Trademark Office and before competent International Authorities including the World Intellectual Property Organization, connected herewith:

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Please direct all correspondence in this case to Greenberg Traurig LLP at the address indicated below:

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Attn: IP Docketing
GREENBERG TRAURIG LLP
2450 Colorado Avenue, Suite 400E
Santa Monica, California 90404
(310) 586-7700 - Phone
(310) 586-7800 - Fax
laipmail@gtlaw.com

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

2	Full Name Of Inventor	Family Name LAPA	First Given Name NIKOLAY	Second Given Name L.
0	Residence & Citizenship	City Jaroslavl'	State or Foreign Country Russia	Country of Citizenship Russian Federation
1	Post Office Address	Post Office Address 3 Dombrovskogo St., Apt. 2	City Jaroslavl'	State & Zip Code/Country Russian Federation
Signature of Inventor:			Date: 27.08.2007г.	

2	Full Name Of Inventor	Family Name BRAILOV	First Given Name YURY	Second Given Name A.
0	Residence & Citizenship	City Moscow	State or Foreign Country Moscow	Country of Citizenship Russian Federation
1	Post Office Address	Post Office Address 24 Dezhneva Proezd.	City Moscow	State & Zip Code/Country Russian Federation
Signature of Inventor:			Date: 27.08.2007 г.	

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PTO/SB/06 (12-04)

08/28/07

Approved for use through 7/31/2006. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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PATENT APPLICATION FEE DETERMINATION RECORD
Substitute for Form PTO-875

Application or Docket Number
11/846,494

APPLICATION AS FILED – PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY FEE ($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))				75			
SEARCH FEE (37 CFR 1.16(k), (i), or (m))				250			
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))				100			
TOTAL CLAIMS (37 CFR 1.16(i))	20 minus 20 =	0	X$ 25	0	OR	X$50	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	2 minus 3 =	* 0	X$100	0		X$200	
APPLICATION SIZE FEE (37 CFR 1.16(s))							
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))			180			360	
			TOTAL	425		TOTAL	0

* If the difference in column 1 is less than zero, enter "0" in column 2.

APPLICATION AS AMENDED – PART II

AMENDMENT A

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE ($)	SMALL ENTITY ADDITIONAL FEE ($)	OR	OTHER THAN SMALL ENTITY RATE ($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
Application Size Fee (37 CFR 1.16(s))									
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					180		OR	360	
					TOTAL ADD'T FEE		OR	TOTAL ADD'T FEE	

AMENDMENT B

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)	OR	RATE ($)	ADDITIONAL FEE ($)
Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
Application Size Fee (37 CFR 1.16(s))									
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))					N/A		OR	N/A	
					TOTAL ADD'T FEE		OR	TOTAL ADD'T FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
11/846,494	08/28/2007	2877	425	104098.010300	20	2

CONFIRMATION NO. 1491

33717
GREENBERG TRAURIG LLP (LA)
2450 COLORADO AVENUE, SUITE 400E
INTELLECTUAL PROPERTY DEPARTMENT
SANTA MONICA, CA90404

FILING RECEIPT

Date Mailed: 09/11/2007

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please write to the Office of Initial Patent Examination's Filing Receipt Corrections. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Applicant(s)

Nikolay L. Lapa, Jaroslavl, RUSSIAN FEDERATION;
Yury A. Brailov, Moscow, RUSSIAN FEDERATION;

Assignment For Published Patent Application

Artec Ventures, Moscow, RUSSIAN FEDERATION

Power of Attorney: The patent practitioners associated with Customer Number 33717

Domestic Priority data as claimed by applicant

Foreign Applications

If Required, Foreign Filing License Granted: 09/10/2007

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US11/846,494**

Projected Publication Date: 03/05/2009

Non-Publication Request: No

Early Publication Request: No

** SMALL ENTITY **

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Exhibit 1002

Title

System and Method for Three-Dimensional Measurement of The Shape of Material Objects

Preliminary Class

356

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

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For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4158).

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Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Nikolay L. Lapa, et al	Examiner:	Unknown
Serial No.:	11/846,494	Group Art Unit:	2877
Filed:	August 28, 2007	Docket No.:	104098.010300
Title:	**SYSTEM AND METHOD FOR THREE-DIMENSIONAL MEASUREMENT OF THE SHAPE OF MATERIAL OBJECTS**		
Customer No.:	33,717		

CERTIFICATE OF TRANSMISSION

I hereby certify that this document is being transmitted electronically to the United States Patent and Trademark Office via the EFS Web e-Filing system on March 5, 2008.

Name: Vicki King

INFORMATION DISCLOSURE STATEMENT [37 C.F.R. § 1.56]

MAIL STOP: AMENDMENT
Commissioner for Patents
Post Office Box 1450
Alexandria, Virginia 22313-1450

Sir/Madam:

Pursuant to 37 C.F.R. §§ 1.56, 1.97 and 1.98, Applicant brings the references listed on the attached Form PTO/SB/08a to the attention of the Examiner.

No representation is made that a reference is "prior art" within the meaning of 35 U.S.C. §§ 102 and 103 and Applicant reserves the right, pursuant to 37 C.F.R. § 1.131 or otherwise, to establish that the reference(s) are not "prior art." Moreover, Applicant does not represent that a reference has been thoroughly reviewed or that any relevance of any portion of a reference is intended.

Copies of the U.S. references are not enclosed.

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This Information Disclosure Statement is being submitted:

☒ 1. Within three months of the filing date of a national application other than a continued prosecution application under 37 C.F.R. § 1.53(d), or within three months of the date of entry of the national stage as set forth in 37 C.F.R. § 1.491 in an international application; or before the mailing date of a first Office action on the merits, and therefore, Applicant believes no fee is required;

☐ 2. After the period specified in paragraph (1) above of this section, but before the mailing date of either a final action under 37 C.F.R. § 1.113, or a notice of allowance under 37 C.F.R. § 1.311, whichever occurs first, and is accompanied by either:

☐ a. A statement that:

(i) Each item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application not more than three months before the filing of the information disclosure statement; or

(ii) No item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the statement after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 C.F.R. § 1.56(c) more than three months before the filing of the information disclosure statement;

☐ b. The fee for filing an Information Disclosure Statement under 37 C.F.R. § 1.17(p) is $180.00.

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☐ 3. After the period specified in paragraph (2) of this section, but on or before payment of the issue fee and is accompanied by:

☐ a. A statement that:

(i) Each item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application not more than three months before the filing of the information disclosure statement; or

(ii) No item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the statement after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 C.F.R. § 1.56(c) more than three months before the filing of the information disclosure statement;

☐ b. A petition requesting consideration of the information disclosure statement; and

☐ c. The petition fee set forth in 37 C.F.R. § 1.17(i).

Applicant would appreciate the examiner initialing and signing a copy of attached Form SB-08 indicating that he or she considered the information and made the information of record.

If the transmittal letter is separated from this document and the PTO determines that an extension or other relief is required, applicant petitions for any required relief including extensions of time and authorizes the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to Deposit Account No. 50-2638.

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Authorization is hereby given to charge any fees due, or credit any overpayment of fees, to Deposit Account No. 50-2638.

Respectfully submitted,

Date: March 5, 2008

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PTO/SB/08a (09-06)
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Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 1

Complete if Known	
Application Number	11/846,494
Filing Date	August 28, 2007
First Named Inventor	Nikolay L. Lapa
Art Unit	2877
Examiner Name	Unknown
Attorney Docket Number	104098.010300

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US- 6,751,344	06/15/2004	Grumbine, Michael T.	
		US-			
		US-			
		US-			
		US-			

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3] "Number[4] "Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
		WO 03/078927	09/25/2003			

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1]Applicant's unique citation designation number (optional). [2]See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. [3]Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4]For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5]Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. [6]Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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(12) МЕЖДУНАРОДНАЯ ЗАЯВКА, ОПУБЛИКОВАННАЯ В СООТВЕТСТВИИ С ДОГОВОРОМ О ПАТЕНТНОЙ КООПЕРАЦИИ (PCT)

(19) ВСЕМИРНАЯ ОРГАНИЗАЦИЯ ИНТЕЛЛЕКТУАЛЬНОЙ СОБСТВЕННОСТИ
Международное бюро

(43) Дата международной публикации:
25 сентября 2003 (25.09.2003)

PCT

(10) Номер международной публикации:
WO 03/078927 A1

(51) Международная патентная классификация [7]:
G01B 11/24

(21) Номер международной заявки: PCT/RU02/00097

(22) Дата международной подачи:
18 марта 2002 (18.03.2002)

(25) Язык подачи: русский

(26) Язык публикации: русский

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(81) Указанные государства *(национально):* AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW.

(84) Указанные государства *(регионально):* ARIPO патент (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), евразийский патент (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), европейский патент (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), патент OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Декларация в соответствии с правилом 4.17:
Об авторстве изобретения (правило 4.17 (iv)) только для US.

Опубликована
С отчётом о международном поиске.

В отношении двухбуквенных кодов, кодов языков и других сокращений см. «Пояснения к кодам и сокращениям», публикуемые в начале каждого очередного выпуска Бюллетеня PCT.

(54) **Title:** DEVICE FOR CONTACTLESS INSPECTION OF LINEAR DIMENSIONS OF THREE-DIMENSIONAL OBJECTS

(54) **Название изобретения:** УСТРОЙСТВО ДЛЯ БЕСКОНТАКТНОГО КОНТРОЛЯ ЛИНЕЙНЫХ РАЗМЕРОВ ТРЁХМЕРНЫХ ОБЪЕКТОВ

(57) **Abstract:** The invention relates to measurement engineering and can be used for visualising profiles of three-dimensional objects. The inventive device performs a "structured lighting" principle and comprises a light emission source and the following components which are sequentially arranged along the emission direction: a transparency and an additional objective lens with aid of which the structured lighting of an object is formed by a line structure, a main objective lens, a photorecorder, a digital electronic unit, a second digital electronic comparing unit whose memory stores the digital image of the line structure which is periodical along one co-ordinate of the line structure. The transparency is embodied in the form of a slide provided with a line structure which is periodical along two co-ordinates, i.e. in the form of a pattern. In the comparing unit, the pattern stored in the memory thereof is subtracted from the recorded pattern, whereby a pattern is formed whose through holes are coded with negative illuminance values and interpreted in a unique manner. Said invention makes it possible to eliminate an increased inspection error and increase the accuracy and reliability of the device.

[Продолжение на след. странице]

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(57) Реферат: Изобретение относится к области измерительной техники и может быть использовано для визуализации профилей трехмерных объектов.

Устройство реализует принцип «структурированной подсветки» и содержат источник оптического излучения и последовательно установленные по ходу излучения транспарант и дополнительный объектив, с помощью которого формируется структурированная подсветка объекта системой полос, основной объектив, фоторегистратор, цифровой электронный блок, второй электронный цифровой блок-компаратор, в памяти которого хранится цифровое изображение периодической по одной координате линейчатой структуры. Транспарант выполнен в виде слайда с линейчатой структурой, периодической вдоль двух координат, т.е., в виде решетки. В компараторе из зарегистрированной картины вычитается картина полос, хранящаяся в его памяти. В результате образуется картина, в которой сквозные отверстия кодируются отрицательными значениями освещенности и однозначно интерпретируются. Таким образом устраняются высокая погрешность контроля, повышается точность и достоверность.

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Устройство для бесконтактного контроля линейных размеров трехмерных объектов.

Область техники

Предполагаемое изобретение относится к области измерительной техники и может быть использовано для визуализации профилей трехмерных объектов.

Предшествующий уровень техники

Известны устройства, реализующие принцип "структурированной подсветки", которые используются в трехмерной компьютерной анимации и некоторых других приложениях для регистрации формы поверхности.

Известен способ и устройство, его реализующее для бесконтактного контроля линейных размеров трехмерных объектов Способ заключается в том, что последовательно сканируют отдельные контуры поверхности светящейся полосой и судят о контролируемых размерах по степени искажения изображения полосы и местоположению полосы в декартовой системе координат . Устройство, реализующее способ, содержит лазер, сканер, объектив, фоторегистратор, и блок обработки информации (см., например, описание международной заявки PCT / IB97/01649 публикация №WO 98 /27514 от 25.06.98).

Недостатком известного устройства является низкая точность и длительное время контроля, связанные с наличием операции и блока сканирования.

Известен способ и устройство, его реализующее для контроля линейных размеров трехмерных объектов по трем декартовым координатам. Способ заключается в том, что на объект проецируется система разноцветных периодических полос. В результате в одном кадре регистрируется целиком вся попадающая в поле зрения камеры часть поверхности и судят о контролируемых размерах по степени искажений изображения множества полос и местоположению полос в декартовой системе координат. Устройство, реализующее способ устройство, реализующее способ бесконтактного контроля линейных размеров трехмерных объектов методом структурированной подсветки, содержащее источник оптического излучения и последовательно установленные по ходу излучения транспарант, выполненный в виде слайда с изображением радужных полос, объектив, проецирующий изображение возникающей на поверхности контролируемого объекта искаженной рельефом поверхности картины радужных полос, фоторегистратор,

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преобразующий спроецированное объективом изображение в цифровое и цифровой электронный блок, вход которого соединен с выходом фоторегистратора, осуществляющий пересчет фиксируемых фоторегистратором цифровых изображений в величины высот рельефа (см., например, описание международной заявки PCT/US99/70303 публикация № WO00/70303 , кл. G01B 11/24, 23.11.2000).

Недостатком известного устройства является низкая точность, обусловленная неоднозначным отражением подсвечивающего пучка от поверхности цветного объекта и отсутствие в отраженной картине информации о сквозных отверстиях.

Наиболее близким из известных по своей технической сущности и достигаемому результату является выбранное в качестве прототипа координат контролируемой поверхности по формуле: устройство, реализующее способ бесконтактного контроля линейных размеров трехмерных объектов методом структурированной подсветки, содержащее источник оптического излучения и последовательно установленные по ходу излучения транспарант, выполненный в виде слайда с изображением периодической линейчатой структуры, объектив, проецирующий изображение возникающей на поверхности контролируемого объекта искаженной рельефом поверхности картины периодической линейчатой структуры, фоторегистратор, преобразующий спроецированное объективом изображение в цифровое и цифровой электронный блок, вход которого соединен с выходом фоторегистратора, осуществляющий пересчет фиксируемых фоторегистратором цифровых изображений в величины

$$Z = \frac{\Delta Y}{tg\alpha};$$

где: Z – значение высоты профиля поверхности в точке с координатами X,Y, пересекаемой какой-либо полосой линейчатой структуры, ΔY - величина искривления полосы в этой точке, α - угол межу направлением излучения от источника оптического изображения и оптической осью объектива. (см. например описание международной заявки PCT/US99/106777 публикация №WO 99/58930, кл.G01B11/24 1999г.)

Недостатками известного устройства является высокая погрешность контроля и ограниченные функциональные возможности. Высокая погрешность измерения обусловлена тем, что при направлении на поверхность контролируемого объекта оптического изучения, промодулированного транспарантом вдоль одной координаты, возникает изображение с линейчатой структурой и искажения картины, вызванные глубокими впадинами, высокими выпуклостями и, тем более, сквозными отверстиями,

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невозможно идентифицировать из-за разрывов в изображении линий. Поскольку высота рельефа определяется по величине искажений линий, отсутствие в изображении собственно линий не позволяет распознать отверстия на контролируемой поверхности. Ограниченные функциональные возможности обусловлены необходимостью ориентировать контролируемый объект на определенном расстоянии от источника излучения .

Раскрытие изобретения

Сущность заявляемого изобретения выражается в совокупности существенных признаков, достаточных для достижения предполагаемым изобретением технического результата, который выражается в повышении точности контроля линейных размеров трехмерных объектов и расширении возможностей при проведении контроля поскольку контролируемый объект может располагаться без жесткого позиционирования.

Заявленная совокупность существенных признаков находится в прямой причинно-следственной связи с достигаемым результатом .

Новизна предложенного устройства усматривается в том, что оно дополнительно снабжено вторым объективом для проецирования изображения транспаранта на контролируемую поверхность, установленным за транспарантом на расстоянии, равном проекционному, выполненным с глубиной резко передаваемого изображения, равной глубине резко передаваемого изображения первого объектива, вторым электронным цифровым блоком, соединенным своим входом с выходом фоторегистратора, а выходом – со входом первого электронного блока, выполненным в виде компаратора двух цифровых изображений, в памяти которого хранится цифровое изображение периодической по одной координат линейчатой структуры, транспарант выполнен в виде слайда с линейчатой структурой, периодической вдоль двух координат.

Сравнение заявленного технического решения с прототипом позволило установить соответствие его критерию «новизна», так как оно не известно из уровня техники.

Предложенное устройство является промышленно применимым существующими средствами, так как его реализация не требует создания новых элементов, материалов и технологий, и соответствует критерию «изобретательский уровень», так как оно явным образом не следует из уровня техники, при этом из последнего не выявлено каких-либо элементов и связей между элементами, характеризуемых отличительными от прототипа

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существенными признаками, направленных на достижение указанного технического результата.

Таким образом, предложенное техническое решение соответствует установленным условиям патентоспособности изобретения.

Краткое описание чертежей

На фиг.1 изображена схема предлагаемого устройства.

Устройство содержит источник 1 излучения, транспарант 2, дополнительный объектив 3, установленный за транспарантом 2 на расстоянии, равном проекционному, объектив 4, фоторегистратор 5, установленный в плоскости изображения объектива 4, дополнительный цифровой электронный блок 6 – компаратор цифровых изображений, вход которого соединен с выходом фоторегистратора 5, основной цифровой электронный блок 7, вход которого соединен с выходом цифрового электронного блока 6- компаратора в памяти которого хранится цифровое изображение периодической по одной координат линейчатой структуры. На фиг.2 изображен слайд, реализующий функцию пропускания транспаранта 2. На фиг.3 приведено цифровое изображение линейчатой структуры, хранящееся в памяти дополнительного цифрового блока 6-компаратора. На фиг.4 а) приведено цифровое (бинарное) изображение линейчатой структуры, периодической вдоль двух координат, возникающей на поверхности контролируемого объекта при ее искажениях рельефом поверхности. На фиг.4 б) приведено цифровое (бинарное) изображение линейчатой структуры, возникающее после обработки в дополнительном цифровом блоке 6- компараторе.

Вариант осуществления изобретения

Устройство работает следующим образом. Изображение управляемого транспаранта 2 с помощью дополнительного объектива 3 проецируется на поверхность контролируемого объекта, рельеф которой однозначным образом искажает изображение транспаранта 2. Объектив 4 проецирует возникающую на поверхности картину искаженной рельефом поверхности контролируемого объекта структурированной подсветки на чувствительную площадку фоторегистратора 5 (см. фиг.4а). Дополнительный цифровой электронный блок 6- компаратор преобразует сигнал с выхода фоторегистратора 5 путем вычитания из цифрового изображения искаженной рельефом поверхности контролируемого объекта структурированной подсветки

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цифрового изображения линейчатой структуры, хранящееся в памяти дополнительного цифрового блока 6- компаратора. В электронный цифровой блок 7 поступает сигнал, кодирующий цифровое изображение искаженной рельефом поверхности контролируемого объекта структурированной подсветки, в котором областям с отрицательным значениям освещенности соответствуют области сквозных отверстий (см. фиг.4 б). Таким образом, при вычислении в электронном цифровом блоке значений высоты рельефа и соответствующей пары координат, зоны с отрицательными значениями освещенности однозначно интерпретируются как области, соответствующие сквозным отверстиям. В результате повышается точность и достоверность контроля.

Данное предложение может с успехом использоваться в технологических процессах формообразования объектов сложной формы (лопатки турбин и.т.п). Кроме того, оно может использоваться в различных приложениях компьютерной трехмерной графики.

Литература:

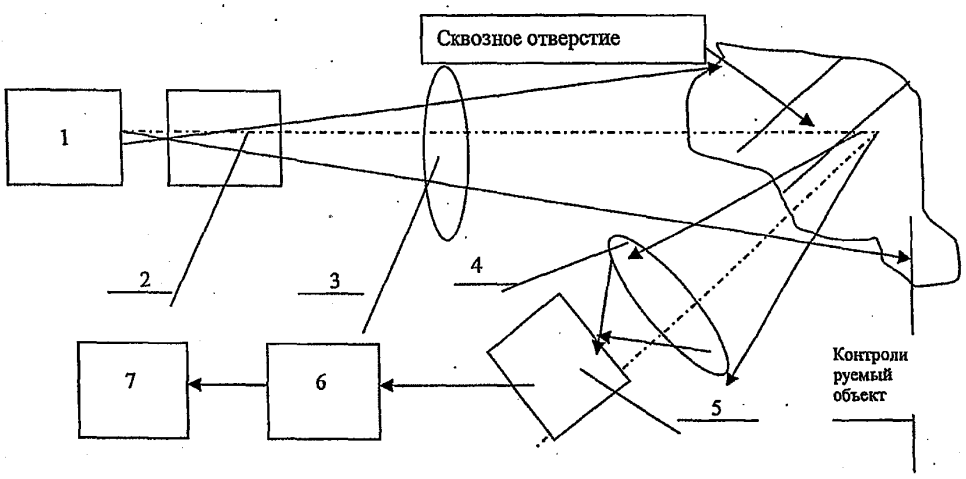
Техническое зрение роботов.-под. ред. А.Пью.;пер.с англ. – М.:Машиностроение, 1987. С.56-57

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Формула изобретения

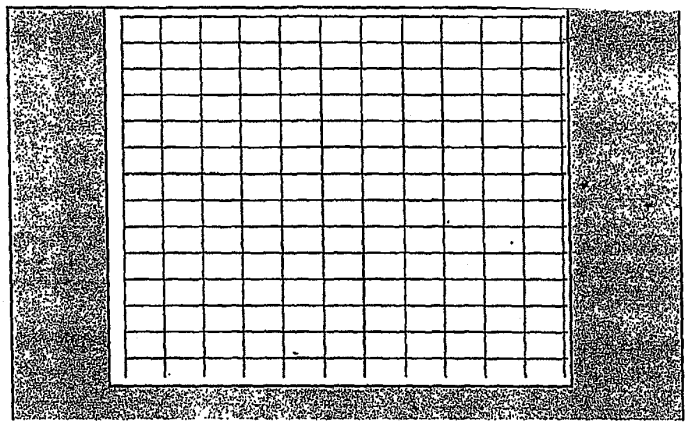
Устройство, реализующее способ бесконтактного контроля линейных размеров трехмерных объектов методом структурированной подсветки, содержащее источник оптического излучения и последовательно установленные по ходу излучения транспарант, выполненный в виде слайда с изображением периодической линейчатой структуры, объектив, проецирующий изображение возникающей на поверхности контролируемого объекта искаженной рельефом поверхности картины периодической линейчатой структуры, фоторегистратор, преобразующий спроецированное объективом изображение в цифровое и цифровой электронный блок, вход которого соединен с выходом фоторегистратора, осуществляющий пересчет фиксируемых фоторегистратором цифровых изображений в величины координат контролируемой поверхности по формуле: $Z = \frac{\Delta Y}{tg\alpha}$; где: Z – значение высоты профиля поверхности в точке с координатами X,Y, пересекаемой какой-либо полосой линейчатой структуры, ΔY - величина искривления полосы в этой точке, α - угол межу направлением излучения от источника оптического изображения и оптической осью объектива, ***ОТЛИЧАЮЩЕЕСЯ*** тем, что оно снабжено вторым объективом для проецирования изображения транспаранта на контролируемую поверхность, установленным за транспарантом на расстоянии, равном проекционному, выполненным с глубиной резко передаваемого изображения, равной глубине резко передаваемого изображения первого объектива, вторым электронным цифровым блоком, соединенным своим входом с выходом фоторегистратора, а выходом – со входом первого электронного блока, выполненным в виде компаратора двух цифровых изображений, в памяти которого хранится цифровое изображение периодической вдоль одной из координат линейчатой структуры, транспарант выполнен в виде слайда с линейчатой структурой, периодической вдоль двух координат.

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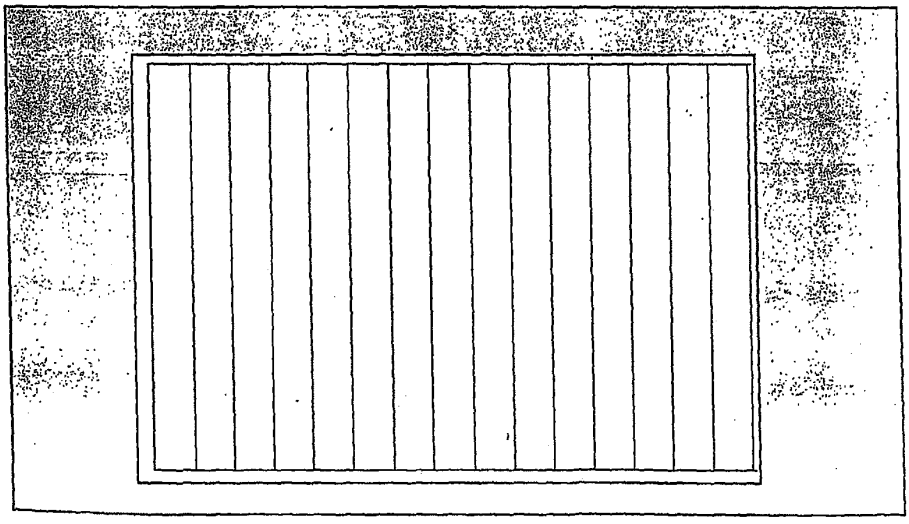


Фиг. 1

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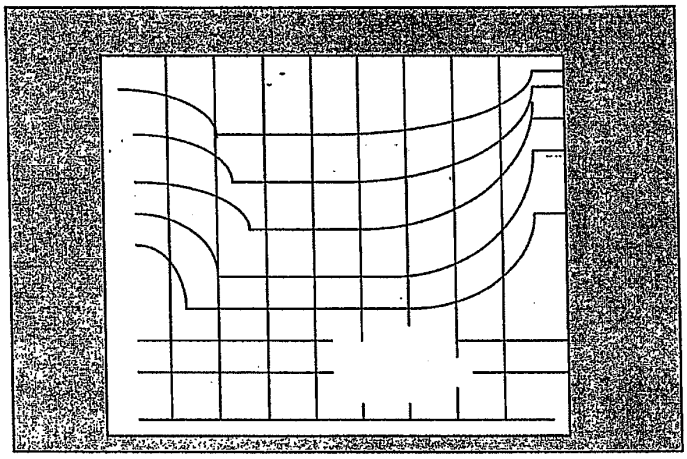


Фиг. 2



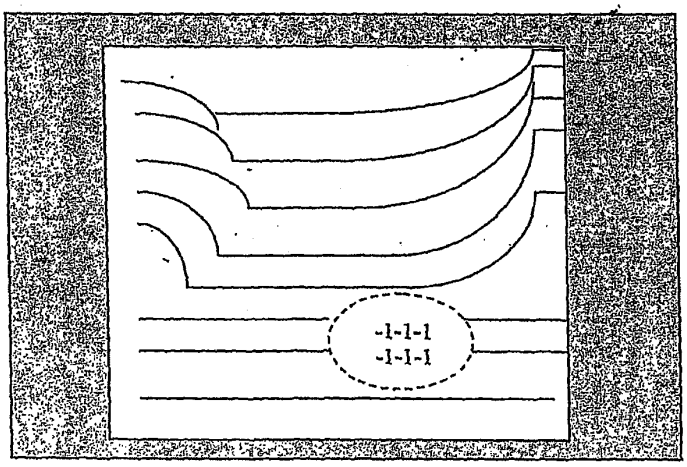
Фиг. 3

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Фиг. 4а

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Фиг. 4б

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/RU02/00097

A. CLASSIFICATION OF SUBJECT MATTER

G01B 11/24

According to International Patent Classification (IPC) or to both national classification and IPC 7

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols) 7

G01B 11/00-11/30, 21/00-21/32, 9/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 99/58930 A1(METACREATIONS CORPORATION) 18 November 1999 (18.11.1999), the claims	1
A	RU 2148793 C1 (FILIPPOV EVGENY IVANOVICH) 10.05.2000, the abstract, fig. 1	1
A	FR 2785674 A1 (EASTMAN KODAK COMPANY) 12.05.2000, the claims	1

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
22 MAY 2002 (22.05.2002)	**27JUNE 2002 (27.06.2002)**
Name and mailing address of the ISA/ **RU**	Authorized officer
Facsimile No.	Telephone No.

Form PCT/ISA/210 (second sheet) (July 1992)

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ОТЧЕТ О МЕЖДУНАРОДНОМ ПОИСКЕ

Международная заявка № PCT/RU 02/00097

А. КЛАССИФИКАЦИЯ ПРЕДМЕТА ИЗОБРЕТЕНИЯ:

G01B 11/24

Согласно международной патентной классификации (МПК-7)

В. ОБЛАСТИ ПОИСКА:

Проверенный минимум документации (система классификации и индексы) МПК-7:

G01B 11/00-11/30, 21/00-21/32, 9/00

Другая проверенная документация в той мере, в какой она включена в поисковые подборки:

Электронная база данных, использовавшаяся при поиске (название базы и, если, возможно, поисковые термины):

С. ДОКУМЕНТЫ, СЧИТАЮЩИЕСЯ РЕЛЕВАНТНЫМИ:

Категория*	Ссылки на документы с указанием, где это возможно, релевантных частей	Относится к пункту №
A	WO 99/58930 A1(METACREATIONS CORPORATION) 18 November 1999 (18.11.1999), формула	1
A	RU 2148793 C1 (ФИЛИППОВ ЕВГЕНИЙ ИВАНОВИЧ и др.) 10.05.2000, реферат, фиг. 1	1
A	FR 2785674 A1 (EASTMAN KODAK COMPANY) 12.05.2000, формула	1

☐ последующие документы указаны в продолжении графы С. ☐ данные о патентах-аналогах указаны в приложении

* Особые категории ссылочных документов:

A документ, определяющий общий уровень техники

E более ранний документ, но опубликованный на дату международной подачи или после нее

O документ, относящийся к устному раскрытию, экспонированию и т.д.

P документ, опубликованный до даты международной подачи, но после даты испрашиваемого приоритета и т.д.

T более поздний документ, опубликованный после даты приоритета и приведенный для понимания изобретения

X документ, имеющий наиболее близкое отношение к предмету поиска, порочащий новизну и изобретательский уровень

Y документ, порочащий изобретательский уровень в сочетании с одним или несколькими документами той же категории

& документ, являющийся патентом-аналогом

Дата действительного завершения международного поиска: 22 мая 2002 (22.05.2002)

Дата отправки настоящего отчета о международном поиске: 27 июня 2002 (27.06.2002)

Наименование и адрес Международного поискового органа
Федеральный институт промышленной собственности
РФ,123995, Москва, Г-59, ГСП-5, Бережковская наб., 30,1 Факс: 243-3337, телетайп: 114818 ПОДАЧА

Уполномоченное лицо:
Н. Денисова

Телефон № 240-25-91

Форма PCT/ISA/210 (второй лист)(июль 1998)

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Electronic Acknowledgement Receipt

EFS ID:	2956185
Application Number:	11846494
International Application Number:	
Confirmation Number:	1491
Title of Invention:	System and Method for Three-Dimensional Measurement of The Shape of Material Objects
First Named Inventor/Applicant Name:	Nikolay L. Lapa
Customer Number:	33717
Filer:	Bradley D. Blanche/Vicki King
Filer Authorized By:	Bradley D. Blanche
Attorney Docket Number:	104098.010300
Receipt Date:	05-MAR-2008
Filing Date:	28-AUG-2007
Time Stamp:	20:17:46
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes) /Message Digest	Multi Part /.zip	Pages (if appl.)
1		104098-010300IDS.pdf	947638 a0fafa60f7d54a21b5603d1e0655761b0774e35b	yes	20

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	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Miscellaneous Incoming Letter	1	1
	Information Disclosure Statement Letter	2	5
	Information Disclosure Statement (IDS) Filed	6	6
	Foreign Reference	7	20
Warnings:			
Information:			
	Total Files Size (in bytes):	947638	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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PTO/SB/21 (04-07)
Approved for use through 09/30/2007. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission: 20

Application Number	11/846,494
Filing Date	August 28, 2007
First Named Inventor	Nikolay L. Lapa
Art Unit	2877
Examiner Name	Unknown
Attorney Docket Number	104098.010300

ENCLOSURES *(Check all that apply)*

- ☐ Fee Transmittal Form
  - ☐ Fee Attached
- ☐ Amendment/Reply
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☒ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Reply to Missing Parts/ Incomplete Application
  - ☐ Reply to Missing Parts under 37 CFR 1.52 or 1.53
- ☐ Drawing(s)
- ☐ Licensing-related Papers
- ☐ Petition
- ☐ Petition to Convert to a Provisional Application
- ☐ Power of Attorney, Revocation Change of Correspondence Address
- ☐ Terminal Disclaimer
- ☐ Request for Refund
- ☐ CD, Number of CD(s) _____
  - ☐ Landscape Table on CD
- ☐ After Allowance Communication to TC
- ☐ Appeal Communication to Board of Appeals and Interferences
- ☐ Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- ☐ Proprietary Information
- ☐ Status Letter
- ☐ Other Enclosure(s) (please Identify below):

Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Greenberg Traurig LLP		
Signature			
Printed name	Bradley D. Blanche		
Date	March 5, 2008	Reg. No.	38,387

CERTIFICATE OF TRANSMISSION/MAILING

I hereby certify that this correspondence is being transmitted electronically to the United States Patent and Trademark Office via the EFS Web e-Filing system on the date shown below:

Signature			
Typed or printed name	Vicki King	Date	March 5, 2008

This collection of information is required by 37 CFR 1.5. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: **Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

American LegalNet, Inc.
www.FormsWorkflow.com

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PTO/SB/21 (01-09)
Approved for use through 02/28/2009. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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TRANSMITTAL FORM

(to be used for all correspondence after initial filing)

Total Number of Pages in This Submission

Application Number	11/846,494
Filing Date	August 28, 2007
First Named Inventor	Nikolay L. Lapa
Art Unit	4176
Examiner Name	Jonathan M. Newport
Attorney Docket Number	104098.010300

ENCLOSURES *(Check all that apply)*

- ☐ Fee Transmittal Form
  - ☐ Fee Attached
- ☐ Amendment/Reply
  - ☐ After Final
  - ☐ Affidavits/declaration(s)
- ☐ Extension of Time Request
- ☐ Express Abandonment Request
- ☑ Information Disclosure Statement
- ☐ Certified Copy of Priority Document(s)
- ☐ Reply to Missing Parts/ Incomplete Application
  - ☐ Reply to Missing Parts under 37 CFR 1.52 or 1.53
- ☐ Drawing(s)
- ☐ Licensing-related Papers
- ☐ Petition
- ☐ Petition to Convert to a Provisional Application
- ☐ Power of Attorney, Revocation Change of Correspondence Address
- ☐ Terminal Disclaimer
- ☐ Request for Refund
- ☐ CD, Number of CD(s) _____
  - ☐ Landscape Table on CD
- ☐ After Allowance Communication to TC
- ☐ Appeal Communication to Board of Appeals and Interferences
- ☐ Appeal Communication to TC **(Appeal Notice, Brief, Reply Brief)**
- ☐ Proprietary Information
- ☐ Status Letter
- ☑ Other Enclosure(s) (please Identify below):
  1. Information Disclosure Statement by Applicants - Form PTO/SB/08a & PTO/SB? 08b
  2. Foreign References
  2. Copy of the PCT International Search Report and Written Opinion

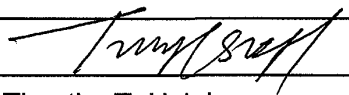
Remarks

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Greenberg Traurig LLP		
Signature			
Printed name	Timothy T. Hsieh		
Date	February 13, 2009	Reg. No.	60,435

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I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on the date shown below:

Signature			
Typed or printed name	Timothy T. Hsieh	Date	February 13, 2009

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Nikolay L. Lapa, et al	Examiner:	Jonathan M. Newport
Serial No.:	11/846,494	Group Art Unit:	4176
Filed:	August 28, 2007	Docket No.:	104098.010300
Deposit No.:	50-2638	Confirmation No.:	9141
Title:	**SYSTEM AND METHOD FOR THREE-DIMENSIONAL MEASUREMENT OF THE SHAPE OF MATERIAL OBJECTS**		
Customer No.:	33,717		

CERTIFICATE OF TRANSMISSION

I hereby certify that this document is being transmitted electronically to the United States Patent and Trademark Office via the EFS Web e-Filing system on February 13, 2009.

Name: Timothy T. Hsieh

INFORMATION DISCLOSURE STATEMENT [37 C.F.R. § 1.56]

MAIL STOP: AMENDMENT
Commissioner for Patents
Post Office Box 1450
Alexandria, Virginia 22313-1450

Sir/Madam:

Pursuant to 37 C.F.R. §§ 1.56, 1.97 and 1.98, Applicants bring the references listed on the attached Forms PTO/SB/08a and PTO/SB/08b to the attention of the Examiner.

No representation is made that a reference is "prior art" within the meaning of 35 U.S.C. §§ 102 and 103 and Applicant reserves the right, pursuant to 37 C.F.R. § 1.131 or otherwise, to establish that the reference(s) are not "prior art." Moreover, Applicant does not represent that a reference has been thoroughly reviewed or that any relevance of any portion of a reference is intended.

Copies of the U.S. references are not enclosed.

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This Information Disclosure Statement is being submitted before the mailing date of a first Office Action on the merits, and therefore, Applicants believe no fee is required.

Applicants would appreciate the Examiner initialing and signing a copy of attached Forms PTO/SB/08a and PTO/SB/08b indicating that he or she considered the information and made the information of record.

If the transmittal letter is separated from this document and the PTO determines that an extension or other relief is required, applicant petitions for any required relief including extensions of time and authorizes the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to Deposit Account No. **50-2638**.

Authorization is hereby given to charge any fees due, or credit any overpayment of fees, to Deposit Account No. **50-2638**.

Respectfully submitted,

Date: February 13, 2009

Timothy T. Hsieh
Reg. No. 60,435

Customer Number 33,717
GREENBERG TRAURIG, LLP
2450 Colorado Avenue, Suite 400E
Santa Monica, CA 90404
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Fax: (310) 586-7800
E-mail: laipmail@gtlaw.com

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Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet | | of | |

Complete if Known	
Application Number	11/846,494
Filing Date	August 28, 2007
First Named Inventor	Nikolay L. Lapa
Art Unit	4176
Examiner Name	Jonathan M. Newport
Attorney Docket Number	104098.010300

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		US- 6813030	11-02-2004	Tanno	
		US-			
		US-			
		US-			
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FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]-Number[4]-Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T[6]
		JP 2007-163266 A	06-28-2007	Yoshihiro		
		JP 2003-57191 A	02-26-2003	Ryuji		

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1] Applicant's unique citation designation number (optional). [2] See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST.16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet | | of | |

Complete if Known	
Application Number	11/846,494
Filing Date	August 28, 2007
First Named Inventor	Nikolay L. Lapa
Art Unit	4176
Examiner Name	Jonathan M. Newport
Attorney Docket Number	104098.010300

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
		PCT Notification of Transmittal of The International Search Report and The ritten Opinion of the International Searching Authority, or the Declaration (PCT Rule 44.1), 18 December 2008, 10 pages.	

Examiner Signature		Date Considered	

*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

1 Applicant's unique citation designation number (optional). 2 Applicant is to place a check mark here if English language Translation is attached.

This collection of information is required by 37 CFR 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

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(19) JAPANESE PATENT OFFICE

PATENT ABSTRACTS OF JAPAN

(11) Publication number: 2007163266 A
(43) Date of publication of application: 28.06.2007

(51) Int. Cl.:
G01B 11/02(2006.01) G01B 11/30(2006.01) G01B 11/00(2006.01)

(21) Application number: 2005359092
(22) Date of filing: 13.12.2005

(71) Applicant: NEC ELECTRONICS CORP
(72) Inventor: SASAKI YOSHIHIRO

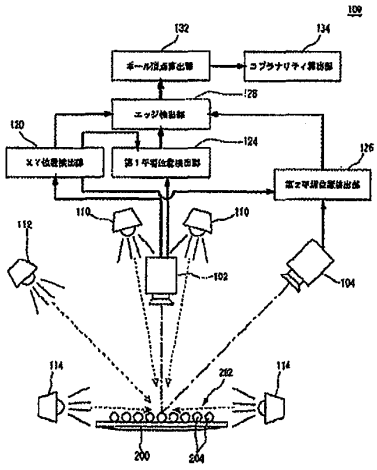
(54) INSPECTION DEVICE AND INSPECTION METHOD

(57) Abstract:

PROBLEM TO BE SOLVED: To detect accurately the vertex of a projection part even when the vertex part of the projection part is not formed flatly but the vertex side caves in.

SOLUTION: This inspection device 100 is provided with the first camera 102 for imaging a ball 204 from the vertical direction with respect to the plane of a substrate 200, the second camera 104 for imaging the ball 204 from the oblique direction with respect to the plane of the substrate 200, an edge detection part 128 for detecting the edge part of a caving-in part of the ball 204 in the first image imaged by the first camera 102 and in the second image imaged by the second camera 104, and a vertex height calculation part 132 for determining the height to the plane of the edge part by comparing the position of the edge part in the first image with the position of the edge part in the second image when the edge part of the caving-in part is detected in the first image and in the second image by the edge detection part 128, and calculating the height of the highest part at the edge part as the height of the vertex of the ball 204.

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OrderPatent

(19) JAPANESE PATENT OFFICE

PATENT ABSTRACTS OF JAPAN

(11) Publication number: 20030571!
(43) Date of publication of application: 26.02.2

(51) Int. Cl G01N 21/952
G01B 11/25, G06T 1/00

(21) Application number: 2001248925
(22) Date of filing: 20.08.2001

(71) Applicant: RICOH CO LTD
(72) Inventor: SAKIDA RYUJI

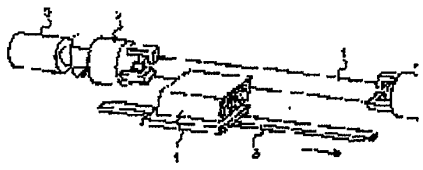
(54) **APPARATUS FOR MEASURING SHAPE OF CYLINDRICAL ARTICLE TO BE MEASURED AND METHOD OF ADJUSTING THE APPARATUS FOR MEASURING SHAPE OF CYLINDRICAL ARTICLE TO BE MEASURED, AS WELL AS METHOD FOR PROCESSING SIGNAL**

(57) Abstract:

PROBLEM TO BE SOLVED: To provide a method of adjusting such an apparatus for measuring the shape of a cylindrical article to be measure that can measure the shape of the cylindrical article to be measured accurately and rapidly.

SOLUTION: The shape measuring apparatus is provided with a measuring head 4 for measuring by accurately shifting moire fringes having a specific fringe degree in an entity- lattice type moire optical system by a desired phase and limiting the moire fringes to a near side of the fringe degree. The head 4 has a photodetecting element having at least 3 or more lines of pixel rows linearly arranged, and a mark for regulating a vertex position indicating a vertical upper dire a central line of the cylindrical article 1 to be me or a parallel regulating mark representing an a rection of the cylindrical element 1 to be date the case of measuring a surface shape of the a by gripping with a gripping tool 2 and rotating t tary motor 3. The method for adjusting the apj for measuring the shape of the cylindrical artic measured comprises a step of adjusting the p of the article 1 and the photodetecting element, providing a mark for adjusting an imaging ma tion having a predetermined interval at an imag sition of the photodetecting element, the imagir nification of the photodetecting can be adjuste the mark is observing by the element.

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BBD/Newell

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To:

BLANCHE, Bradley, D.

GREENBERG TRAURIG, LLP 2450 Colorado Ave., Suite 400E Santa Monica California 90404 USA

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL SEARCH REPORT AND THE WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY, OR THE DECLARATION

(PCT Rule 44.1)

Date of mailing *(day/month/year)*	18 DECEMBER 2008 (18.12.2008)
Applicant's or agent's file reference 104098010300	FOR FURTHER ACTION See paragraphs 1 and 4 below
International application No. **PCT/US2008/074354**	International filing date *(day/month/year)* **26 AUGUST 2008 (26.08.2008)**
Applicant **ARTEC GROUP, INC. et al**	

RECEIVED
DEC 29 2008
BY IP DEPARTMENT
GREENBERG TRAURIG LLP

1. ☒ The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

Filing of amendments and statement under Article 19:

The applicant is entitled, if he so wishes, to amend the claims of the international application (see Rule 46):

When? The time limit for filing such amendments is normally two months from the date of transmittal of the international search report.

Where? Directly to the International Bureau of WIPO, 34 chemin des Colombettes, 1211 Geneva 20, Switzerland, Facsimile No.: +41 22 338 82 70

For more detailed instructions, see the notes on the accompanying sheet.

GT-LA 30th Month
DUE DATE: 4
DEADLINE: 2.28.10
DOCKETED: 12.29.08
BY (INITIALS):

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.

3. ☐ **With regard to the protest** against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Offices.

☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. **Reminders**

Shortly after the expiration of **18 months** from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90*bis*.1 and 90*bis*.3, respectively, before the completion of the technical preparations for international publication.

The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established. These comments would also be made available to the public but not before the expiration of 30 months from the priority date.

Within **19 months** from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase **until 30 months** from the priority date (in some Offices even later); otherwise, the applicant must, **within 20 months** from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices.

In respect of other designated Offices, the time limit of **30 months** (or later) will apply even if no demand is filed within 19 months.

See the Annex to Form PCT/IB/301 and, for details about the applicable time limits, Office by Office, see the *PCT Applicant's Guide*, Volume II, National Chapters and the WIPO Internet site.

Name and mailing address of the ISA/KR	Authorized officer
Korean Intellectual Property Office Government Complex-Daejeon, 139 Seonsa-ro, Seo-gu, Daejeon 302-701, Republic of Korea	COMMISSIONER

Shenzhen Jimuyida
Exhibit 1002

NOTES TO FORM PCT/ISA/220

These Notes are intended to give the basic instructions concerning the filing of amendments under Article 19. The Notes are based on the requirements of the Patent Cooperation Treaty, the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and those requirements, the latter are applicable. For more detailed information, see also the *PCT Applicant's Guide*, a publication of WIPO.

In these Notes, "Article", "Rule" and "Section" refer to the provisions of the PCT, the PCT Regulations and the PCT Administrative Instructions, respectively.

INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19

The applicant has, after having received the international search report and the written opinion of the International Searching Authority, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims, description and drawings) may be amended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 except where, e.g. the applicant wants the latter to be published for the purposes of provisional protection or has another reason for amending the claims before international publication. Furthermore, it should be emphasized that provisional protection is available in some States only (see *PCT Applicant's Guide*, Volume I/A, Annexes B1 and B2).

The attention of the applicant is drawn to the fact that ammendments to the claims under Article 19 are not allowed where the International Searching Authority has declared, under Article 17(2), that no international search report would be established (see *PCT Applicant's Guide*, Volume I/A, paragraph 296).

What parts of the international application may be amended ?

Under Article 19, only the claims may be amended.

During the international phase, the claims may also be amended (or further amended) under Article 34 before the International Preliminary Examining Authority. The description and drawings may only be amended under Article 34 before the International Preliminary Examining Authority.

Upon entry into the national phase, all parts of the international application may be amended under Article 28 or, where applicable, Article 41.

When ? Within 2 months from the date of transmittal of the international search report or 16 months from the priority date, whichever time limit expires later. It should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication (Rule 46.1).

Where not to file the amendments ?

The amendments may only be filed with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 46.2).

Where a demand for international preliminary examination has been/is filed, see below.

How ? Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed.

A replacement sheet must be submitted for each sheet of the claims which, on account of an amendment or amendments, differs from the sheet originally filed.

All the claims appearing on a replacement sheet must be numbered in Arabic numerals. Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively (Section 205(b)).

The amendments must be made in the language in which the international application is to be published.

What documents must/may accompany the amendments ?

Letter (Section 205(b)):

The amendments must be submitted with a letter.

The letter will not be published with the international application and the amended claims. It should not be confused with the "Statement under Article 19(1)" (see below,under "Statement under Article 19(1)").

The letter must be in English or French, at the choice of the applicant. However, if the language of the international application is English, the letter must be in English; if the language of the international application is French, the letter must be in French.

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Exhibit 1002

The letter must indicate the differences between the claims as filed and the claims as amended. It must, in particular, indicate, in connection with each claim appearing in the international application (it being understood that identical indications concerning several claims may be grouped), whether

(i) the claim is unchanged;
(ii) the claim is cancelled;
(iii) the claim is new;
(iv) the claim replaces one or more claims as filed;
(v) the claim is the result of the division of a claim as filed.

The following examples illustrate the manner in which amendments must be explained in the accompanying letter:

1. [Where originally there were 48 claims and after amendment of some claims there are 51]:
   "Claims 1 to 29, 31, 32, 34, 35, 37 to 48 replaced by amended claims bearing the same numbers; claims 30, 33 and 36 unchanged; new claims 49 to 51 added."
2. [Where originally there were 15 claims and after amendment of all claims there are 11]:
   "Claims 1 to 15 replaced by amended claims 1 to 11."
3. [Where originally there were 14 claims and the amendments consist in cancelling some claims and in adding new claims]:
   "Claims 1 to 6 and 14 unchanged; claims 7 to 13 cancelled; new claims 15, 16 and 17 added." or
   "Claims 7 to 13 cancelled; new claims 15, 16 and 17 added; all other claims unchanged."
4. [Where various kinds of amendments are made]:
   "Claims 1 - 10 unchanged; claims 11 to 13, 18 and 19 cancelled; claims 14, 15 and 16 replaced by amended claim 14; claim 17 subdivided into amended claims 15, 16 and 17; new claims 20 and 21 added."

"Statement under Article 19(1)" (Rule 46.4)

The amendments may be accompanied by a statement explaining the amendments and indicating any impact that such amendments might have on the description and the drawings (which cannot be amended under Article 19(1)).

The statement will be published with the international application and the amended claims.

It must be in the language in which the international application is to be published.

It must be brief, not exceeding 500 words if in English or if translated into English.

It should not be confused with and does not replace the letter indicating the differences between the claims as filed and as amended. It must be filed on a separate sheet and must be indentified as such by a heading, preferably by using the words "Statement under Article 19(1)."

It may not contain any disparaging comments on the international search report or the relevance of citations contained in that report. Reference to citations, relevant to a given claim, contained in the international search report may be made only in connection with an amendment of that claim.

Consequence if a demand for international preliminary examination has already been filed

If, at the time of filing any amendments and any accompanying statement, under Article 19, a demand for international preliminary examination has already been submitted, the applicant must preferably, at the time of filing the amendments (and any statement) with the International Bureau, also file with the International Preliminary Examining Authority a copy of such amendments (and of any statement) and, where required, a translation of such amendments for the proceduer before that Authority (see Rules 55.3(a) and 62.2, first sentence). For further information, see the Notes to the demand form (PCT/IPEA/401).

If a demand for international preliminary examination is made, the written opinion of the International Searching Authority will, except in certain cases where the International Preliminary Examining Authority did not act as International Searching Authority and where it has notified the International Bureau under Rule 66.1*bis*(b), be considered to be a written opinion of the International Preliminary Examining Authority. If a demand is made, the applicant may submit to the International Preliminary Examining Authority a reply to the written opinion together, where appropriate, with amendments before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later (Rule 43*bis*.1(c)).

Consequence with regard to translation of the international application for entry into the national phase

The applicant's attention is drawn to the fact that, upon entry into the national phase, a translation of the claims as amended under Article 19 may have to be furnished to the designated/elected Offices, instead of, or in addition to, the translation of the claims as filed.

For further details on the requirements of each designated/elected Office, see the *PCT Applicant's Guide*, Volume II.

Shenzhen Jimuyida
Exhibit 1002

PATENT COOPERATION TREATY

PCT

INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	FOR FURTHER ACTION	see Form PCT/ISA/220 as well as, where applicable, item 5 below.
104098010300		
International application No.	International filing date *(day/month/year)*	(Earliest) Priority Date *(day/month/year)*
PCT/US2008/074354	**26 AUGUST 2008 (26.08.2008)**	28 AUGUST 2007 (28.08.2007)
Applicant		
ARTEC GROUP, INC. et al		

This International search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 3 sheets.

☐ It is also accompanied by a copy of each prior art document cited in this report.

1. **Basis of the report**
   a. With regard to the **language**, the international search was carried out on the basis of:
      ☒ the international application in the language in which it was filed
      ☐ a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))
   b. ☐ This international search report has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43.6*bis*(a)).
   c. ☐ With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, see Box No. I.
2. ☐ **Certain claims were found unsearchable** (See Box No. II)
3. ☐ **Unity of invention is lacking** (See Box No. III)
4. With regard to the **title,**
   ☒ the text is approved as submitted by the applicant.
   ☐ the text has been established by this Authority to read as follows:

File Corresponding ISR in U.S.

GT-LA
DUE DATE: 1.17.09
DEADLINE: X
DOCKETED: 12.29.08
BY (INITIALS): RS

5. With regard to the **abstract,**
   ☒ the text is approved as submitted by the applicant.
   ☐ the text has been established, according to Rule 38.2, by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.
6. With regard to the drawings,
   a. the figure of the **drawings** to be published with the abstract is Figure No. 6
      ☒ as suggested by the applicant.
      ☐ because the applicant failed to suggest a figure.
      ☐ because this figure better characterizes the invention.
   b. ☐ none of the figure is to be published with the abstract.

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DEC 29 2008
BY IP DEPARTMENT
GREENBERG TRAURIG LLP

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2008/074354

A. CLASSIFICATION OF SUBJECT MATTER

G01B 11/24(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 8 G01B 11/24

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean Utility models and applications for Utility models since 1975
Japanese Utility models and applications for Utility models since 1975

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

KIPASS & keywords: "vertex", "coded", "image", "detect", "shape"

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2007-163266 A(NEC ELECTRONICS CORP) 28 JUN 2007 see the entire documents	1-20
A	JP 2003-57191 A(RICOH CO LTD) 26 FEB 2003 see the entire documents	1-20
A	US 6813030 B2(Japan Science and Technology CORP) 02 NOV 2004 see the entire documents	1-20

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents,such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
18 DECEMBER 2008 (18.12.2008)	**18 DECEMBER 2008 (18.12.2008)**

Name and mailing address of the ISA/KR	Authorized officer
Korean Intellectual Property Office Government Complex-Daejeon, 139 Seonsa-ro, Seo-gu, Daejeon 302-701, Republic of Korea	CHUNG, Sang Tae

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/US2008/074354

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 2007-163266	28.06.2007	NONE	
JP 2003-057191	26.02.2003	NONE	
US 6813030	02.11.2004	EP 1273903 B1	11.06.2008
		EP 1273903 B9	08.10.2008
		EP 1273903 A1	08.01.2003
		EP 1273903 A4	17.05.2006
		JP 2001-228080	24.08.2001
		JP 2001-228080 A	24.08.2001
		JP 3553451 B2	11.08.2004
		US 6813030	02.11.2004
		US 2003-0011782 A1	16.01.2003
		US 2003-011782 A1	16.01.2003
		US 6813030 B2	02.11.2004
		WO 01-61318 A1	23.08.2001

Shenzhen Jimuyida
Exhibit 1002

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:
BLANCHE, Bradley, D.

GREENBERG TRAURIG, LLP 2450 Colorado Ave., Suite 400E Santa Monica California 90404 USA

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

Date of mailing *(day/month/year)*	**18 DECEMBER 2008 (18.12.2008)**
Applicant's or agent's file reference 104098010300	**FOR FURTHER ACTION** See paragraph 2 below

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/US2008/074354	**26 AUGUST 2008 (26.08.2008)**	28 AUGUST 2007 (28.08.2007)

International Patent Classification (IPC) or both national classification and IPC

G01B 11/24(2006.01)i

Applicant

ARTEC GROUP, INC. et al

RECEIVED
DEC 29 2008
BY IP DEPARTMENT
GREENBERG TRAURIG LLP

1. This opinion contains indications relating to the following items:

- [X] Box No. I Basis of the opinion
- [ ] Box No. II Priority
- [ ] Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- [ ] Box No. IV Lack of unity of invention
- [X] Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- [ ] Box No. VI Certain documents cited
- [ ] Box No. VII Certain defects in the international application
- [ ] Box No. VIII Certain observations on the international application

written opinion (ISA)
GT-LA
DUE DATE: 3.18.09
DEADLINE: X
DOCKETED: 12.29.08
BY (INITIALS): VG

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.
For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/KR	Date of completion of this opinion	Authorized officer
Korean Intellectual Property Office Government Complex-Daejeon, 139 Seonsa-ro, Seo-gu, Daejeon 302-701, Republic of Korea Facsimile No. 82-42-472-7140	18 DECEMBER 2008 (18.12.2008)	CHUNG, Sang Tae Telephone No.010-9908-9225

Shenzhen Jimuyida
Exhibit 1002

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2008/074354

Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of :

   ☒ the international application in the language in which it was filed

   ☐ a translation of the international application into _____ , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b))

2. ☐ This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43*bis*.1(a))

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of:

   a. type of material
   - ☐ a sequence listing
   - ☐ table(s) related to the sequence listing

   b. format of material
   - ☐ on paper
   - ☐ in electronic form

   c. time of filing/furnishing
   - ☐ contained in the international application as filed.
   - ☐ filed together with the international application in electronic form.
   - ☐ furnished subsequently to this Authority for the purposes of search.

4. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additioanl copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

5. Additional comments:

Shenzhen Jimuyida
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WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

International application No.
PCT/US2008/074354

Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-20	YES
	Claims	none	NO
Inventive step (IS)	Claims	1-20	YES
	Claims	none	NO
Industrial applicability (IA)	Claims	1-20	YES
	Claims	none	NO

2. Citations and explanations :

1. Citations

Reference is made to the following documents:

D1: JP2007-163266A
D2: JP2003-57191A
D3: US6813030B2

D1 relates to detection of the vertex of a projection part even when the vertex part of the projection part is not formed flatly but the vertex side caves in. This inspection device is provided with the first camera for imaging a ball from the vertical direction with respect to the plane of a substrate, the second camera for imaging the ball from the oblique direction with respect to the plane of the substrate, an edge detection part for detecting the edge part of a caving-in part of the ball in the first image imaged by the first camera and in the second image imaged by the second camera, and a vertex height calculation part for determining the height to the plane of the edge part by comparing the position of the edge part in the first image with the position of the edge part in the second image when the edge part of the caving-in part is detected in the first image and in the second image by the edge detection part, and calculating the height of the highest part at the edge part as the height of the vertex of the ball.

D2 relates to a method of adjusting such an apparatus for measuring the shape of a cylindrical article to be measure that can measure the shape of the cylindrical article to be measured accurately and rapidly.

D3 relates to an optical interference tomographic image observing apparatus provided so as to detect the static or dynamic structure at a deep portion of a living body or the like and provide a multidimensional image thereof for observation. The optical interference tomographic image observing apparatus includes a rotary prism apparatus which includes a Littrow reflector prism having a 90-degree vertex and disposed near a circumference of a rotary body in such a manner that a surface facing the vertex extends substantially perpendicular to a tangential line of the circumference, the prism having a characteristics such that when a light beam impinges the surface, the light beam is reflected in a direction parallel to the incidence direction. Through utilization of the characteristics, the reflection point can be scanned in a predetermined direction as the rotary body rotates; and a delay reflection light beam is periodically generated when the rotary body rotates in the travel direction of the light beam and a progressive reflection light beam is periodically generated when the rotary body rotates in the opposite direction.

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Supplemental Box

In case **the space in any of the preceding boxes is not sufficient.**
Continuation of:

2. Novelty and Inventive step

The subject matter of claims 1-20 relates to a system and method provided for the 3D measurement of the shape of material objects using non-contact structured light triangulation.
The subject matter of claims 1-20 differs from these prior art documents D1 to D3 in that it further includes coded element that lie within planes passing through vertices of the central projection areas of both the projector and the camera also that pass through the space of the object being measured.
And it is not obvious to a person skilled in the art by the documents, taken alone or in combination.
Therefore, claims 1-20 meet the requirements of PCT Article 33(2) and (3) with respect to novelty and inventive step.

3. Industrial Applicability

Claims 1-20 are industrially applicable under PCT Article 33(4).

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Electronic Acknowledgement Receipt	
EFS ID:	4792917
Application Number:	11846494
International Application Number:	
Confirmation Number:	1491
Title of Invention:	System and Method for Three-Dimensional Measurement of The Shape of Material Objects
First Named Inventor/Applicant Name:	Nikolay L. Lapa
Customer Number:	33717
Filer:	Timothy T. Hsieh
Filer Authorized By:	
Attorney Docket Number:	104098.010300
Receipt Date:	13-FEB-2009
Filing Date:	28-AUG-2007
Time Stamp:	16:04:42
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		ARTEC-104098-010300-IDS-Dtd-02-13-09.pdf	1004781 5ce86b56b34d970e54b88c39d3e9103e4917ea4b	yes	17

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	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Information Disclosure Statement Letter	1	3
	Information Disclosure Statement (IDS) Filed (SB/08)	4	5
	Foreign Reference	6	7
	NPL Documents	8	17
Warnings:			
Information:			
	Total Files Size (in bytes):	1004781	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/846,494	08/28/2007	Nikolay L. Lapa	104098.010300	1491

33717 7590 03/04/2009

GREENBERG TRAURIG LLP (LA)
2450 COLORADO AVENUE, SUITE 400E
INTELLECTUAL PROPERTY DEPARTMENT
SANTA MONICA, CA 90404

EXAMINER	
NEWPORT, JONATHAN M	
ART UNIT	**PAPER NUMBER**
4176	
MAIL DATE	**DELIVERY MODE**
03/04/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Shenzhen Jimuyida
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Office Action Summary	Application No.	Applicant(s)	
	11/846,494	LAPA ET AL.	
	Examiner	Art Unit	
	JONATHAN M. NEWPORT	4176	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 1 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 November 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) _____ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☒ Claim(s) *1-20* are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

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DETAILED ACTION

1. This office action is in response to the applicants' communication filed on 08/28/2007. In virtue of this communication, claims 1-20 are currently pending in the instant application.

Election/Restrictions

2. Restriction to one of the following inventions is required under 35 U.S.C. 121:

I. Claims 1-10, drawn to a three-dimensional shape measurement system, classified in class 356, subclass 610.

II. Claim 11-20, drawn to a method for the three-dimensional measurement of an object, classified in class 356, subclass 602.

3. Inventions of Group I and Group II are related as product and process of use. The inventions can be shown to be distinct if either or both of the following can be shown: (1) the process for using the product as claimed can be practiced with another materially different product or (2) the product as claimed can be used in a materially different process of using that product. See MPEP § 806.05(h). In the instant case the product as claimed can be used in a materially different process such as using the apparatus as a load to test a power source or using the apparatus as a paperweight. Furthermore, the invention of Group II is drawn to a method that may be practiced with an apparatus materially different from the invention of Group I or may be practiced manually.

4. Restriction for examination purposes as indicated is proper because all these inventions listed in this action are independent or distinct for the reasons given above and there would be a serious search and examination burden if restriction were not required because one or more of the following reasons apply:

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(a) the inventions have acquired a separate status in the art in view of their different classification;

(b) the inventions have acquired a separate status in the art due to their recognized divergent subject matter;

(c) the inventions require a different field of search (for example, searching different classes/subclasses or electronic resources, or employing different search queries);

(d) the prior art applicable to one invention would not likely be applicable to another invention;

(e) the inventions are likely to raise different non-prior art issues under 35 U.S.C. 101 and/or 35 U.S.C. 112, first paragraph.

Applicant is advised that the reply to this requirement to be complete must include (i) an election of a invention to be examined even though the requirement may be traversed (37 CFR 1.143) **and (ii) identification of the claims encompassing the elected invention**.

The election of an invention may be made with or without traverse. To reserve a right to petition, the election must be made with traverse. If the reply does not distinctly and specifically point out supposed errors in the restriction requirement, the election shall be treated as an election without traverse. Traversal must be presented at the time of election in order to be considered timely. Failure to timely traverse the requirement will result in the loss of right to petition under 37 CFR 1.144. If claims are added after the election, applicant must indicate which of these claims are readable on the elected invention.

If claims are added after the election, applicant must indicate which of these claims are readable upon the elected invention.

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Exhibit 1002**

Should applicant traverse on the ground that the inventions are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the inventions to be obvious variants or clearly admit on the record that this is the case. In either instance, if the examiner finds one of the inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

4. A telephone call was made to Timothy T. Hsieh on 02/24/2009 to request an oral election to the above restriction requirement, but did not result in an election being made.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

5. The examiner has required restriction between product and process claims. Where applicant elects claims directed to the product, and the product claims are subsequently found allowable, withdrawn process claims that depend from or otherwise require all the limitations of the allowable product claim will be considered for rejoinder. All claims directed to a nonelected process invention must require all the limitations of an allowable product claim for that process invention to be rejoined.

In the event of rejoinder, the requirement for restriction between the product claims and the rejoined process claims will be withdrawn, and the rejoined process claims will be fully examined for patentability in accordance with 37 CFR 1.104. Thus, to be allowable, the rejoined claims must meet all criteria for patentability including the requirements of 35 U.S.C. 101, 102,

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103 and 112. Until all claims to the elected product are found allowable, an otherwise proper restriction requirement between product claims and process claims may be maintained. Withdrawn process claims that are not commensurate in scope with an allowable product claim will not be rejoined. See MPEP § 821.04(b). Additionally, in order to retain the right to rejoinder in accordance with the above policy, applicant is advised that the process claims should be amended during prosecution to require the limitations of the product claims. **Failure to do so may result in a loss of the right to rejoinder**. Further, note that the prohibition against double patenting rejections of 35 U.S.C. 121 does not apply where the restriction requirement is withdrawn by the examiner before the patent issues. See MPEP § 804.01.

Inquiry

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JONATHAN M. NEWPORT whose telephone number is (571)270-7553. The examiner can normally be reached on Monday through Thursday, 7:30am-5:00pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thuy V. Tran can be reached on (571)272-1828. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Exhibit 1002

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Thuy Vinh Tran/
Supervisory Patent Examiner, Art Unit 4176
02/28/2009

/J. M. N./
Examiner, Art Unit 4176

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Exhibit 1002

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11846494	LAPA ET AL.
	Examiner	Art Unit
	JONATHAN M NEWPORT	4176

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	02/24/2009								
	1	÷								
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UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/846,494	08/28/2007	Nikolay L. Lapa	104098.010300

CONFIRMATION NO. 1491

33717
GREENBERG TRAURIG LLP (LA)
2450 COLORADO AVENUE, SUITE 400E
INTELLECTUAL PROPERTY DEPARTMENT
SANTA MONICA, CA 90404

PUBLICATION NOTICE



Title: System and Method for Three-Dimensional Measurement of The Shape of Material Objects

Publication No.US-2009-0059241-A1
Publication Date:03/05/2009

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently http://pair.uspto.gov/. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Managment, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

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Electronic Patent Application Fee Transmittal

Application Number:	11846494
Filing Date:	28-Aug-2007
Title of Invention:	System and Method for Three-Dimensional Measurement of The Shape of Material Objects
First Named Inventor/Applicant Name:	Nikolay L. Lapa
Filer:	Bradley D. Blanche/Angela Williams
Attorney Docket Number:	104098.010300

Filed as Small Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Extension - 1 month with $0 paid	2251	1	65	65

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Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
			Total in USD ($)	**65**

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Electronic Acknowledgement Receipt	
EFS ID:	5263386
Application Number:	11846494
International Application Number:	
Confirmation Number:	1491
Title of Invention:	System and Method for Three-Dimensional Measurement of The Shape of Material Objects
First Named Inventor/Applicant Name:	Nikolay L. Lapa
Customer Number:	33717
Filer:	Bradley D. Blanche/Angela Williams
Filer Authorized By:	Bradley D. Blanche
Attorney Docket Number:	104098.010300
Receipt Date:	01-MAY-2009
Filing Date:	28-AUG-2007
Time Stamp:	18:30:19
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$65
RAM confirmation Number	4188
Deposit Account	502638
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)	

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		ARTEC104098010300ResponseToRR.pdf	4286096 24a384d5c29302400067ef0f56b8a336044640d8	yes	3
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Response to Election / Restriction Filed		1	2	
	Extension of Time		3	3	
Warnings:					
Information:					
2	Fee Worksheet (PTO-875)	fee-info.pdf	30484 bb9007ab086d065f56ec9e1c6c8c53090a74995a	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	4316580		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Nikolay L. Lapa, et al	Examiner:	Jonathan M. Newport
Serial No.:	11/846,494	Group Art Unit:	4176
Filed:	August 28, 2007	Docket No.:	104098.010300
Deposit No.:	50-2638	Confirmation No.:	1491
Title:	**SYSTEM AND METHOD FOR THREE-DIMENSIONAL MEASUREMENT OF THE SHAPE OF MATERIAL OBJECTS**		
Customer No.:	33717		

CERTIFICATE OF TRANSMISSION

I hereby certify that this document is being transmitted electronically to the United States Patent and Trademark Office via the EFS Web e-Filing system on May 1, 2009.

Name: Angela Williams

RESPONSE TO RESTRICTION/ELECTION REQUIREMENT

MAIL STOP: AMENDMENT
Commissioner for Patents
Post Office Box 1450
Alexandria, Virginia 22313-1450

Dear Sir/Madam:

In the Restriction Requirement mailed March 4, 2009, the Examiner has restricted the claims by asserting that the claims fall within the following patentably distinct Groups of Inventions:

I. Claims 1-10, drawn to a three-dimensional shape measurement system, classified in class 356, subclass 610.

II. Claims 11-20, drawn to a method for the three-dimensional shape measurement of an object, classified in class 356, subclass 602.

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Applicants hereby elect with traverse the species of Group II, encompassed at least by claims 11-20.

Applicants note that the method for the three-dimensional shape measurement of an object indicates that the steps of the method are performed by the same components of the system recited in claims 1-10. For example, the method of claim 11 recites a step of "projecting a structured light pattern from a light projector onto a surface of an object" while the system of claim 1 recites "a light projector for projecting a structured light pattern onto a surface of an object." Similar correspondence is found for the various claim elements between system claim 1 and method claim 11. As such, applicants submit that the system as claimed in claim 1 is used using the same process recited in the method of claim 11.

Notwithstanding this traversal, Applicants hereby elect with traverse the species of Group II, encompassed at least by claims 11-20. Applicants reserve the right to have the system claims from the non-elected Group I that include the limitations of any allowed generic claim examined in the present application at that time. Applicants further reserve the right to file divisional applications directed to the claims from non-elected Group I and any remaining claimed subject matter after the filing of this response.

The Director is authorized to charge any additional fee(s) or any underpayment of fee(s), or to credit any overpayments to **Deposit Account Number 50-2638**. Please ensure that Attorney Docket Number 104098.010300 is referred to when charging any payments or credits.

Respectfully submitted,

Date: May 1, 2009

Bradley D. Blanche
Reg. No. 38,387

Customer Number 33717
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2450 Colorado Avenue, Suite 400E
Santa Monica, CA 90404
Phone: (949) 732-6500
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PTO/SB/22 (03-09)
Approved for use through 04/30/2009. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARMENT OF COMMERCE
Under the paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless if displays a valid OMB control number.

PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a) FY 2009 ***(Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).)***	Docket Number (Optional) 104098.010300
Application Number 11/846,494	Filed August 28, 2007
For System and Method for Three-Dimensional Measurement of the Shape of Material Objects	
Art Unit 4176	Examiner Jonathan M. Newport

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above identified application.

The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):

	Fee	Small Entity Fee	
☒ One month (37 CFR 1.17(a)(1))	$130	$65	$ 65.00
☐ Two months (37 CFR 1.17(a)(2))	$490	$245	$
☐ Three months (37 CFR 1.17(a)(3))	$1110	$555	$
☐ Four months (37 CFR 1.17(a)(4))	$1730	$865	$
☐ Five months (37 CFR 1.17(a)(5))	$2350	$1175	$

☒ Applicant claims small entity status. See 37 CFR 1.27.

☐ A check in the amount of the fee is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☐ The Director has already been authorized to charge fees in this application to a Deposit Account.

☒ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number 50-2638.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

I am the ☐ applicant/inventor.

☐ assignee of record of the entire interest. See 37 CFR 3.71.
Statement under 37 CFR 3.73(b) is enclosed (Form PTO/SB/96).

☒ attorney or agent of record. Registration Number 38,387

☐ attorney or agent under 37 CFR 1.34.
Registration number if acting under 37 CFR 1.34 _____.

Signature	May 1, 2009 Date
Bradley D. Blanche Typed or printed name	(949) 732-6539 Telephone Number

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below.

☒ Total of one forms are submitted.

This collection of information is required by 37 CFR 1.136(a). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 6 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

American LegalNet, Inc.
www.FormsWorkflow.com

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PLUS Search Results for S/N 11846494, Searched Wed Jun 17 12:39:13 EDT 2009

The Patent Linguistics Utility System (PLUS) is a USPTO automated search system for U.S. Patents from 1971 to the present PLUS is a query-by-example search system which produces a list of patents that are most closely related linguistically to the application searched. This search was prepared by the staff of the Scientific and Technical Information Center, SIRA.

3578170 99
3597056 99
3705765 99
3756724 99
3762294 99
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3804408 99
3825730 99
3827789 99
3833816 99
3843264 99
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PLUS Search Results for S/N 11846494, Searched Wed Jun 17 12:39:09 EDT 2009

The Patent Linguistics Utility System (PLUS) is a USPTO automated search system for U.S. Patents from 1971 to the present PLUS is a query-by-example search system which produces a list of patents that are most closely related linguistically to the application searched. This search was prepared by the staff of the Scientific and Technical Information Center, SIRA.

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6341016 99
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6603561 99
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/846,494	08/28/2007	Nikolay L. Lapa	104098.010300	1491

33717 7590 07/01/2009

GREENBERG TRAURIG LLP (LA)
2450 COLORADO AVENUE, SUITE 400E
INTELLECTUAL PROPERTY DEPARTMENT
SANTA MONICA, CA 90404

EXAMINER	
LAPAGE, MICHAEL P	
ART UNIT	**PAPER NUMBER**
2886	

MAIL DATE	DELIVERY MODE
07/01/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	11/846,494	LAPA ET AL.	
	Examiner	Art Unit	
	MICHAEL LAPAGE	2886	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 May 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 August 2007* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *05 March 2008, 13 February 2009*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

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DETAILED ACTION

1. Claims 1-20 are presented for examination.

Election/Restrictions

2. As to the restriction with respect to claims 1-20 upon further review by the examiner the applicant's arguments filed 05/01/2009 have been deemed persuasive and therefore the restriction has been withdrawn between group I consisting of claims 1-10, and group II consisting of claims 11-20.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-3, 6-13, and 16-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Geng (U.S. Patent No. 6,937,348 B2).

As to claims 1 and 11, Geng does disclose and show in figure 2, a system for the 3D measurement of the shape of a material object, comprising:

a light projector (100) for projecting a structured light pattern (101) onto a surface of an object, wherein the light projector includes a vertex (i.e. where as explicitly shown a vertex is present from the starting point of the fan based light from light source 100 upon transmission of light through linear variable wavelength filter (LVWF) 101) for the projected structured light pattern (col. 1, lines 40-43; col. 4, lines 6-10);

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an image detecting device (102) for capturing an image of the structured light pattern acting on the surface of the object (104), wherein the image capturing device includes a vertex (i.e. where both explicitly shown the detector is detecting a vertex in figure 2, and also inherently in detecting light from light projector 100 the system is detecting a vertex, further the vertex since not defined could be the same vertex and not two different or separate vertexes within the system) for a field of view of the image detecting device (col. 4, lines 6-19); and

a computing device (i.e. though a computing device is not explicitly disclose, inherently in order to the device to actually attain any results (i.e. 3d modeling) a computing device must be present be it computer or human) for determining a measurement relating to the surface of the object using a triangulation algorithm based on a correspondence between the projected structured light pattern and the captured image (col. 3, lines 1-14),

wherein the structured light pattern includes at least two coded elements (i.e. where the examiner is interpreting the multiple vertical planes of light each with a unique projection angle and wavelength as at least two coded elements) that lie within a plane (i.e. as shown by the surface present in fig 2, which all components are shown resting upon) passing through the vertices of the light projector and the image detecting device and a portion of the object being measured (col. 1, line 61 thru col. 2, line 1).

The subject matter of claims 1 and 11 relate in that the technical features of apparatus claim 1 are in each case suitable for implement the method of claim 11, therefore the method is inherent in view of the above apparatus rejection.

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As to claims 2 and 12, Geng does disclose and show in figure 13 a system, wherein the structured light pattern includes a plurality of different groups (i.e. sub-patterns) of coded elements (i.e. wavelength spectra ranges), wherein all of the coded elements in at least one group of coded elements lie within the same respective plane (i.e. as shown by the surface present in fig 2, which all components are shown resting upon) passing through the vertices of the light projector and the image detecting device and a portion of the object being measured (col. 4, lines 57-63; col. 9, lines 4-15).

As to claims 2-10, and 12-20, the disclosure of the present invention relates to the background as cited in the independent claims in that the disclosure is to a mere improvement of the prior system and therefore inherently contains all the limitations and elements as cited in the above independent claims.

As to claims 3 and 13, Geng discloses and shows in figure 13, a system, wherein each group of coded elements lies within a different respective plane (i.e. where the examiner is interpreting that a vertical planes passing through the sub-patterns (i.e. R and rg etc.) lie within different respective planes and pass through the vertices and reflect off the object under analysis) passing through the vertices of the light projector and the image detecting device and a portion of the object being measured (col. 4, lines 57-63; col. 9, lines 4-15).

As to claims 6 and 16, Geng discloses and shows in figure 1, a system, wherein the projector further includes a central optical axis and the image detecting device further includes a central optical axis, further wherein the light projector and the image detecting device are arranged such that a line extending between the vertex of the light

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projector and the vertex of the image detecting device is not perpendicular to either optical axis of the projector and the image detecting device (Fig. 1 explicitly discloses and shows where the line B extending between projector 100 and camera 102 is shown as not perpendicular to the central optical axes denoted by R).

As to claims 7 and 17, Geng discloses a system, wherein the light projector projects structured light in a wavelength selected from one of optical, visible and infrared wavelengths (col. 4, lines 44-47).

As to claims 8 and 18, Geng disclose a system, wherein the light projector is a continuous light source (col. 2, line 50-53).

As to claims 9 and 19, Geng discloses and shows in figure 13, a system, wherein the structured light pattern includes a plurality of coded elements that can be variably grouped together such that all of the coded elements in each group lie in a respective plane (i.e. as shown by the surface present in fig 2, which all components are shown resting upon) passing through the vertices of the light projector and the image detecting device and a portion of the object being measured and such that all of the coded elements in each group form a unique sequence (i.e. where the examiner is interpreting that the color variances between each group as unique since the term unique only requires they be different) relative to the sequences of coded elements in other adjacent groups of coded elements (col. 4, lines 57-63; col. 9, lines 4-15).

As to claims 10 and 20, Geng discloses a system, wherein the computing device determines a three-dimensional shape of the surface (col. 2, lines 44-48).

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Claim Rejections - 35 USC § 103

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

> (a) 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.

6. Claims 4-5 and 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Geng.

As to claims 4-5 and 14-15, Geng does disclose and shows in figure 1, a system, wherein the projector further includes a central optical axis and the image detecting device further includes a central optical axis, further wherein the light projector and the image detecting device are arranged such that a line extending between the vertex of the light projector and the vertex of the image detecting device is not perpendicular to either optical axis of the projector and the image detecting device (Fig. 1 explicitly discloses and shows where the line B extending between projector 100 and camera 102 is shown as not perpendicular to the central optical axes denoted by R).

Geng does not explicitly disclose, a system wherein a line extending between the vertex of the light projector and the vertex of the image detecting device is perpendicular to the optical axis of the projector or a line extending between the vertex of the light projector and the vertex of the image detecting device is perpendicular to the optical axis of the image detecting device.

However, It would have been obvious to one of ordinary skill in the art at the time the invention was made to rearrange by providing some of the components at a

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perpendicular angle with respect to the central axes, since it has been held that rearranging parts of an invention involves only routine skill in the art. In re Japikse, 86 USPQ 70.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Geng by providing the projector and detector at perpendicular positions with respect to the central axes in order to provide the advantage of heightened efficiency due to the simplification of the triangulation functions when 90 degree angles are present within the equations.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL LAPAGE whose telephone number is (571)270-3833. The examiner can normally be reached on Monday Through Friday 7:30AM-5:00PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tarifur Chowdhury can be reached on 571-272-2287. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Michael LaPage/
Examiner, Art Unit 2886

/TARIFUR R CHOWDHURY/
Supervisory Patent Examiner, Art Unit 2886

Shenzhen Jimuyida
Exhibit 1002

Notice of References Cited	Application/Control No. 11/846,494	Applicant(s)/Patent Under Reexamination LAPA ET AL.	
	Examiner MICHAEL LAPAGE	Art Unit 2886	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-6,937,348	08-2005	Geng, Z. Jason	356/603
*	B	US-5,135,309	08-1992	Kuchel et al.	356/604
*	C	US-7,502,125	03-2009	Suzuki, Tatsuhiko	356/604
*	D	US-7,525,669	04-2009	Abdollahi, Mohsen	356/603
*	E	US-7,286,246	10-2007	Yoshida, Hiroyuki	356/605
*	F	US-7,330,577	02-2008	Ernst et al.	382/128
*	G	US-4,648,717	03-1987	Ross et al.	356/610
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
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	P					
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	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11846494	LAPA ET AL.
	Examiner	Art Unit
	MICHAEL LAPAGE	2886

SEARCHED			
Class	Subclass	Date	Examiner
356	601-604	6/18/2009	ML

SEARCH NOTES		
Search Notes	Date	Examiner
Searched Double Patenting (None found)	6/17/2009	ML
EAST (USPAT, USPGPub, FPRS, EPO, JPO, DERWENT, IBMTDB)	6/17/2009	ML
PLUS search	6/17/2009	ML

INTERFERENCE SEARCH			
Class	Subclass	Date	Examiner

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Exhibit 1002

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11846494	LAPA ET AL.
	Examiner	Art Unit
	JONATHAN M NEWPORT	4176

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	02/24/2009	06/25/2009							
	1	÷	✓							
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PTO/SB/08a (01-09)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet | | of | |

Complete if Known	
Application Number	11/846,494
Filing Date	August 28, 2007
First Named Inventor	Nikolay L. Lapa
Art Unit	~~4176~~
Examiner Name	~~Jonathan M. Newport~~ Michael LaPage
Attorney Docket Number	104098.010300

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
/M.L./		US- 6813030	11-02-2004	Tanno	
		US-			
		US-			
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FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3]-Number[4]-Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages Or Relevant Figures Appear	T[6]
/M.L./		JP 2007-163266 A	06-28-2007	Yoshihiro		
/M.L./		JP 2003-57191 A	02-26-2003	Ryuji		

Examiner Signature	/Michael Lapage/	Date Considered	06/17/2009

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet | | of | |

Complete if Known	
Application Number	11/846,494
Filing Date	August 28, 2007
First Named Inventor	Nikolay L. Lapa
Art Unit	~~4176~~
Examiner Name	~~Jonathan M. Newport~~
Attorney Docket Number	104098.010300

NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
/M.L./		PCT Notification of Transmittal of The International Search Report and The ritten Opinion of the International Searching Authority, or the Declaration (PCT Rule 44.1), 18 December 2008, 10 pages.	

Examiner Signature	/Michael Lapage/	Date Considered	06/17/2009

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1 Applicant's unique citation designation number (optional). 2 Applicant is to place a check mark here if English language Translation is attached.

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet 1 of 1

Complete if Known	
Application Number	11/846,494
Filing Date	August 28, 2007
First Named Inventor	Nikolay L. Lapa
Art Unit	2877
Examiner Name	Unknown
Attorney Docket Number	104098.010300

U. S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number Number-Kind Code[2] (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
/M.L./		US- 6,751,344	06/15/2004	Grumbine, Michael T.	
		US-			
		US-			
		US-			
		US-			

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document Country Code[3] "Number[4] "Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]
/M.L./		WO 03/078927	09/25/2003			

Examiner Signature	/Michael Lapage/	Date Considered	06/17/2009

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This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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EAST Search History

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	2	"20090059241"	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/17 11:04
S2	8	"6813030"	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/17 11:56
S3	3	"6813030".pn.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/17 11:56
S4	198	356/603.ccls.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/17 12:12
S5	2	"6751344".pn.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/17 12:33
S6	2	(lapa, nikolay).in.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/17 12:33
S7	1	(brailov, yury).in.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/17 12:34
S8	11	("5867250" | "6028672" | "6064756" | "6144366" | "6229913" | "6377700" | "6463351").PN. OR ("6751344").URPN.	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/06/17 13:57

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S19	134	S15 and point cloud	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/17 17:15
S20	460	S15 and (vertices or vertex)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/17 17:34

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S27	903	S25 and (grating or pattern or projected structure)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/18 11:33
S28	33	S27 and vertex	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/18 11:33

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Exhibit 1002

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S36	0	"2007177160"	USPAT	ADJ	ON	2009/06/18 15:00
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Exhibit 1002

S39	2	("6075605" | "6788210").PN. OR ("7502125").URPN.	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/06/23 11:19
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S42	1	"7525671"	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/06/23 18:15
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S45	20	S44 and triang$	US-PGPUB; USPAT	ADJ	ON	2009/06/25 11:32
S46	1	"20030223083"	US-PGPUB; USPAT	ADJ	ON	2009/06/25 12:01
S47	2	"5675407".pn.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/25 15:07

6/25/2009 7:09:45 PM
C:\Documents and Settings\mlapage\My Documents\EAST\Workspaces\11846494.wsp

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BIB DATA SHEET

CONFIRMATION NO. 1491

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
11/846,494	08/28/2007 RULE	356	2886	104098.010300

APPLICANTS

Nikolay L. Lapa, Jaroslavl, RUSSIAN FEDERATION;
Yury A. Brailov, Moscow, RUSSIAN FEDERATION;

** **CONTINUING DATA** **********

** **FOREIGN APPLICATIONS** **********

** **IF REQUIRED, FOREIGN FILING LICENSE GRANTED** ** SMALL ENTITY **
09/10/2007

Foreign Priority claimed ☐ Yes ☑ No 35 USC 119(a-d) conditions met ☐ Yes ☑ No Verified and Acknowledged /MICHAEL P LAPAGE/ Examiner's Signature	☐ Met after Allowance Initials	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
		RUSSIAN FEDERATION	15	20	2

ADDRESS

GREENBERG TRAURIG LLP (LA)
2450 COLORADO AVENUE, SUITE 400E
INTELLECTUAL PROPERTY DEPARTMENT
SANTA MONICA, CA 90404
UNITED STATES

TITLE

System and Method for Three-Dimensional Measurement of The Shape of Material Objects

FILING FEE RECEIVED		
425	FEES: Authority has been given in Paper No._____ to charge/credit DEPOSIT ACCOUNT No._____ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit

BIB (Rev. 05/07).

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	NIKOLAY L. LAPA ET AL	Examiner:	MICHAEL LAPAGE
Serial No.	11/846,494	Group Art Unit:	2886
Filed:	AUGUST 28, 2007	Docket No.	104098.010300
Title:	SYSTEM AND METHOD FOR THREE-DIMENSIONAL MEASUREMENT OF THE SHAPE OF MATERIAL OBJECTS		
Customer No.:	33717	Confirmation No.	1491

CERTIFICATE OF TRANSMISSION

I hereby certify that this document is being transmitted electronically to the United States Patent and Trademark Office via the EFS Web e-Filing system on January 4, 2010.

Name: Angela Williams

AMENDMENT

MAIL STOP: AMENDMENT
Commissioner for Patents
Post Office Box 1450
Alexandria, Virginia 22313-1450

Dear Sir/Madam:

In response to the Office Action mailed on July 1, 2009 in the above-identified application, please amend the application as follows:

Amendments to the Specification begin on page 2 of this paper.

Amendments to the Claims begin on page 3 of this paper.

Remarks begin on page 9 of this paper.

Conclusion begins on page 11 of this paper.

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AMENDMENTS TO THE SPECIFICATION

Please make the following amendments in the specification to correct inadvertent typographical errors:

In the fourth sentence of paragraph [0003], replace the words "that pass" with the word "pass."

In the first sentence of paragraph [0022], delete the words "a" and "one of," and replace the word "wavelength" with the word "wavelengths."

In the last sentence of paragraph [0024], delete the word "to."

In the first sentence of paragraph [0024], replace the reference to "optical unit 100" with a reference to "optical unit 102."

In the last sentence of paragraph [0028], replace the word "illustrates" with the word "illustrate."

In the first sentence of paragraph [0031], please replace the word "each" with the word "any."

In the first sentence of paragraph [0031], delete the word "the" before the words "one camera."

In the first sentence of paragraph [0032], replace the word "assumption" with the word "principle."

In the first sentence of paragraph [0032], replace the words "each point" with the words "any point."

In the first sentence of paragraph [034], replace the word "relationship" with the word "relationships."

Delete the last sentence of paragraph [0039] and replace it with the following sentence: "The number of possible directions of deformations is restricted to the ones along the meridians."

In the first sentence of paragraph [0042], insert the word "the" after the words "any of."

In the fourth sentence of paragraph [0040], delete the word "with."

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AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions, and listings, of claims in the application.

Listings of Claims:

CLAIMS

1. (Currently Amended) A system for the 3D measurement of the shape of a material object, comprising:

a light projector for projecting a structured light pattern onto a surface of ~~an~~ said object, wherein ~~the~~ said light projector ~~includes~~ comprises a light source, a slide with a slide pattern located on a slide surface, and a projector lens characterized by a projector lens vertex; ~~for the projected structured light pattern;~~

~~an image detecting~~ a device for capturing an image of ~~the~~ said structured light pattern ~~acting~~ reflected on ~~the surface of the~~ said object, wherein ~~the image capturing~~ said device for capturing an image ~~includes~~ comprises a device lens characterized by a device lens vertex; ~~for a field of view of the image detecting device;~~ and

a computing device for determining a measurement relating to the ~~surface~~ shape of ~~the~~ said object using a triangulation algorithm based on a correspondence between points in said slide pattern and said image, ~~the projected structured light pattern and the captured image,~~ and

~~wherein the structured light pattern includes at least two coded elements that lie within a plane passing through the vertices of the light projector and the image detecting device and a portion of the object being measured.~~

wherein said slide pattern comprises a plurality of coded elements, where each of said coded elements is characterized by at least one parameter having one of at least two values, and

wherein said coded elements are assigned to one of at least first group or second group, each of which first group and second group comprising at least two of said coded elements, and

wherein at least first slide virtual line and second slide virtual line are defined on said slide surface, where said first slide virtual line is defined by an intersection between said slide

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surface and a first plane passing through said projector lens vertex and through said device lens vertex, and said second slide virtual line is defined by an intersection between said slide surface and a second plane passing through said projector lens vertex and through said device lens vertex, and

wherein said coded elements of said first group are located along said first virtual line and said coded elements of said second group are located along said second virtual line.

2. (Currently Amended) The system of claim 1, wherein ~~the structured light pattern includes a plurality of different groups of coded elements, wherein all of the coded elements in at least one group of coded elements lie within the same respective plane passing through the vertices of the light projector and the image detecting device and a portion of the object being measured.~~ each of said coded elements having at least three points that do not lie on a straight line.

3. (Currently Amended) The system of claim 12~~, wherein each group of coded elements lies within a different respective plane passing through the vertices of the light projector and the image detecting device and a portion of the object being measured.~~, wherein at least first object virtual line and second object virtual line are defined on the surface of said object, where said first object virtual line is defined by an intersection between said surface of said object and said first plane and where said second object virtual line is defined by an intersection between said surface of said object and said second plane.

4. (Currently Amended) The system of claim 13, wherein the light projector is further characterized by ~~includes~~ a central optical axis, further wherein the light projector and the ~~image detecting~~ device for capturing an image are arranged such that a line extending between the projector vertex ~~of the light projector~~ and the device vertex ~~of the image detecting device~~ is perpendicular to the central optical axis of the light projector.

5. (Currently Amended) The system of claim 13, wherein the ~~image detecting~~ device for capturing an image is ~~further includes~~ is characterized by a central optical axis, further wherein the light projector and the ~~image detecting~~ device for capturing an image are arranged such that a line extending between the projector vertex ~~of the light projector~~ and the device vertex ~~of the image detecting device~~ is perpendicular to the central optical axis of the ~~image detecting~~ device for capturing an image.

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6. (Currently Amended) The system of claim 13, wherein the light projector is characterized by further includes a projector central optical axis and wherein the image detecting device for capturing an image is characterized by further includes a device central optical axis, further wherein the light projector and the image detecting device for capturing an image are arranged such that a line extending between the projector vertex of the light projector and the device vertex of the image detecting device is not perpendicular to either the projector optical axis of the projector or the and device optical axis. of the image detecting device.

7. (Currently Amended) The system of claim 13, wherein the light projector projects structured light in a wavelengths selected from one of optical, visible and infrared wavelengths.

8. (Currently Amended) The system of claim 13, wherein the light projector is a continuous light flashlight source.

9. (Currently Amended) The system of claim 13, wherein the structured light pattern includes comprises a plurality of coded elements that can be variably grouped together such that all of the coded elements in each group lie in a respective plane passing through the vertices of the light projector and the image detecting device and a portion of the object being measured and such that all of the coded elements in each group form a unique sequence relative to the sequences of coded elements in other adjacent groups of coded elements.

10. (Currently Amended) The system of claim 13, wherein the computing device determines a three-dimensional shape of the surface of said object.

11. (Currently Amended) A method for the 3D measurement of the shape of a material object, comprising:

projecting a structured light pattern from a light projector onto a surface of an object, wherein the light projector includes comprises a light source, a slide with a slide pattern located on a slide surface, and a projector lens characterized by a projector lens vertex; a vertex for the projected structured light pattern;

capturing an image of the structured light pattern acting reflected on the surface of the object with an image detecting a device for capturing an image, wherein the image detecting said

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device for capturing an image comprises a device lens characterized by a device lens vertex; ~~includes a vertex for a field of view for the image detecting device~~; and

determining a measurement relating to the surface of the object using a triangulation algorithm based on a correspondence between ~~the~~ points in said slide ~~projected structured light~~ pattern and ~~the captured~~ said image, and

~~wherein the structured light pattern includes at least two coded elements that lie within a plane passing through the vertices of the light projector and the image detecting device and a portion of the object being measured.~~

wherein said slide pattern comprises a plurality of coded elements, where each of said coded elements is characterized by at least one parameter having one of at least two values, and

wherein said coded elements are assigned to one of at least first group or second group, each of which first group and second group comprising at least two of said coded elements, and

wherein at least first slide virtual line and second slide virtual line are defined on said slide surface, where said first slide virtual line is defined by an intersection between said slide surface and a first plane passing through said projector lens vertex and through said device lens vertex, and said second slide virtual line is defined by an intersection between said slide surface and a second plane passing through said projector lens vertex and through said device lens vertex, and

wherein said coded elements of said first group are located along said first virtual line and said coded elements of said second group are located along said second virtual line.

12. (Currently Amended) The method of claim 11, wherein ~~the structured light pattern includes a plurality of different groups of coded elements such that all of the coded elements in at least one group of coded elements is projected to lie within the same respective plane passing through the vertices of the light projector and the image detecting device and a portion of the object being measured.~~ each of said coded elements having at least three points that do not lie on a straight line.

13. (Currently Amended) The method of claim 12, wherein ~~each group of coded elements lies within a different respective plane passing through the vertices of the light projector and the image detecting device and a portion of the object being measured.~~ at least first object virtual line and second object virtual line are defined on said surface of said object, where said first

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object virtual line is defined by an intersection between said surface of said object and said first plane and where said second object virtual line is defined by an intersection between said surface of said object and said second plane.

14. (Currently Amended) The method of claim 11 ~~13~~, wherein the light projector is further ~~includes~~ characterized by a central optical axis, further comprising arranging the light projector and the ~~image detecting~~ device for capturing an image such that a line extending between the light projector vertex ~~of the light projector~~ and the device vertex ~~of the image detecting device~~ is perpendicular to the central optical axis of the light projector.

15. (Currently Amended) The method of claim 11 ~~13~~, wherein the ~~image detecting~~ device for capturing an image is characterized by ~~further includes~~ a central optical axis, further comprising arranging the light projector and the ~~image detecting~~ device for capturing an image such that a line extending between the light projector vertex ~~of the light projector~~ and the device vertex ~~of the image detecting device~~ is perpendicular to the central optical axis of the ~~image detecting~~ device for capturing an image.

16. (Currently Amended) The method of claim 11 ~~13~~, wherein the light projector is characterized by ~~further includes~~ a projector central optical axis and wherein the ~~image detecting~~ device for capturing an image is characterized by ~~further includes~~ a device central optical axis, further comprising arranging the light projector and the ~~image detecting~~ device for capturing an image such that a line extending between the projector vertex ~~of the light projector~~ and the device vertex ~~of the image detecting device~~ is not perpendicular to either the projector central optical axis ~~of the projector and~~ or the device central optical axis. ~~image detecting device.~~

17. (Currently Amended) The method of claim 11 ~~13~~, further comprising projecting structured light in ~~a~~ wavelengths selected from ~~one of~~ optical, visible and infrared wavelengths.

18. (Currently Amended) The method of claim 11 ~~13~~, further comprising projecting the structured light from a ~~continuous light~~ flashlight source.

19. (Currently Amended) The method of claim 11 ~~13~~, wherein the structured light pattern ~~includes~~ comprises a plurality of coded elements that can be variably grouped together ~~such that all of the coded elements in each group lie in a respective plane passing through the~~ vertices of

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~~the light projector and the image detecting device and a portion of the object being measured~~ ~~and~~ such that all of the coded elements in each group form a unique sequence relative to the sequences of coded elements in ~~other~~ adjacent groups of coded elements.

20. (Currently Amended) The method of claim 11 ~~13~~, further comprising determining a three-dimensional shape of the surface of said object.

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REMARKS

This amendment responds to the Office Action mailed on July 1, 2009 (the "Office Action"). The statutory period for response expires on January 1, 2010, a public holiday. Accordingly, Applicants respectfully submit that this response is being timely filed.

Claims 1-20 were pending in the present application. Claims 1-20 were rejected in the Office Action. By the instant amendment, Claims 1-20 are being amended and submitted for examination on their merits. Accordingly, Claims 1-20 are now pending in the present application, and Applicants believe these claims are in proper condition for allowance for the reasons set forth below.

In the pages that follow below, Applicants will set forth in detail that:

1) the cited prior art fails to teach or suggest a system or method for 3D measurement of a material object where coded elements in the structured light pattern are located along virtual lines that are defined by the intersections of the slide surface with a plurality of planes passing through the vertices of the light projector and the camera; and

2) the cited prior art fails to teach or suggest a system or method for 3D measurement of a material object where coded elements are always found in the image along virtual lines that are defined by the same virtual planes that define the virtual lines along which the coded elements are located in the structured light pattern, *i.e.*, on the surface of the slide.

Claim Rejections Under 35 U.S.C. § 102

The Office Action rejected claims 1-3, 6-13 and 16-20 under 35 U.S.C. § 102(b) as being anticipated by *Geng* (U.S. Patent No. 6,937,348). Applicants respectfully traverse this rejection and reconsideration is requested in view of the above claim amendments and based on the following remarks.

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The *Geng* patent cited by the Examiner fails to disclose a system and method for 3D measurement of the shape of an object based on the principles disclosed by Applicants. Specifically, Applicants disclose a system and method where groups of coded elements of the structured light are located along virtual lines that are defined on the surface of the projector slide by a plurality of virtual planes. Each of such virtual planes must pass through both the vertex of the projector lens and the vertex of the camera lens. Furthermore, when the structured light is reflected on the object and the image is captured by the camera, the coded elements are found in the image only along virtual lines that are defined by the same exact virtual planes on the surface of the object and in the camera regardless of the shape of the surface. Thus, although the relative location of the coded elements from the same group of elements may change in the image reflected on the object and captured by the camera, all coded elements from the same group of elements will nevertheless be found along one virtual line defined as stated above, regardless of the shape of the object. Therefore, the foregoing principles make it easier to establish a direct correspondence between coded elements in the structured light pattern and the images of the coded elements as they are reflected on the surface of the object and captured by the camera and, thereby, establish a direct correspondence between points in the structured light pattern and the images. Once such direct correspondence is established, the shape of the object may be calculated using a triangulation method and the information regarding how the relative locations of the points are affected by the shape of the object.

Applicants note that *Geng* fails to teach the above principles. Thus, Applicants respectfully believe that the pending claims, as amended, are not anticipated by *Geng*.

Claim Rejections Under 35 U.S.C. § 103

The Office Action rejected claims 4-5 and 14-15 under 35 U.S.C. § 103 as being unpatentable over *Geng*. Applicants respectfully traverse this rejection and reconsideration is requested in view of the above claim amendments and based on the following remarks.

Claims 4-5 and 14-15, as amended, depend from Claims 1 and 10 respectively. As discussed above, *Geng* fails to teach the system of Claim 1 and method of Claim 10. Thus, also as respectfully stated above, Claims 1 and 10 are not anticipated by *Geng*, and, therefore, are not unpatentable. Inasmuch as Claims 4-5 and 14-15 depend from patentable independent claims

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and inasmuch as *Geng* fails to teach the systems of Claims 4-5 (as amended) and the methods of Claims 14-15 (as amended), Claims 4-5 and Claims 14-15 are not unpatentable over *Geng* under 35 U.S.C. §103.

CONCLUSION

In each case, the pending rejections should be reconsidered in view of the amendments and remarks herein. Applicants believe that this case is in good condition for allowance, and a Notice of Allowance is earnestly solicited. If a telephone or further personal conference would be helpful, the Examiner is invited to call the undersigned, who will cooperate in any appropriate manner to advance prosecution. The Commissioner is directed and authorized to charge all additional required fees, except for the Issue Fee and the Publication Fee, to **Deposit Account Number 50-2638**. Please also credit any overpayments to said Deposit Account. Please ensure that Attorney Docket Number 104098.010300 is referred to when charging any payments or credits for this case.

Respectfully submitted,

Date: January 4, 2010

Allan Z. Litovsky
Reg. No. 40,249

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Electronic Patent Application Fee Transmittal

Application Number:	11846494
Filing Date:	28-Aug-2007
Title of Invention:	System and Method for Three-Dimensional Measurement of The Shape of Material Objects
First Named Inventor/Applicant Name:	Nikolay L. Lapa
Filer:	Allan Z. Litovsky/Angela Williams
Attorney Docket Number:	104098.010300

Filed as Small Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Extension - 3 months with $0 paid	2253	1	555	555

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Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
		Total in USD ($)		**555**

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Electronic Acknowledgement Receipt	
EFS ID:	6745841
Application Number:	11846494
International Application Number:	
Confirmation Number:	1491
Title of Invention:	System and Method for Three-Dimensional Measurement of The Shape of Material Objects
First Named Inventor/Applicant Name:	Nikolay L. Lapa
Customer Number:	33717
Filer:	Allan Z. Litovsky/Angela Williams
Filer Authorized By:	Allan Z. Litovsky
Attorney Docket Number:	104098.010300
Receipt Date:	04-JAN-2010
Filing Date:	28-AUG-2007
Time Stamp:	18:33:22
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$555
RAM confirmation Number	4746
Deposit Account	502638
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: Charge any Additional Fees required under 37 C.F.R. Section 1.21 (Miscellaneous fees and charges)	

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File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		ARTEC104098010300ResponseToOA.pdf	624433 f1725dea4e30169153468edd4397b6f0970e09de	yes	12
	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Extension of Time		1	1	
	Amendment/Req. Reconsideration-After Non-Final Reject		2	12	
Warnings:					
Information:					
2	Fee Worksheet (PTO-875)	fee-info.pdf	30358 3fa382e2bc7e0d47a94ed1d95353c161c2800d08	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	654791		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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PTO/SB/22 (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
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PETITION FOR EXTENSION OF TIME UNDER 37 CFR 1.136(a) **FY 2009** *(Fees pursuant to the Consolidated Appropriations Act, 2005 (H.R. 4818).)*	Docket Number (Optional) 104098.010300
Application Number 11/846,494	Filed August 28, 2007
For System and Method for Three-Dimensional Measurement of The Shape of Material Objects	
Art Unit 2886	Examiner Michael P. LaPage

This is a request under the provisions of 37 CFR 1.136(a) to extend the period for filing a reply in the above identified application.

The requested extension and fee are as follows (check time period desired and enter the appropriate fee below):

		Fee	Small Entity Fee	
☐	One month (37 CFR 1.17(a)(1))	$130	$65	$
☐	Two months (37 CFR 1.17(a)(2))	$490	$245	$
☑	Three months (37 CFR 1.17(a)(3))	$1110	$555	$ 555.00
☐	Four months (37 CFR 1.17(a)(4))	$1730	$865	$
☐	Five months (37 CFR 1.17(a)(5))	$2350	$1175	$

☐ Applicant claims small entity status. See 37 CFR 1.27.

☐ A check in the amount of the fee is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☐ The Director has already been authorized to charge fees in this application to a Deposit Account.

☑ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment, to Deposit Account Number 502638.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

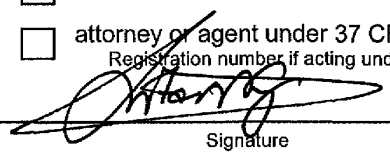
I am the

☐ applicant/inventor.

☐ assignee of record of the entire interest. See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed (Form PTO/SB/96).

☑ attorney or agent of record. Registration Number 40,249

☐ attorney or agent under 37 CFR 1.34. Registration number if acting under 37 CFR 1.34 _____



Signature — January 4, 2010 (Date)

Allan Z. Litovsky — Typed or printed name

(949) 732-6500 — Telephone Number

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below.

☑ Total of one forms are submitted.

This collection of information is required by 37 CFR 1.136(a). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 6 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number	Filing Date	☐ To be Mailed
11/846,494	08/28/2007	

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)	SMALL ENTITY ☒		OR	OTHER THAN SMALL ENTITY	
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =		OR	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =			X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $250 ($125 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	

APPLICATION AS AMENDED – PART II

		(Column 1)		(Column 2)	(Column 3)	SMALL ENTITY		OR	OTHER THAN SMALL ENTITY	
AMENDMENT	01/04/2010	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 20	Minus	** 20	= 0	X $26 =	0	OR	X $ =	
	Independent (37 CFR 1.16(h))	* 2	Minus	***3	= 0	X $110 =	0	OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE	0	OR	TOTAL ADD'L FEE	

		(Column 1)		(Column 2)	(Column 3)					
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =		OR	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =		OR	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))									
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

Legal Instrument Examiner:
/PAMELA V. THERATT/

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Shenzhen Jimuyida
Exhibit 1002

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/846,494	08/28/2007	Nikolay L. Lapa	104098.010300	1491

33717 7590 03/11/2010

GREENBERG TRAURIG LLP (LA)
2450 COLORADO AVENUE, SUITE 400E
INTELLECTUAL PROPERTY DEPARTMENT
SANTA MONICA, CA 90404

EXAMINER	
LAPAGE, MICHAEL P	
ART UNIT	**PAPER NUMBER**
2886	

NOTIFICATION DATE	DELIVERY MODE
03/11/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

laipmail@gtlaw.com
allenr@gtlaw.com
santosv@gtlaw.com

Shenzhen Jimuyida
Exhibit 1002

Interview Summary	Application No.	Applicant(s)	
	11/846,494	LAPA ET AL.	
	Examiner	Art Unit	
	MICHAEL LAPAGE	2886	

All participants (applicant, applicant's representative, PTO personnel):

(1) *MICHAEL LAPAGE*. (3)_____.

(2) *ALLAN LITOVSKY*. (4)_____.

Date of Interview: *03 March 2010*.

Type: a)☒ Telephonic b)☐ Video Conference
c)☐ Personal [copy given to: 1)☐ applicant 2)☐ applicant's representative]

Exhibit shown or demonstration conducted: d)☐ Yes e)☒ No.
If Yes, brief description: _____.

Claim(s) discussed: *1 and 11*.

Identification of prior art discussed: *Geng (U.S. Patent No. 6,937,348 B2)*.

Agreement with respect to the claims f)☒ was reached. g)☐ was not reached. h)☐ N/A.

Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: *Applicant explained amendment filed 01/04/2010 in relation to prior art of record Geng, further the examiner proposed amendments to help clarify the claim. Agreement was reached with respect to the amendment overcoming the prior art of record.*.

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN A NON-EXTENDABLE PERIOD OF THE LONGER OF ONE MONTH OR THIRTY DAYS FROM THIS INTERVIEW DATE, OR THE MAILING DATE OF THIS INTERVIEW SUMMARY FORM, WHICHEVER IS LATER, TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.

/TARIFUR R CHOWDHURY/
Supervisory Patent Examiner, Art Unit 2886

Shenzhen Jimuyida
Exhibit 1002

Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record
A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews
Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.
All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

———

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:
- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:
1) A brief description of the nature of any exhibit shown or any demonstration conducted,
2) an identification of the claims discussed,
3) an identification of the specific prior art discussed,
4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
5) a brief identification of the general thrust of the principal arguments presented to the examiner,
   (The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
6) a general indication of any other pertinent matters discussed, and
7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

Shenzhen Jimuyida
Exhibit 1002

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
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Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

33717 7590 03/23/2010

GREENBERG TRAURIG LLP (LA)
2450 COLORADO AVENUE, SUITE 400E
INTELLECTUAL PROPERTY DEPARTMENT
SANTA MONICA, CA 90404

EXAMINER	
LAPAGE, MICHAEL P	
ART UNIT	PAPER NUMBER
2886	

DATE MAILED: 03/23/2010

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/846,494	08/28/2007	Nikolay L. Lapa	104098.010300	1491

TITLE OF INVENTION: SYSTEM AND METHOD FOR THREE-DIMENSIONAL MEASUREMENT OF THE SHAPE OF MATERIAL OBJECTS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$755	$300	$0	$1055	06/23/2010

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PTOL-85 (Rev. 08/07) Approved for use through 08/31/2010.

Shenzhen Jimuyida
Exhibit 1002

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

33717 7590 03/23/2010

GREENBERG TRAURIG LLP (LA)
2450 COLORADO AVENUE, SUITE 400E
INTELLECTUAL PROPERTY DEPARTMENT
SANTA MONICA, CA 90404

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/846,494	08/28/2007	Nikolay L. Lapa	104098.010300	1491

TITLE OF INVENTION: SYSTEM AND METHOD FOR THREE-DIMENSIONAL MEASUREMENT OF THE SHAPE OF MATERIAL OBJECTS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$755	$300	$0	$1055	06/23/2010

EXAMINER	ART UNIT	CLASS-SUBCLASS
LAPAGE, MICHAEL P	2886	356-603000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list

(1) the names of up to 3 registered patent attorneys or agents OR, alternatively,

(2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1 _____

2 _____

3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. The following fee(s) are submitted:

❑ Issue Fee

❑ Publication Fee (No small entity discount permitted)

❑ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**

❑ A check is enclosed.

❑ Payment by credit card. Form PTO-2038 is attached.

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)

❑ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.

❑ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Shenzhen Jimuyida
Exhibit 1002

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
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Alexandria, Virginia 22313-1450
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/846,494	08/28/2007	Nikolay L. Lapa	104098.010300	1491

33717 7590 03/23/2010

GREENBERG TRAURIG LLP (LA)
2450 COLORADO AVENUE, SUITE 400E
INTELLECTUAL PROPERTY DEPARTMENT
SANTA MONICA, CA 90404

EXAMINER	
LAPAGE, MICHAEL P	
ART UNIT	PAPER NUMBER
2886	

DATE MAILED: 03/23/2010

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 32 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 32 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Shenzhen Jimuyida
Exhibit 1002

Notice of Allowability	Application No.	Applicant(s)	
	11/846,494	LAPA ET AL.	
	Examiner	Art Unit	
	MICHAEL LAPAGE	2886	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *04 January 2010*.

2. ☒ The allowed claim(s) is/are *1-22*.

3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date *03/11/2010* .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

Shenzhen Jimuyida
Exhibit 1002

Interview Summary	Application No.	Applicant(s)	
	11/846,494	LAPA ET AL.	
	Examiner	Art Unit	
	MICHAEL LAPAGE	2886	

All participants (applicant, applicant's representative, PTO personnel):

(1) *MICHAEL LAPAGE*. (3)_____.

(2) *ALLAN LITOVSKY*. (4)_____.

Date of Interview: *11 March 2010*.

Type: a)☒ Telephonic b)☐ Video Conference
c)☐ Personal [copy given to: 1)☐ applicant 2)☐ applicant's representative]

Exhibit shown or demonstration conducted: d)☐ Yes e)☒ No.
If Yes, brief description: _____.

Claim(s) discussed: *1-22*.

Identification of prior art discussed: *None*.

Agreement with respect to the claims f)☒ was reached. g)☐ was not reached. h)☐ N/A.

Substance of Interview including description of the general nature of what was agreed to if an agreement was reached, or any other comments: *Applicant proposed amendment to overcome clarity issues of claims 1 and 11, and further provided additional claims 21-22. Amendment detailed in examiner's amendment attached herein*.

(A fuller description, if necessary, and a copy of the amendments which the examiner agreed would render the claims allowable, if available, must be attached. Also, where no copy of the amendments that would render the claims allowable is available, a summary thereof must be attached.)

THE FORMAL WRITTEN REPLY TO THE LAST OFFICE ACTION MUST INCLUDE THE SUBSTANCE OF THE INTERVIEW. (See MPEP Section 713.04). If a reply to the last Office action has already been filed, APPLICANT IS GIVEN A NON-EXTENDABLE PERIOD OF THE LONGER OF ONE MONTH OR THIRTY DAYS FROM THIS INTERVIEW DATE, OR THE MAILING DATE OF THIS INTERVIEW SUMMARY FORM, WHICHEVER IS LATER, TO FILE A STATEMENT OF THE SUBSTANCE OF THE INTERVIEW. See Summary of Record of Interview requirements on reverse side or on attached sheet.

Shenzhen Jimuyida
Exhibit 1002

Summary of Record of Interview Requirements

Manual of Patent Examining Procedure (MPEP), Section 713.04, Substance of Interview Must be Made of Record
A complete written statement as to the substance of any face-to-face, video conference, or telephone interview with regard to an application must be made of record in the application whether or not an agreement with the examiner was reached at the interview.

Title 37 Code of Federal Regulations (CFR) § 1.133 Interviews
Paragraph (b)

In every instance where reconsideration is requested in view of an interview with an examiner, a complete written statement of the reasons presented at the interview as warranting favorable action must be filed by the applicant. An interview does not remove the necessity for reply to Office action as specified in §§ 1.111, 1.135. (35 U.S.C. 132)

37 CFR §1.2 Business to be transacted in writing.
All business with the Patent or Trademark Office should be transacted in writing. The personal attendance of applicants or their attorneys or agents at the Patent and Trademark Office is unnecessary. The action of the Patent and Trademark Office will be based exclusively on the written record in the Office. No attention will be paid to any alleged oral promise, stipulation, or understanding in relation to which there is disagreement or doubt.

The action of the Patent and Trademark Office cannot be based exclusively on the written record in the Office if that record is itself incomplete through the failure to record the substance of interviews.

It is the responsibility of the applicant or the attorney or agent to make the substance of an interview of record in the application file, unless the examiner indicates he or she will do so. It is the examiner's responsibility to see that such a record is made and to correct material inaccuracies which bear directly on the question of patentability.

Examiners must complete an Interview Summary Form for each interview held where a matter of substance has been discussed during the interview by checking the appropriate boxes and filling in the blanks. Discussions regarding only procedural matters, directed solely to restriction requirements for which interview recordation is otherwise provided for in Section 812.01 of the Manual of Patent Examining Procedure, or pointing out typographical errors or unreadable script in Office actions or the like, are excluded from the interview recordation procedures below. Where the substance of an interview is completely recorded in an Examiners Amendment, no separate Interview Summary Record is required.

The Interview Summary Form shall be given an appropriate Paper No., placed in the right hand portion of the file, and listed on the "Contents" section of the file wrapper. In a personal interview, a duplicate of the Form is given to the applicant (or attorney or agent) at the conclusion of the interview. In the case of a telephone or video-conference interview, the copy is mailed to the applicant's correspondence address either with or prior to the next official communication. If additional correspondence from the examiner is not likely before an allowance or if other circumstances dictate, the Form should be mailed promptly after the interview rather than with the next official communication.

The Form provides for recordation of the following information:

- Application Number (Series Code and Serial Number)
- Name of applicant
- Name of examiner
- Date of interview
- Type of interview (telephonic, video-conference, or personal)
- Name of participant(s) (applicant, attorney or agent, examiner, other PTO personnel, etc.)
- An indication whether or not an exhibit was shown or a demonstration conducted
- An identification of the specific prior art discussed
- An indication whether an agreement was reached and if so, a description of the general nature of the agreement (may be by attachment of a copy of amendments or claims agreed as being allowable). Note: Agreement as to allowability is tentative and does not restrict further action by the examiner to the contrary.
- The signature of the examiner who conducted the interview (if Form is not an attachment to a signed Office action)

It is desirable that the examiner orally remind the applicant of his or her obligation to record the substance of the interview of each case. It should be noted, however, that the Interview Summary Form will not normally be considered a complete and proper recordation of the interview unless it includes, or is supplemented by the applicant or the examiner to include, all of the applicable items required below concerning the substance of the interview.

A complete and proper recordation of the substance of any interview should include at least the following applicable items:

1) A brief description of the nature of any exhibit shown or any demonstration conducted,
2) an identification of the claims discussed,
3) an identification of the specific prior art discussed,
4) an identification of the principal proposed amendments of a substantive nature discussed, unless these are already described on the Interview Summary Form completed by the Examiner,
5) a brief identification of the general thrust of the principal arguments presented to the examiner,
   (The identification of arguments need not be lengthy or elaborate. A verbatim or highly detailed description of the arguments is not required. The identification of the arguments is sufficient if the general nature or thrust of the principal arguments made to the examiner can be understood in the context of the application file. Of course, the applicant may desire to emphasize and fully describe those arguments which he or she feels were or might be persuasive to the examiner.)
6) a general indication of any other pertinent matters discussed, and
7) if appropriate, the general results or outcome of the interview unless already described in the Interview Summary Form completed by the examiner.

Examiners are expected to carefully review the applicant's record of the substance of an interview. If the record is not complete and accurate, the examiner will give the applicant an extendable one month time period to correct the record.

Examiner to Check for Accuracy

If the claims are allowable for other reasons of record, the examiner should send a letter setting forth the examiner's version of the statement attributed to him or her. If the record is complete and accurate, the examiner should place the indication, "Interview Record OK" on the paper recording the substance of the interview along with the date and the examiner's initials.

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EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Allan Litovsky on March 11th 2010.

The application has been amended as follows:

a. In claim 1, line 18, "one parameter having one of at least two values, and" has been changed to --one parameter and, where said at least one parameter defines a spatial or temporal distribution of an amplitude or a wavelength of said structured light, and--.

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b. In claim 1, line 21, "wherein at least first slide virtual line and second slide virtual line" has been changed to –wherein at least a first slide virtual line and a second slide virtual line—.

c. In claim 11, line 18, "one parameter having one of at least two values, and" has been changed to --one parameter and, where said at least one parameter defines a spatial or temporal distribution of an amplitude or a wavelength of said structured light, and--.

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d. In claim 11, line 21, "wherein at least first slide virtual line and second slide virtual line" has been changed to –wherein at least a first slide virtual line and a second slide virtual line—.

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e. In claim 13, line 1, “The method of claim 12, wherein" has been changed to --The method of claim 11, wherein--.

f. The following claim 21 has been added as new :

g. –21. The system of claim 1, wherein said at least one parameter defines a shape, size, or color or a change thereof in time for at least one of said coded elements.—

h. The following claim 22 has been added as new:

i. –22. The method of claim 1, wherein said at least one parameter defines a shape, size, or color or a change thereof in time for at least one of said coded elements.--

Allowable Subject Matter

2. Claims 1-22 are allowed.

The following is an examiner’s statement of reasons for allowance:

As to claims 1 and 11, the prior arts of record taken alone or in combination with any other references fail to teach or suggest the claimed system or method of a 3d measurement of the shape of a material object comprising: a **computing device** for determining a measurement relating to the shape of said object using a **triangulation algorithm** based on a correspondence between points in said **slide pattern** and **said image**, and wherein said slide pattern comprises a plurality of **coded elements**, where each of said coded elements is characterized by at least **one parameter**, and where said at least one parameter defines a **spatial or temporal distribution** of an amplitude or a **wavelength** of said structures light, and wherein said coded elements are assigned

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to one of at least **first group** or **second group**, each of which first group and second group comprising at least **two** of **said coded elements**, and wherein at least first slide **virtual line** and second slide **virtual line** are defined on said **slide surface**, where said first slide virtual line is defined by an intersection between said slide surface and a **first plane** passing through said **projector lens vertex** and through said **device lens vertex**, and said **second slide virtual line** is defined by an intersection between said **slide surface** and **a second plane** passing through said **projector lens vertex** and through said **device lens vertex**, and wherein said coded elements of said **first group** are located **along said first virtual line** and said coded elements of said **second group** are located along said **second virtual line.**

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled “Comments on Statement of Reasons for Allowance.”

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL LAPAGE whose telephone number is (571)270-3833. The examiner can normally be reached on Monday Through Friday 7:30AM-5:00PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner’s supervisor, Tarifur Chowdhury can be reached on 571-272-2287. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Michael LaPage/
Examiner, Art Unit 2886

/TARIFUR R CHOWDHURY/

Supervisory Patent Examiner, Art Unit 2886

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Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11846494	LAPA ET AL.
	Examiner	**Art Unit**
	Michael LaPage	2886

ORIGINAL		INTERNATIONAL CLASSIFICATION	
CLASS	SUBCLASS	CLAIMED	NON-CLAIMED
356	603	G 0 1 B 11 / 24 (2006.01.01)	
		G 0 1 B 11 / 30 (2006.01.01)	

CROSS REFERENCE(S)					
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)				
356	601	602			

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	18	17												
2	2	19	18												
3	3	20	19												
4	4	21	20												
5	5	11	21												
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15	14														
16	15														
17	16														

/MICHAEL LAPAGE/ Examiner.Art Unit 2886	03/11/2010	**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	22	
/Tarifur Chowdhury/	03/12/10	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

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Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11846494	LAPA ET AL.
	Examiner	**Art Unit**
	MICHAEL LAPAGE	2886

SEARCHED			
Class	**Subclass**	**Date**	**Examiner**
356	601-604	6/18/2009	ML
356	601-604	3/11/2010	ML
356	All (with text)	3/11/2010	ML
250	All (with text)	3/11/2010	ML

SEARCH NOTES		
Search Notes	**Date**	**Examiner**
Searched Double Patenting (None found)	6/17/2009	ML
EAST (USPAT, USPGPub, FPRS, EPO, JPO, DERWENT, IBMTDB)	6/17/2009	ML
PLUS search	6/17/2009	ML
Updated Search	3/11/2010	ML
Consulted Primary Roy Punnoose for allowable subject matter	3/2/2010	ML

INTERFERENCE SEARCH			
Class	**Subclass**	**Date**	**Examiner**
Interference Search	Searched above class and subclasses	3/11/2010	ML

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Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	11846494	LAPA ET AL.
	Examiner	**Art Unit**
	MICHAEL LAPAGE	4176

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	02/24/2009	06/25/2009	03/11/2010						
1	1	÷	✓	=						
2	2	÷	✓	=						
3	3	÷	✓	=						
4	4	÷	✓	=						
5	5	÷	✓	=						
6	6	÷	✓	=						
7	7	÷	✓	=						
8	8	÷	✓	=						
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10	10	÷	✓	=						
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18	17	÷	✓	=						
19	18	÷	✓	=						
20	19	÷	✓	=						
21	20	÷	✓	=						
11	21			=						
22	22			=						

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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L8	1501	356/601-604.ccls.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2010/03/11 15:17
L9	1	8 and coded elements	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2010/03/11 15:17
L10	392	8 and (structur$6 NEAR5 light)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2010/03/11 15:17
L11	52	10 and (lens WITH (vertex or center))	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2010/03/11 15:18
L12	138292	"250"/$.ccls.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2010/03/11 15:25
L14	101614	"356"/$.ccls.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2010/03/11 15:26
L15	222249	12 or 14	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2010/03/11 15:26
L16	12931	15 and (structur$6 NEAR5 light)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2010/03/11 15:26
L17	682	16 and triangulat$5	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2010/03/11 15:27

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L18	1	17 and coded elements	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2010/03/11 15:27
L19	127	17 and (lens WITH (vertex or center))	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2010/03/11 15:27
L20	239	15 and ((slide or mask) same pattern) and triangulat$5	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2010/03/11 15:53
L21	211	20 not 19	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2010/03/11 15:54
L22	231	20 not 11	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2010/03/11 15:54
L24	211	21 not 11	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2010/03/11 15:54
L25	2	"6763131".pn.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2010/03/11 16:01
L26	557	coded elements	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2010/03/11 16:26
L28	2	26 and triangulat$	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2010/03/11 16:26
L29	6	coded elements and (structur $6 NEAR5 light)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2010/03/11 16:29
L30	1972	triangulat$5 and (structur$6 NEAR5 light)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2010/03/11 16:30

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L31	1457	30 and lens	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2010/03/11 16:30
L32	464	30 and (lens WITH (vertex or center))	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2010/03/11 16:30
L33	464	32 not 24	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2010/03/11 16:30
L34	429	32 not 10	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2010/03/11 16:31
L35	429	34 and (surface or object)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2010/03/11 16:31
L36	262	34 and (slide or mask)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2010/03/11 16:31
S1	2	"20090059241"	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/17 11:04
S2	8	"6813030"	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/17 11:56
S3	3	"6813030".pn.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/17 11:56
S4	198	356/603.ccls.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/17 12:12
S5	2	"6751344".pn.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/17 12:33

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S6	2	(lapa, nikolay).in.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/17 12:33
S7	1	(brailov, yury).in.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/17 12:34
S8	11	("5867250" | "6028672" | "6064756" | "6144366" | "6229913" | "6377700" | "6463351").PN. OR ("6751344").URPN.	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/06/17 13:57
S9	49	(US-20010048520-$ or US-20020149762-$ or US-20030042401-$ or US-20050018209-$ or US-20050111705-$ or US-20050184217-$ or US-20050185194-$ or US-20060017720-$ or US-20070057946-$ or US-20090059241-$ or US-20090061381-$ or US-20080319704-$ or US-20080118143-$).did. or (US-5790242-$ or US-4775235-$ or US-5675407-$ or US-5838428-$ or US-5969823-$ or US-6147760-$ or US-6177999-$ or US-6219063-$ or US-6341016-$ or US-6373561-$ or US-6603561-$ or US-6664531-$ or US-6754370-$ or US-7002699-$ or US-7095002-$ or US-7274470-$ or US-6438272-$ or US-5615003-$ or US-5986745-$ or US-5880844-$ or US-4523809-$ or US-4532405-$ or US-4578561-$ or US-4590356-$ or US-4963036-$ or US-5243665-$).did. or (US-5852672-$ or US-5933231-$ or US-5993000-$ or US-6043891-$ or US-6304285-$ or US-6503195-$ or US-6634552-$ or US-6714234-$ or US-6751344-$ or US-6885479-$).did.	US-PGPUB; USPAT	ADJ	ON	2009/06/17 14:00

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S10	50	(US-3578170-$ or US-3597056-$ or US-3705765-$ or US-3756724-$ or US-3762294-$ or US-3779544-$ or US-3788748-$ or US-3794982-$ or US-3801779-$ or US-3804408-$ or US-3825730-$ or US-3827789-$ or US-3833816-$ or US-3843264-$ or US-3904283-$ or US-3905693-$ or US-3960380-$ or US-3966331-$ or US-3975630-$ or US-4093366-$ or US-4130362-$ or US-4173073-$ or US-4178512-$ or US-4180326-$ or US-4278334-$ or US-4311392-$).did. or (US-4450766-$ or US-4467214-$ or US-4472056-$ or US-4490023-$ or US-4537259-$ or US-4542388-$ or US-4594001-$ or US-4615622-$ or US-4664525-$ or US-4731853-$ or US-4836672-$ or US-4848688-$ or US-4879664-$ or US-4891517-$ or US-4907873-$ or US-4950068-$ or US-4984893-$ or US-4999703-$ or US-5021833-$ or US-5024520-$ or US-5069543-$ or US-5115349-$ or US-5119356-$ or US-5132736-$).did.	USPAT	ADJ	ON	2009/06/17 14:00
S11	54	("5018854" | "5135309" | "5237404" | "5381235").PN. OR ("6028672").URPN.	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/06/17 14:20
S12	718824	(3d or three dimension$4 or three-dimension$4)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/17 17:04
S13	99649	S12 and (slit or aperture or spatial filter or structured light pattern)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/17 17:05
S14	78418	S13 and (light or laser or source)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/17 17:05
S15	2345	S13 and triangulation	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/17 17:05

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S16	7	S15 and continuous light source	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/17 17:07
S17	6	("6252623" or "6341016" or "6493095").pn.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/17 17:09
S18	3	"20040105580"	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/17 17:09
S19	134	S15 and point cloud	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/17 17:15
S20	460	S15 and (vertices or vertex)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/17 17:34
S21	340	S20 and lens	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/17 17:35
S22	64	S20 and ("356"/$).ccls.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/17 17:35
S23	21	(US-20040246495-$ or US-20070177160-$ or US-20040105580-$).did. or (US-6813030-$ or US-6751344-$ or US-6028672-$ or US-6970600-$ or US-5135309-$ or US-7286246-$ or US-6700669-$ or US-7525669-$ or US-7502125-$ or US-6937348-$ or US-6542250-$ or US-7489408-$ or US-7388679-$ or US-7379193-$ or US-6549289-$ or US-7330577-$ or US-6754370-$ or US-6043891-$).did.	US-PGPUB; USPAT	ADJ	ON	2009/06/18 10:54
S24	5	"6285474"	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/18 11:09

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S25	1378	356/601,602,603,604.ccls.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/18 11:14
S26	134	356/604.ccls.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/18 11:14
S27	903	S25 and (grating or pattern or projected structure)	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/18 11:33
S28	33	S27 and vertex	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/18 11:33
S29	26	(US-20040246495-$ or US-20070177160-$ or US-20040105580-$ or US-20090059241-$ or US-20030016366-$).did. or (US-6813030-$ or US-6751344-$ or US-6028672-$ or US-6970600-$ or US-5135309-$ or US-7286246-$ or US-6700669-$ or US-7525669-$ or US-7502125-$ or US-6937348-$ or US-6542250-$ or US-7489408-$ or US-7388679-$ or US-7379193-$ or US-6549289-$ or US-7330577-$ or US-6754370-$ or US-6043891-$ or US-5307151-$ or US-5406342-$ or US-6853458-$).did.	US-PGPUB; USPAT	ADJ	ON	2009/06/18 11:39
S30	10142	"29" and triangulation	US-PGPUB; USPAT	ADJ	ON	2009/06/18 14:25
S31	26	(US-20040246495-$ or US-20070177160-$ or US-20040105580-$ or US-20090059241-$ or US-20030016366-$).did. or (US-6813030-$ or US-6751344-$ or US-6028672-$ or US-6970600-$ or US-5135309-$ or US-7286246-$ or US-6700669-$ or US-7525669-$ or US-7502125-$ or US-6937348-$ or US-6542250-$ or US-7489408-$ or US-7388679-$ or US-7379193-$ or US-6549289-$ or US-7330577-$ or US-6754370-$ or US-6043891-$ or US-5307151-$ or US-5406342-$ or US-	US-PGPUB; USPAT	ADJ	ON	2009/06/18 14:25

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Exhibit 1002

		6853458-$).did.				
S32	14	S31 and triangulation	US-PGPUB; USPAT	ADJ	ON	2009/06/18 14:25
S33	0	("2007/0177160").URPN.	USPAT	ADJ	ON	2009/06/18 14:58
S37	2	"20070177160"	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/18 15:01
S38	17	"4648717"	US-PGPUB; USPAT	ADJ	ON	2009/06/18 15:04
S39	2	("6075605" | "6788210").PN. OR ("7502125").URPN.	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/06/23 11:19
S40	2	"20050046873"	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/06/23 11:20
S41	1	"20070222998"	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/06/23 17:32
S42	1	"7525671"	US-PGPUB; USPAT; USOCR	ADJ	ON	2009/06/23 18:15
S44	27	(US-20040246495-$ or US-20070177160-$ or US-20040105580-$ or US-20090059241-$ or US-20030016366-$).did. or (US-6813030-$ or US-6751344-$ or US-6028672-$ or US-6970600-$ or US-5135309-$ or US-7286246-$ or US-6700669-$ or US-7525669-$ or US-7502125-$ or US-6937348-$ or US-6542250-$ or US-7489408-$ or US-7388679-$ or US-7379193-$ or US-6549289-$ or US-7330577-$ or US-6754370-$ or US-6043891-$ or US-5307151-$ or US-5406342-$ or US-6853458-$ or US-4648717-$).did.	US-PGPUB; USPAT	ADJ	ON	2009/06/25 11:32
S45	20	S44 and triang$	US-PGPUB; USPAT	ADJ	ON	2009/06/25 11:32
S46	1	"20030223083"	US-PGPUB; USPAT	ADJ	ON	2009/06/25 12:01
S47	2	"5675407".pn.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2009/06/25 15:07
S48	2	"5355212".pn.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2010/03/02 10:48

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S49	3	"20050046873"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2010/03/02 11:16
S50	213	356/603.ccls.	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2010/03/02 11:19
S51	46	S50 and lcd	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2010/03/02 11:19
S52	72	S50 and ((lcd or liquid NEAR2 crystal))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2010/03/02 11:32
S53	26	S52 not S51	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2010/03/02 11:32
S54	1512	356/601-604.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2010/03/02 13:07
S55	79	356/610.ccls.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2010/03/02 13:07
S56	30	356/610.ccls. and group	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2010/03/02 13:16
S57	2	"20020021434"	US-PGPUB; USPAT; FPRS; EPO; JPO; DERWENT; IBM_TDB	ADJ	ON	2010/03/03 15:03

EAST Search History (Interference)

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Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L37	1516	(356/601-604).ccls.	US-PGPUB; USPAT; UPAD	ADJ	ON	2010/03/11 16:43
L38	1	37 and coded elements	US-PGPUB; USPAT; UPAD	ADJ	ON	2010/03/11 16:44
L39	5	37 and slide pattern	US-PGPUB; USPAT; UPAD	ADJ	ON	2010/03/11 16:45
L40	161	37 and (lens with (vertex or center))	US-PGPUB; USPAT; UPAD	ADJ	ON	2010/03/11 16:45
L41	116	40 and pattern	US-PGPUB; USPAT; UPAD	ADJ	ON	2010/03/11 16:46
L42	61	41 and triangulat$5	US-PGPUB; USPAT; UPAD	ADJ	ON	2010/03/11 16:47
L43	1376	37 and (group or collection or combination or set)	US-PGPUB; USPAT; UPAD	ADJ	ON	2010/03/11 16:48
L45	54	37 and ((group or collection or combination or set) with (structur$3 NEAR2 light))	US-PGPUB; USPAT; UPAD	ADJ	ON	2010/03/11 16:49
L46	27	(coded elements).clm.	US-PGPUB; UPAD	ADJ	ON	2010/03/11 16:53
L47	91	((vertex same lens) and group).clm.	US-PGPUB; UPAD	ADJ	ON	2010/03/11 16:54
L48	0	((vertex same lens) and group and triangulation).clm.	US-PGPUB; UPAD	ADJ	ON	2010/03/11 16:54
L49	0	((vertex same lens) and triangulation).clm.	US-PGPUB; UPAD	ADJ	ON	2010/03/11 16:54
L50	1737	(triangulation).clm.	US-PGPUB; UPAD	ADJ	ON	2010/03/11 16:55
L51	60	(triangulation and computing device).clm.	US-PGPUB; UPAD	ADJ	ON	2010/03/11 16:55
L52	0	(triangulation and computing device and slide).clm.	US-PGPUB; UPAD	ADJ	ON	2010/03/11 16:55
L53	3	(triangulation and virtual line).clm.	US-PGPUB; UPAD	ADJ	ON	2010/03/11 16:56
L54	50	(triangulation and vertex).clm.	US-PGPUB; UPAD	ADJ	ON	2010/03/11 16:57
L55	8	(triangulation and (vertex or center) same lens).clm.	US-PGPUB; UPAD	ADJ	ON	2010/03/11 16:58
L56	1	(slide and lens vertex).clm.	US-PGPUB; UPAD	ADJ	ON	2010/03/11 16:59
L57	0	(mask and lens vertex).clm.	US-PGPUB; UPAD	ADJ	ON	2010/03/11 16:59
L58	246	((mask or slide) and lens same (center or vertex)).clm.	US-PGPUB; UPAD	ADJ	ON	2010/03/11 17:00
L59	6	58 and triangulation	US-PGPUB; UPAD	ADJ	ON	2010/03/11 17:00

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3/11/2010 5:00:33 PM
C:\Documents and Settings\mlapage\My Documents\EAST\Workspaces\11846494.wsp

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AMENDMENTS TO THE SPECIFICATION

Please make the following amendments in the specification to correct inadvertent typographical errors:

In the fourth sentence of paragraph [0003], replace the words "that pass" with the word "pass."

In the first sentence of paragraph [0022], delete the words "a" and "one of," and replace the word "wavelength" with the word "wavelengths."

In the last sentence of paragraph [0024], delete the word "to."

25 KW 4/30/10
In the first sentence of paragraph [0024], replace the reference to "optical unit 100" with a reference to "optical unit 102."

In the last sentence of paragraph [0028], replace the word "illustrates" with the word "illustrate."

In the first sentence of paragraph [0031], please replace the word "each" with the word "any."

In the first sentence of paragraph [0031], delete the word "the" before the words "one camera."

In the first sentence of paragraph [0032], replace the word "assumption" with the word "principle."

In the first sentence of paragraph [0032], replace the words "each point" with the words "any point."

interrelationships KW 4/30/10
In the first sentence of paragraph [034], replace the word "~~relationship~~" with the word "relationships."

Delete the last sentence of paragraph [0039] and replace it with the following sentence: "The number of possible directions of deformations is restricted to the ones along the meridians."

In the first sentence of paragraph [0042], insert the word "the" after the words "any of."

In the fourth sentence of paragraph [0040], delete the word "with."

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Jodi R. Newell (Depositor's name)
(Signature)
June 23, 2010 (Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/846,494	08/28/2007	Nikolay L. Lapa	104098.010300	1491

TITLE OF INVENTION: SYSTEM AND METHOD FOR THREE-DIMENSIONAL MEASUREMENT OF THE SHAPE OF MATERIAL OBJECTS

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	YES	$755	$300	$0	$1055	06/23/2010

EXAMINER	ART UNIT	CLASS-SUBCLASS
LAPAGE, MICHAEL P	2886	356-603000

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1 Allan Litovsky
2 Greenberg Traurig LLP
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(A) NAME OF ASSIGNEE: Artec Group, Inc.

(B) RESIDENCE: (CITY and STATE OR COUNTRY): 4370 La Jolla Village Drive, Suite 400, San Diego, CA 92122 US

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☒ Corporation or other private group entity ☐ Government

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- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.
- ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature /Allan Litovsky Reg. No. 40,249/ Date June 23, 2010

Typed or printed name Allan Litovsky Registration No. 40,249

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Electronic Patent Application Fee Transmittal

Application Number:	11846494
Filing Date:	28-Aug-2007
Title of Invention:	SYSTEM AND METHOD FOR THREE-DIMENSIONAL MEASUREMENT OF THE SHAPE OF MATERIAL OBJECTS
First Named Inventor/Applicant Name:	Nikolay L. Lapa
Filer:	Franklin D. Ubell./Jodi Newell
Attorney Docket Number:	104098.010300

Filed as Large Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Utility Appl issue fee	1501	1	1510	1510
Extension-of-Time:				

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Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
		Total in USD ($)		**1510**

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Electronic Acknowledgement Receipt

EFS ID:	7879985
Application Number:	11846494
International Application Number:	
Confirmation Number:	1491
Title of Invention:	SYSTEM AND METHOD FOR THREE-DIMENSIONAL MEASUREMENT OF THE SHAPE OF MATERIAL OBJECTS
First Named Inventor/Applicant Name:	Nikolay L. Lapa
Customer Number:	33717
Filer:	Franklin D. Ubell./Jodi Newell
Filer Authorized By:	Franklin D. Ubell.
Attorney Docket Number:	104098.010300
Receipt Date:	23-JUN-2010
Filing Date:	28-AUG-2007
Time Stamp:	18:48:51
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Deposit Account
Payment was successfully received in RAM	$1510
RAM confirmation Number	5542
Deposit Account	502638
Authorized User	

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Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	104098010300issuefee.pdf	159077 630c25a0c440b545b69e5ff1f9660abd1543ef2b	no	1
Warnings:					
Information:					
2	Fee Worksheet (PTO-875)	fee-info.pdf	30321 6dab33ea99469c1c504e7e7b815c9fbcbc4cb0fa	no	2
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Jodi R. Newell (Depositor's name)
(Signature)
June 23, 2010 (Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/846,494	08/28/2007	Nikolay L. Lapa	104098.010300	1491

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nonprovisional	YES	$755	$300	$0	$1055	06/23/2010

EXAMINER	ART UNIT	CLASS-SUBCLASS
LAPAGE, MICHAEL P	2886	356-603000

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1 Allan Litovsky
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06/28/2010 BNAM 00000003 502638 11846494
01 FC:1599 300.00 DA

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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
11/846,494	08/03/2010	7768656	104098.010300	1491

33717 7590 07/14/2010

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ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

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(application filed on or after May 29, 2000)

The Patent Term Adjustment is 32 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

Nikolay L. Lapa, Jaroslavl, RUSSIAN FEDERATION;
Yury A. Brailov, Moscow, RUSSIAN FEDERATION;

Shenzhen Jimuyida
Exhibit 1002

Doc Code: PA..
Document Description: Power of Attorney

PTO/AIA/82B (07-13)
Approved for use through 11/30/2014. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number

POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in either the attached transmittal letter or the boxes below.

Application Number	Filing Date

(Note: The boxes above may be left blank if information is provided on form PTO/AIA/82A.)

☑ I hereby appoint the Patent Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above: 122422

OR

☐ I hereby appoint Practitioner(s) named in the attached list (form PTO/AIA/82C) as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the patent application referenced in the attached transmittal letter (form PTO/AIA/82A) or identified above. (Note: Complete form PTO/AIA/82C.)

Please recognize or change the correspondence address for the application identified in the attached transmittal letter or the boxes above to:

☐ The address associated with the above-mentioned Customer Number

OR

☐ The address associated with Customer Number:

OR

Firm or Individual Name					
Address					
City		State		Zip	
Country					
Telephone		Email			

I am the Applicant (if the Applicant is a juristic entity, list the Applicant name in the box):

Artec Group, Inc.

☐ Inventor or Joint Inventor (title not required below)

☐ Legal Representative of a Deceased or Legally Incapacitated Inventor (title not required below)

☐ Assignee or Person to Whom the Inventor is Under an Obligation to Assign (provide signer's title if applicant is a juristic entity)

☐ Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is concurrently being filed with this document) (provide signer's title if applicant is a juristic entity)

SIGNATURE of Applicant for Patent

The undersigned (whose title is supplied below) is authorized to act on behalf of the applicant (e.g., where the applicant is a juristic entity).

Signature		Date (Optional)	12.03.2014
Name	Andrey Rliesov		
Title	CEO		

NOTE: Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. If more than one applicant, use multiple forms.

☐ Total of forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Shenzhen Jimuyida
Exhibit 1002

PTO/SB/96 (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: Nikolay L. Lapa et al.

Application No./Patent No.: 11/846,494 Filed/Issue Date: August 28, 2007

Titled: SYSTEM AND METHOD FOR THREE-DIMENSIONAL MEASUREMENT OF THE SHAPE OF MATERIAL OBJECTS

Artec Group, Inc. , a Corporation
(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.

states that it is:

1. ☒ the assignee of the entire right, title, and interest in;

2. ☐ an assignee of less than the entire right, title, and interest in (The extent (by percentage) of its ownership interest is _____ %); or

3. ☐ the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)

the patent application/patent identified above, by virtue of either:

A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy therefore is attached.

OR

B. ☒ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: Nikolay L. Lapa et al. To: Artec Ventures

The document was recorded in the United States Patent and Trademark Office at
Reel 019764, Frame 0105, or for which a copy thereof is attached.

2. From: Artec Ventures To: Artec Group, Inc.

The document was recorded in the United States Patent and Trademark Office at
Reel 021437, Frame 0698, or for which a copy thereof is attached.

3. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☒ As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (*i.e.*, a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Allan Z. Litovsky/ March 13, 2014
Signature Date

Allan Z. Litovsky Reg. No.: 40,249 Attorney for Applicant
Printed or Typed Name Title

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Shenzhen Jimuyida
Exhibit 1002

Electronic Acknowledgement Receipt

EFS ID:	18467183
Application Number:	11846494
International Application Number:	
Confirmation Number:	1491
Title of Invention:	SYSTEM AND METHOD FOR THREE-DIMENSIONAL MEASUREMENT OF THE SHAPE OF MATERIAL OBJECTS
First Named Inventor/Applicant Name:	Nikolay L. Lapa
Customer Number:	33717
Filer:	Allan Z. Litovsky/Kajsa Bohman
Filer Authorized By:	Allan Z. Litovsky
Attorney Docket Number:	104098.010300
Receipt Date:	13-MAR-2014
Filing Date:	28-AUG-2007
Time Stamp:	19:22:11
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		103107-0005_POA.pdf	297726 cbcb8b8b7c281b28cd86f89ad187d82cf62024dc	yes	2

Shenzhen Jimuyida
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	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Power of Attorney	1	1
	Assignee showing of ownership per 37 CFR 3.73.	2	2
Warnings:			
Information:			
	Total Files Size (in bytes):	297726	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

<u>New Applications Under 35 U.S.C. 111</u>
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

<u>National Stage of an International Application under 35 U.S.C. 371</u>
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

<u>New International Application Filed with the USPTO as a Receiving Office</u>
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Shenzhen Jimuyida
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PTO/SB/80 (11-08)
Approved for use through 11/30/2011. OMB 0651-0035
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE USPTO

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(b).

I hereby appoint:

☑ Practitioners associated with the Customer Number: 122422

OR

☐ Practitioner(s) named below (if more than ten patent practitioners are to be named, then a customer number must be used):

Name	Registration Number	Name	Registration Number

as attorney(s) or agent(s) to represent the undersigned before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 CFR 3.73(b).

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(b) to:

☑ The address associated with Customer Number: 122422

OR

☐ Firm or Individual Name			
Address			
City		State	Zip
Country			
Telephone		Email	

Assignee Name and Address:

Artec Group, Inc.
125 University Avenue
Palo Alto, CA 94301

A copy of this form, together with a statement under 37 CFR 3.73(b) (Form PTO/SB/96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 CFR 3.73(b) may be completed by one of the practitioners appointed in this form if the appointed practitioner is authorized to act on behalf of the assignee, and must identify the application in which this Power of Attorney is to be filed.

SIGNATURE of Assignee of Record

The individual whose signature and title is supplied below is authorized to act on behalf of the assignee

Signature	KLimov A.V.	Date	17.03.14
Name	Andrey Kimov	Telephone	+7916 251 8233
Title	President		

This collection of information is required by 37 CFR 1.31, 1.32 and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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PTO/SB/96 (07-09)
Approved for use through 07/31/2012. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

STATEMENT UNDER 37 CFR 3.73(b)

Applicant/Patent Owner: Nikolay L. Lapa et al.

Application No./Patent No.: 11/846,494 Filed/Issue Date: August 28, 2007

Titled: SYSTEM AND METHOD FOR THREE-DIMENSIONAL MEASUREMENT OF THE SHAPE OF MATERIAL OBJECTS

Artec Group, Inc. , a Corporation
(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.

states that it is:

1. [X] the assignee of the entire right, title, and interest in;

2. [ ] an assignee of less than the entire right, title, and interest in
(The extent (by percentage) of its ownership interest is _____ %); or

3. [ ] the assignee of an undivided interest in the entirety of (a complete assignment from one of the joint inventors was made)

the patent application/patent identified above, by virtue of either:

A. [ ] An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy therefore is attached.

OR

B. [X] A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: Nikolay L. Lapa et al. To: Artec Ventures

The document was recorded in the United States Patent and Trademark Office at
Reel 019764, Frame 0105, or for which a copy thereof is attached.

2. From: Artec Ventures To: Artec Group, Inc.

The document was recorded in the United States Patent and Trademark Office at
Reel 021437, Frame 0698, or for which a copy thereof is attached.

3. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

[ ] Additional documents in the chain of title are listed on a supplemental sheet(s).

[X] As required by 37 CFR 3.73(b)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (*i.e.*, a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Allan Z. Litovsky/ March 17, 2014
Signature Date

Allan Z. Litovsky Reg. No.: 40,249 Attorney for Applicant
Printed or Typed Name Title

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Shenzhen Jimuyida
Exhibit 1002

Electronic Acknowledgement Receipt

EFS ID:	18492841
Application Number:	11846494
International Application Number:	
Confirmation Number:	1491
Title of Invention:	SYSTEM AND METHOD FOR THREE-DIMENSIONAL MEASUREMENT OF THE SHAPE OF MATERIAL OBJECTS
First Named Inventor/Applicant Name:	Nikolay L. Lapa
Customer Number:	33717
Filer:	Allan Z. Litovsky/Kajsa Bohman
Filer Authorized By:	Allan Z. Litovsky
Attorney Docket Number:	104098.010300
Receipt Date:	17-MAR-2014
Filing Date:	28-AUG-2007
Time Stamp:	16:35:09
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		103107-0005_POA.pdf	223289 4241f2dd007ebc3caa42b87c9d25d3a5e5f368d8	yes	2

Shenzhen Jimuyida
Exhibit 1002

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Power of Attorney	1	1
	Assignee showing of ownership per 37 CFR 3.73.	2	2
Warnings:			
Information:			
	Total Files Size (in bytes):	223289	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/846,494	08/28/2007	Nikolay L. Lapa	

CONFIRMATION NO. 1491

122422
Stradling Yocca Carlson & Rauth, P.C.
660 Newport Center Drive,
Suite 1600
Newport Beach, CA 92660

POA ACCEPTANCE LETTER

OC000000067391785

Date Mailed: 03/27/2014

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 03/17/2014.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

/rmturner myles/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

Shenzhen Jimuyida
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UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/846,494	08/28/2007	Nikolay L. Lapa	104098.010300

CONFIRMATION NO. 1491

33717
GREENBERG TRAURIG LLP (LA)
c/o: Greenberg Traurig LLP Chicago Office
77 West Wacker Drive, Suite 3100
INTELLECTUAL PROPERTY DEPARTMENT
Chicago, IL 60601

POWER OF ATTORNEY NOTICE

OC000000067391755

Date Mailed: 03/27/2014

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 03/17/2014.

- The Power of Attorney to you in this application has been revoked by the assignee who has intervened as provided by 37 CFR 3.71. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

/rmturner myles/

Office of Data Management, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

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Exhibit 1002

PATENT ASSIGNMENT COVER SHEET

Electronic Version v1.1
Stylesheet Version v1.2

EPAS ID: PAT3648691

SUBMISSION TYPE:	NEW ASSIGNMENT
NATURE OF CONVEYANCE:	ASSIGNMENT

CONVEYING PARTY DATA

Name	Execution Date
ARTEC GROUP INC.	04/01/2014

RECEIVING PARTY DATA

Name:	ARTEC EUROPE, S.A.R.L.
Street Address:	2, RUE JEAN ENGLING
City:	LUXEMBOURG
State/Country:	LUXEMBOURG
Postal Code:	L-1466

PROPERTY NUMBERS Total: 4

Property Type	Number
Application Number:	11875709
Application Number:	11854518
Patent Number:	7768656
Patent Number:	8488129

CORRESPONDENCE DATA

Fax Number: (949)725-4100

Correspondence will be sent to the e-mail address first; if that is unsuccessful, it will be sent using a fax number, if provided; if that is unsuccessful, it will be sent via US Mail.

Phone: 949-725-4043
Email: amina@sycr.com
Correspondent Name: ARNOLD V. MINA
Address Line 1: STRADLING YOCCA CARLSON & RAUTH
Address Line 2: 660 NEWPORT CENTER DRIVE, SUITE 1600
Address Line 4: NEWPORT BEACH, CALIFORNIA 92660

ATTORNEY DOCKET NUMBER:	103107-0026
NAME OF SUBMITTER:	ARNOLD V. MINA
SIGNATURE:	/Arnold V. Mina/
DATE SIGNED:	12/08/2015
	This document serves as an Oath/Declaration (37 CFR 1.63).

Total Attachments: 4

Shenzhen Jimuyida
Exhibit 1002

source=Artec-Patent Assignment - US#page1.tif
source=Artec-Patent Assignment - US#page2.tif
source=Artec-Patent Assignment - US#page3.tif
source=Artec-Patent Assignment - US#page4.tif

Shenzhen Jimuyida
Exhibit 1002

CONFIRMATION OF ASSIGNMENT AGREEMENT

THIS CONFIRMATION OF ASSIGNMENT AGREEMENT ("Assignment") shall be deemed effective as of 1st day of April 2014 ("Effective Date") between Artec Group, Inc., a California corporation, with its principal office at 335 Bryant St., Suite 100, Palo Alto, CA 94301 ("Assignor") and Artec Europe, S.a.r.l., a Luxemburg company, with its principal office at 2, rue Jean Engling, Luxemburg L-1466, Luxemburg ("Assignee").

WHEREAS, on April 1, 2014, Assignor and Assignee entered into a Patent Assignment Agreement ("Existing Agreement"), pursuant to which Assignor assigned to Assignee all right, title and interest to certain patents and patent applications, including, but not limited to, Assigned U.S. Patents, as set forth in Schedule A hereto;

WHEREAS, consistent with the Existing Agreement and for the purpose of recordation at the United States Patent and Trademark Office, Assignor wishes to confirm its assignment of all right, title and interest in and to the Assigned U.S. Patents to Assignee; and

WHEREAS, consistent with the Existing Agreement and for the purpose of recordation at the United States Patent and Trademark Office, Assignee wishes to obtain a confirmation of the assignment of all right, title and interest in and to the Assigned U.S. Patents.

NOW, THEREFORE, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, and consistent with the Existing Agreement, Assignor does hereby confirm its sale, assignment, and transfer to Assignee of the entire right, title and interest in and to the entire right, title and interest in and to the Assigned U.S. Patents, for the United States and for all foreign countries, including any continuations, divisions, continuations-in-part, reissues, reexaminations, extensions or foreign equivalents thereof, and including the subject matter of all claims which may be obtained therefrom for its own use and

Shenzhen Jimuyida
Exhibit 1002

enjoyment, and for the use and enjoyment of its successors, assigns or other legal representatives, as fully and entirely as the same would have been held and enjoyed by Assignor if this Assignment and sale had not been made; together with all income, royalties, damages or payments accrued, due or payable as of the Effective Date or thereafter, including, without limitation, all claims for damages by reason of past, present or future infringement or other unauthorized use of the Patents, with the right to sue for, and collect the same for its own use and enjoyment, and for the use and enjoyment of its successors, assigns, or other legal representatives.

Assignor authorizes and requests the Commissioner of the United States Patents and Trademarks to record Assignee as owner of the Assigned U.S. Patents (as set forth in Schedule A hereto), including all continuations, divisions, continuations-in-part, reissues, reexaminations or extensions thereof, and to issue any and all letters patent of the United States thereon to Assignee, as assignee of the entire right, title and interest in, to and under the same, for the sole use and enjoyment of Assignee, its successors, assigns or other legal representatives.

Assignor shall promptly provide Assignee, its successors, assigns or other legal representatives, cooperation and assistance at Assignee's request and expense (including the execution and delivery of any and all affidavits, declarations, oaths, exhibits, assignments, powers of attorney or other documentation as may be reasonably required): (1) in the preparation and prosecution of any applications covering the inventions of the Assigned U.S. Patents; (2) in the prosecution or defense of any interference, opposition, reexamination, reissue, infringement or other proceedings that may arise in connection with any of the patent rights covered by the Assigned U.S. Patents, including, but not limited to, testifying as to any facts relating to the Assigned U.S. Patents; (3) in obtaining any additional patent protection that

Shenzhen Jimuyida
Exhibit 1002

Assignee may deem appropriate which may be secured under the laws now or hereafter in effect in the United States or any other country; and (4) in the implementation or perfection of this Assignment.

IN TESTIMONY WHEREOF, the Assignor and Assignee have caused this Assignment to be signed and executed by the undersigned officers thereunto duly authorized.

ARTEC GROUP, INC.

Name: Artem Yukhin

Title: President

ARTEC EUROPE, S.a.r.l.

Name: Sergey Sukhovey

Title: Manager

Name: Gusev Gleb

Title: Manager

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Exhibit 1002

SCHEDULE A

U.S. ASSIGNED PATENTS

Application or Patent	Title
USPA No. 11/875,709	SYSTEM AND METHOD FOR BIOMETRIC BEHAVIOR CONTEXT-BASED HUMAN RECOGNITION
USPA No. 11/854,518	SYSTEM AND METHOD FOR MULTIFRAME SURFACE MEASUREMENT OF THE SHAPE OF OBJECTS
USP No. 7,768,656	SYSTEM AND METHOD FOR THREE-DIMENSIONAL MEASUREMENT OF THE SHAPE OF MATERIAL OBJECTS
USP No. 8,488,129	COMBINED OBJECT CAPTURING SYSTEM AND DISPLAY DEVICE AND ASSOCIATED METHOD

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UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	PATENT NUMBER	GROUP ART UNIT	REQUEST ID
11/846,494	7768656	2886	20394

PAIR Correspondence Address/Fee Address Change

The following fields have been changed to Customer Number 141985 on 06/27/2016 via Private PAIR in view of the certification copied below that authorized the change.

- Correspondence Address

The address for Customer Number 141985 is:
141985
Allan Litovsky
The Litovsky Law Firm
18685 Main St
#101-181
Huntington Beach, CA 92648

I certify, in accordance with 37 CFR 1.4(d)(4) that I am:

An attorney or Agent of Record registered to practice before the Patent and Trademark Office who has been given power of attorney in this application

Signature:	/Allan Litovsky/
Name:	Allan Litovsky
Registration Number:	40249

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UNITED STATES PATENT AND TRADEMARK OFFICE

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APPLICATION NUMBER	PATENT NUMBER	GROUP ART UNIT	REQUEST ID
11/846,494	7768656	2886	20394

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- Maintenance Fee Address

The address for Customer Number 141985 is:
141985
Allan Litovsky
The Litovsky Law Firm
18685 Main St
#101-181
Huntington Beach, CA 92648

I certify, in accordance with 37 CFR 1.4(d)(4) that I am:

An attorney or Agent of Record registered to practice before the Patent and Trademark Office who has been given power of attorney in this application

Signature:	/Allan Litovsky/
Name:	Allan Litovsky
Registration Number:	40249

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POWER OF ATTORNEY TO PROSECUTE APPLICATIONS BEFORE THE UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

I hereby revoke all previous powers of attorney given in the application identified in the attached statement under 37 CFR 3.73(c).

I hereby appoint the practitioners of Morgan, Lewis & Bockius LLP, Customer Number **24341** as attorneys or agents to represent the undersigned and to transact all business before the United States Patent and Trademark Office (USPTO) in connection with any and all patent applications and patents assigned only to the undersigned according to the USPTO assignment records or assignment documents attached to this form in accordance with 37 C.F.R. § 3.73(c), said appointment to be to the exclusion of the inventor(s) and their attorney(s) in accordance with the provisions of 37 C.F.R. § 3.71, provided that, if any one of these attorneys ceases being affiliated with the law firm of Morgan, Lewis & Bockius LLP as partner, counsel, or employee, then the appointment of that attorney and all powers derived therefrom shall terminate on the date such attorney ceases being so affiliated.

Please change the correspondence address for the application identified in the attached statement under 37 CFR 3.73(c) to the address associated with Customer Number **24341**.

Assignee Name and Address: **ARTEC EUROPE S.à r.l.**
2, rue Jean Engling
Luxembourg L-1466
Luxembourg

SIGNATURE of Assignee of Record
The undersigned whose signature and title is supplied below is authorized to act on behalf of the assignee.

Signature _____

Name Sergey Sukhoveev Date 05-Sep-2018

Title CEO Telephone +352. 621.195.902

A copy of this form, together with a statement under 37 C.F.R. § 3.73(c) (Form PTO/SB96 or equivalent) is required to be filed in each application in which this form is used. The statement under 37 C.F.R. § 3.73(c) may be completed by one of the practitioners appointed in this form if the appointed practitioner is authorized to act on behalf of the assignee and must identify the application in which this Power of Attorney is to be filed.

DB2/ 35066777.1

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Electronic Acknowledgement Receipt

EFS ID:	41075262
Application Number:	11846494
International Application Number:	
Confirmation Number:	1491
Title of Invention:	SYSTEM AND METHOD FOR THREE-DIMENSIONAL MEASUREMENT OF THE SHAPE OF MATERIAL OBJECTS
First Named Inventor/Applicant Name:	Nikolay L. Lapa
Customer Number:	141985
Filer:	David P. Bernstein
Filer Authorized By:	
Attorney Docket Number:	103107-0005
Receipt Date:	09-NOV-2020
Filing Date:	28-AUG-2007
Time Stamp:	18:15:27
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Assignee showing of ownership per 37 CFR 3.73	119980-5003-US_Statement373c.pdf	90916 501cbf5a634f412ca0968d0d6aca40088b0e3cfd	no	1

Warnings:

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Information:					
2	Power of Attorney	119980_Artec_POA.pdf	108209 23578aefacd45f83f784fba2ef9980a1288e12de	no	1
Warnings:					
Information:					
			Total Files Size (in bytes):	199125	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Shenzhen Jimuyida
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Electronically filed November 9, 2020

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of:	Nikolay Lapa et al.	Application No.:	11/846,494
Patent No.:	7,768,656	Filed:	August 28, 2007
Issued:	August 3, 2010	Art Unit	2886
Confirmation No.:	1491	Examiner:	Michael P. LAPAGE
For:	*SYSTEM AND METHOD FOR THREE-DIMENSIONAL MEASUREMENT OF THE SHAPE OF MATERIAL OBJECTS*	Attorney Docket No.:	119980-5003-US

STATEMENT UNDER 37 C.F.R. § 3.73(c)

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

ARTEC EUROPE S.À R.L., a corporation, states that it is the assignee of the entire right, title and interest in the parent of the patent application identified above by virtue of an assignment from the inventor(s) of the patent application/patent identified above:

1.	From:	Inventors				
	To:	ARTEC VENTURES				
	Recorded:	08/29/2007	Reel:	19764	Frame:	105
2.	From:	ARTEC VENTURES				
	To:	ARTEC GROUP, INC.				
	Recorded:	08/25/2008	Reel:	21437	Frame:	698
3.	From:	ARTEC GROUP, INC.				
	To:	ARTEC EUROPE S.À R.L.				
	Recorded:	12/08/2015	Reel:	37240	Frame:	823

The undersigned is authorized to act on behalf of the assignee.

Date: November 9, 2020

/David P. Bernstein/ 71,064

David P. Bernstein (Reg. No.)
MORGAN, LEWIS & BOCKIUS LLP
1400 Page Mill Road
Palo Alto, CA 94304
(650) 843-4000

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www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/846,494	08/28/2007	Nikolay L. Lapa	103107-0005

CONFIRMATION NO. 1491

POWER OF ATTORNEY NOTICE

141985
Allan Litovsky
The Litovsky Law Firm
18685 Main St
#101-181
Huntington Beach, CA 92648

OC000000121374068

Date Mailed: 11/18/2020

NOTICE REGARDING CHANGE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 11/09/2020.

- The Power of Attorney to you in this application has been revoked by the applicant. Future correspondence will be mailed to the new address of record(37 CFR 1.33).

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/nbekele/

Shenzhen Jimuyida
Exhibit 1002

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United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
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www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
11/846,494	08/28/2007	Nikolay L. Lapa	103107-0005

CONFIRMATION NO. 1491

24341
Morgan, Lewis & Bockius LLP (PA)
1400 Page Mill Road
Palo Alto, CA 94304-1124

POA ACCEPTANCE LETTER

OC000000121374104

Date Mailed: 11/18/2020

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 11/09/2020.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/nbekele/

Shenzhen Jimuyida
Exhibit 1002