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(54) Title: DIRECTIONAL OPTICAL RECEIVER

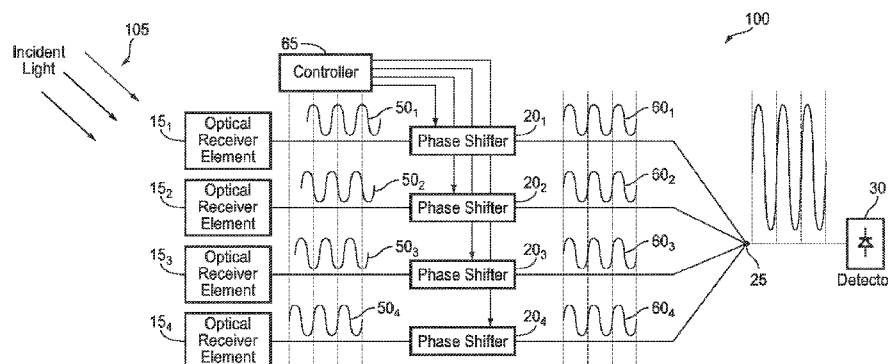


FIG. 1

(57) Abstract: An optical phased array (OPA) receiver selectively detects, measures and differentiates between the amplitudes and directions of signals received from different directions. Because the OPA changes the direction that it looks toward electronically and without the use of any mechanical movements, the OPA is fast, has an enhanced sensitivity, and can be used in a wide variety of applications, such as lens-free imaging systems. The OPA is adapted to dynamically control the array of optical elements and focus on the area of interest. The OPA achieves a higher numerical aperture compared to imaging systems that use conventional lens, thereby effectively maintaining a relatively large field of view and collection area concurrently. The OPA may be readily scaled by increasing its array size. Furthermore, because the OPA is relatively flat, it is ideally suited for small form factor applications such as cell phones and tablets.



**A. CLASSIFICATION OF SUBJECT MATTER****H04B 10/69(2013.01)**

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)

H04B 10/69; G06K 9/36; H04N 5/225; G01J 1/20; G02B 26/10; H04B 10/548; G02B 27/00; H01L 27/10; H04N 3/14

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

Japanese utility models and applications for utility models

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

eKOMPASS(KIPO internal) &amp; Keywords: object image, phase-shifted optical signals, in phase, reference optical signal, optical-to-electrical signal converter, electrical signal

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2010-0141829 A1 (BAHRAM JALALI et al.) 10 June 2010 See paragraphs [0036]-[0038], [0099]-[0115]; claim 1; and figures 1-5, 8-9.	1-40
A	US 2013-0322892 A1 (CALIFORNIA INSTITUTE OF TECHNOLOGY) 05 December 2013 See paragraphs [0003], [0015]-[0019], [0031]-[0036]; claims 1, 16, 21-22; and figures 1-2A.	1-40
A	WO 2014-031797 A1 (C URCHIN TECHNOLOGIES LLC) 27 February 2014 See page 4, line 11 - page 6, line 15; and figures 1-2B.	1-40
A	US 2008-0225144 A1 (RICHARD A. MAURITZSON) 18 September 2008 See paragraphs [0018]-[0019], [0063]-[0065]; claim 1 and figure 9.	1-40
A	US 5093563 A (JAMES G. SMALL et al.) 03 March 1992 See column 4, line 21 - column 6, line 28, column 14, lines 8-34; and figure 4.	1-40

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

\* Special categories of cited documents:

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Name and mailing address of the ISA/KR

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**INTERNATIONAL SEARCH REPORT**

Information on patent family members

International application No.

**PCT/US2015/029110**

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2010-0141829 A1	10/06/2010	US 2014-0313310 A1 US 8440952 B2 US 8987649 B2	23/10/2014 14/05/2013 24/03/2015
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US 5093563 A	03/03/1992	None	