

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau

(43) International Publication Date
24 May 2018 (24.05.2018)



(10) International Publication Number
WO 2018/093613 A1

(51) International Patent Classification:
G01S 7/487 (2006.01) *G05D 1/02* (2006.01)
G01S 17/93 (2006.01)

(21) International Application Number:
PCT/US2017/060438

(22) International Filing Date:
07 November 2017 (07.11.2017)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
15/352,717 16 November 2016 (16.11.2016) US

(71) Applicant: **WAYMO LLC** [US/US]; 1600 Amphitheatre
Parkway, Mountain View, CA 94043 (US).

(72) Inventors: **VERGHESE, Simon**; Waymo LLC, 1600 Amphitheatre Parkway, Mountain View, CA 94043 (US). **DROZ, Pierre-yves**; Waymo LLC, 1600 Amphitheatre Parkway, Mountain View, CA 94043 (US). **SHAND, Mark**; Waymo LLC, 1600 Amphitheatre Parkway, Mountain View, CA 94043 (US).

(74) Agent: **KRASNIANSKY, Michael**; McDonnell Boehnen Hulbert & Berghoff LLP, 300 South Wacker Drive, Chicago, IL 60606 (US).

(81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ,

(54) Title: METHODS AND SYSTEMS FOR PROTECTING A LIGHT DETECTION AND RANGING (LIDAR) DEVICE

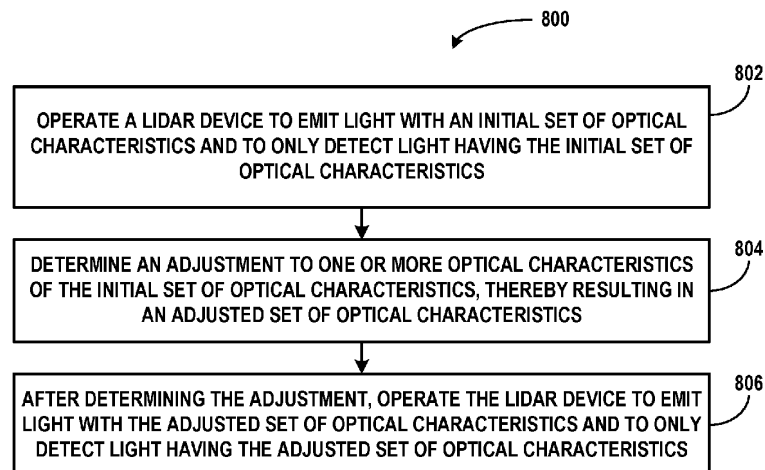


FIG. 8

(57) Abstract: Described herein are methods and systems for protecting a light detection and ranging (LIDAR) device against external light that is originated at a light source other than a light source of the LIDAR device and that is being emitted towards the LIDAR device. In particular, the LIDAR device may be equipped with a mitigation system that includes an interference filter, an absorptive filter, an adaptive filter, and/or a spatial filter. Additionally or alternatively, the LIDAR device may be operated to carry out reactive and/or proactive mitigation operations. For example, the LIDAR device may be operated to vary over time characteristics with which light is being emitted and to only detect light having characteristics that match the characteristics with which light is being emitted. In another example, the LIDAR device may be operated to activate a shutter to block the external light from being detected by the LIDAR device.

[Continued on next page]

WO 2018/093613 A1

OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

— with international search report (Art. 21(3))