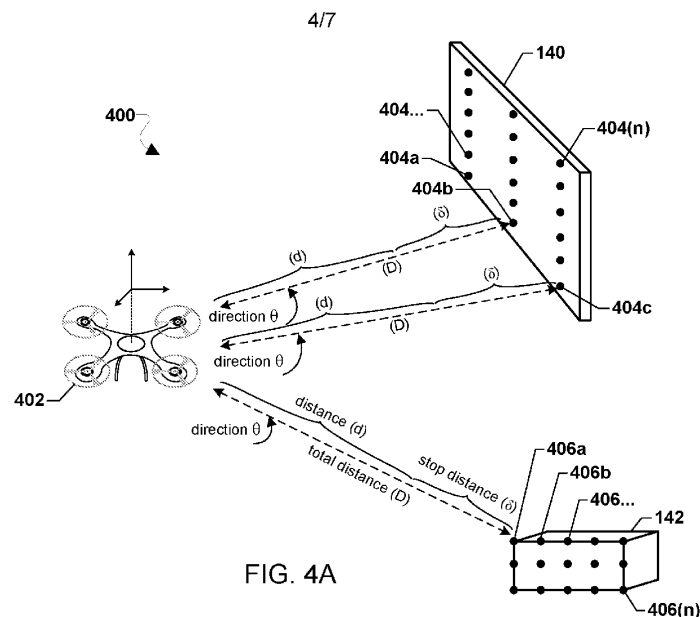




- (51) International Patent Classification:
G05D 1/02 (2006.01) **G05D 1/10** (2006.01)
- (21) International Application Number:
PCT/US2017/054291
- (22) International Filing Date:
29 September 2017 (29.09.2017)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
62/421,551 14 November 2016 (14.11.2016) US
15/607,975 30 May 2017 (30.05.2017) US
- (71) Applicant: **QUALCOMM INCORPORATED** [US/US];
ATTN: International IP Administration, 5775 Morehouse
Drive, San Diego, California 92121-1714 (US).
- (72) Inventors: **TURPIN, Matthew Hyatt**; 5775 Morehouse
Drive, San Diego, California 92121-1714 (US). **CHAVES,
Stephen Marc**; 5775 Morehouse Drive, San Diego, Cali-
fornia 92121-1714 (US).
- (74) Agent: **HANSEN, ROBERT M.** et al.; The Marbury Law
Group, PLLC, 11800 Sunrise Valley Drive 15th Floor, Re-
ston, Virginia 20191 (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,
OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA,

(54) Title: VEHICLE COLLISION AVOIDANCE



(57) Abstract: Embodiments include devices and methods for vehicle collision avoidance. A processor of the vehicle may receive sensor data comprising one or more points. The processor may determine a distance and a direction from the vehicle to the one or more points. The processor may determine a velocity constraint for each of the one or more points based on the determined distance and direction from the vehicle to the one or more points. Based on a navigation instruction, the processor may determine one or more velocity solutions that satisfy the one or more velocity constraints. The processor may select a velocity solution from the determined one or more velocity solutions based on the navigation instruction, and may adjust a vehicle velocity based on the selected velocity solution.

[Continued on next page]

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).

Declarations under Rule 4.17:

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

Published:

- *with international search report (Art. 21(3))*