



(12) **CORRECTED EUROPEAN PATENT SPECIFICATION**

(15) Correction information:
Corrected version no 1 (W1 B1)
Corrections, see
Bibliography INID code(s) 73

(48) Corrigendum issued on:
02.10.2024 Bulletin 2024/40

(45) Date of publication and mention
of the grant of the patent:
21.08.2024 Bulletin 2024/34

(21) Application number: **21207642.6**

(22) Date of filing: **14.03.2018**

(51) International Patent Classification (IPC):
G05D 1/00 ^(2024.01) **B66F 9/00** ^(2006.01)
G01C 21/00 ^(2006.01) **B66F 9/075** ^(2006.01)
G01C 21/20 ^(2006.01) **G06V 20/56** ^(2022.01)
G06V 20/10 ^(2022.01) **B66F 9/06** ^(2006.01)
G06V 30/196 ^(2022.01)

(52) Cooperative Patent Classification (CPC):
G05D 1/0234; B66F 9/063; B66F 9/0755;
G01C 21/20; G01C 21/206; G05D 1/0268;
G05D 1/0274; G06V 20/10; G06V 20/56;
G06V 30/1988

(54) **METHOD AND CONTROL SYSTEM FOR SIMULTANEOUS LOCALIZATION AND CALIBRATION**

VERFAHREN UND STEUERUNGSSYSTEM ZUR GLEICHZEITIGEN LOKALISIERUNG UND KALIBRATION

PROCÉDÉ ET SYSTÈME INFORMATISÉ DE LOCALISATION ET D'ÉTALONNAGE SIMULTANÉS

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR

(30) Priority: **21.04.2017 US 201762488639 P**
09.10.2017 US 201715727726

(43) Date of publication of application:
22.06.2022 Bulletin 2022/25

(62) Document number(s) of the earlier application(s) in
accordance with Art. 76 EPC:
18715854.8 / 3 590 016

(73) Proprietor: **Google LLC**
Mountain View, CA 94043 (US)

(72) Inventors:
• **HOLZ, Dirk**
Mountain View 94043 (US)
• **STRASZHEIM, Troy**
Mountain View 94043 (US)

(74) Representative: **Chettle, John Edward et al**
Venner Shipley LLP
200 Aldersgate
London EC1A 4HD (GB)

(56) References cited:
• **RAINER KÜMMERLE ET AL: "Simultaneous Parameter Calibration, Localization, and Mapping", ADVANCED ROBOTICS, vol. 26, no. 17, 13 September 2012 (2012-09-13), NL, pages 2021 - 2041, XP055475511, ISSN: 0169-1864, DOI: 10.1080/01691864.2012.728694**
• **KELLY J ET AL: "Visual-inertial simultaneous localization, mapping and sensor-to-sensor self-calibration", COMPUTATIONAL INTELLIGENCE IN ROBOTICS AND AUTOMATION (CIRA), 2009 IEEE INTERNATIONAL SYMPOSIUM ON, IEEE, PISCATAWAY, NJ, USA, 15 December 2009 (2009-12-15), pages 360 - 368, XP031643806, ISBN: 978-1-4244-4808-1**

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

- CENSI A ET AL: "Simultaneous maximum-likelihood calibration of odometry and sensor parameters", 2008 IEEE INTERNATIONAL CONFERENCE ON ROBOTICS AND AUTOMATION. THE HALF-DAY WORKSHOP ON: TOWARDS AUTONOMOUS AGRICULTURE OF TOMORROW; PASADENA, CA, USA, MAY 19-23, 2008, IEEE, PISCATAWAY, NJ, USA, 19 May 2008 (2008-05-19), pages 2098 - 2103, XP031340460, ISBN: 978-1-4244-1646-2