

(51) International Patent Classification:
G01N 29/24 (2006.01)(21) International Application Number:
PCT/US2009/038309(22) International Filing Date:
26 March 2009 (26.03.2009)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
61/040,415 28 March 2008 (28.03.2008) US
12/202,016 29 August 2008 (29.08.2008) US(71) Applicant (for all designated States except US): **LOCKHEED MARTIN CORPORATION** [US/US]; 6801 Rockledge Drive, Bethesda, MD 20817 (US).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **MILLER, James** [US/US]; 8 Bonneau Road, Clifton Park, NY (US). **TURNER, Wesley** [US/US]; 18 Blue Jay Way, Rexford, NY (US). **LORENSEN, William** [US/US]; 14 Hearthside Drive, Ballston Park, NY (US).(74) Agent: **BISIGNANO, Denver, S.**; Bracewell & Giuliani LLP, 711 Louisiana Street, Suite 2300, Houston, TX 77002-2770 (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, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, 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, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (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, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report (Art. 21(3))
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))

(54) Title: SYSTEM, PROGRAM PRODUCT, AND RELATED METHODS FOR REGISTERING THREE-DIMENSIONAL MODELS TO POINT DATA REPRESENTING THE POSE OF A PART

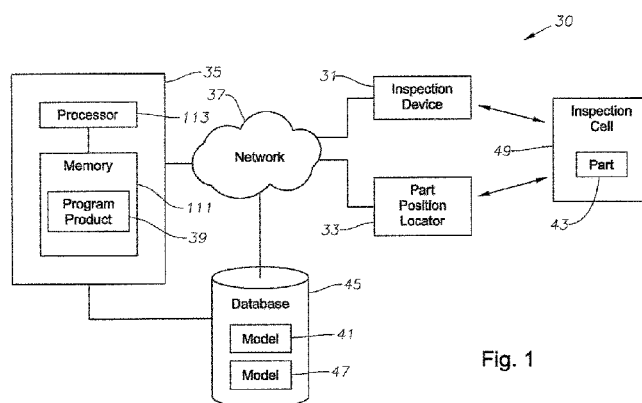


Fig. 1

(57) Abstract: A system (30), program product (39), and method to perform automated three-dimensional image registration of a part (43) within an inspection cell (49), are provided. The system (30) can include a laser-ultrasound inspection device (31) having a scanning head (61) to generate ultrasonic surface displacements in a part (43), an inspection laser (55), and an interferometer (59) to collect phase modulated light reflected by the part (43). The system (30) can also include a part position locator (33) positioned to measure a distance between points on a surface of the part (43) and a scanning laser reference location. The system (30) can also include a database (45) containing computer-aided design models (41) for each part (43) of interest, and a model (47) of the inspection cell (49). The system (30) can further include a laser ultrasound inspection computer (35) communication with the laser-ultrasound inspection device (31) and the part position locator (33), and laser ultrasound inspection program product (39) adapted to perform automated three-dimensional image registration of the part (43).