

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
24 August 2006 (24.08.2006)

PCT

(10) International Publication Number
WO 2006/089037 A3

- (51) International Patent Classification:
B23K 26/00 (2006.01) *G06F 19/00* (2006.01)
- (21) International Application Number:
PCT/US2006/005499
- (22) International Filing Date:
15 February 2006 (15.02.2006)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
11/059,025 15 February 2005 (15.02.2005) US
- (71) Applicant (for all designated States except US): **ELECTRO SCIENTIFIC INDUSTRIES, INC.** [US/US]; 13900 Nw Science Park Drive, Portland, Oregon 97229-5497 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **SWARINGEN, Stephen, Neal** [US/US]; 2065 Club Lake Circle, Rockwall, Texas 75087 (US). **BRULAND, Kelly** [US/US]; 85 Sw 102nd Avenue, Portland, Oregon 97225 (US). **WELLS, Andrew** [US/US]; 3104 Ne 34th Avenue, Portland, Oregon 97212 (US).
- (74) Agent: **ANGELLO, Paul, S.**; Stoel Rives, LLP, 900 S.W. Fifth Avenue, Suite 2600, Portland, Oregon 97204 (US).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

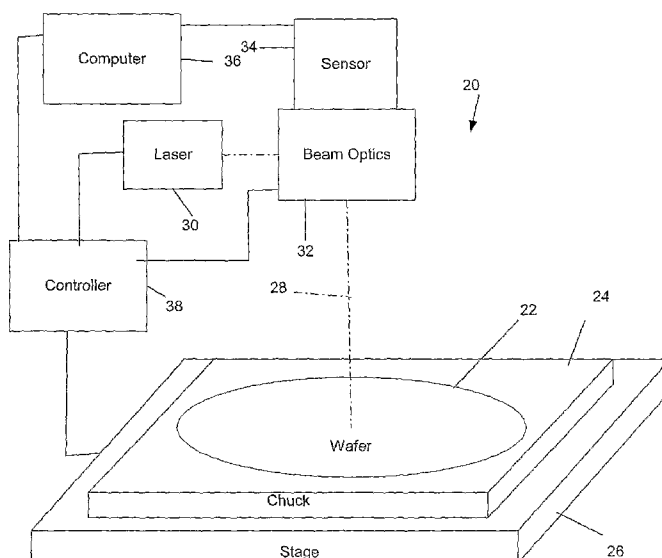
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, 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
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

[Continued on next page]

(54) Title: METHOD FOR CORRECTING SYSTEMATIC ERRORS IN A LASER PROCESSING SYSTEM



(57) Abstract: A method for calibrating a laser micro-machining system (20) in three dimensions includes scanning (70) a sample workpiece (22) to determine the 3D surface, calculating (72, 74, 76, 78, 80, 82) the best fit surfaces to the scanned data in a series of steps, and storing (84) the results so that subsequent workpieces can be calibrated to remove systematic errors introduced by variations in an associated material handling subsystem. The method optionally uses plate bending theory to model particulate contamination and splines to fit the 3D surface in a piecewise fashion to minimize the effect of local variations on the entire surface fit.



(88) Date of publication of the international search report:

5 April 2007

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.