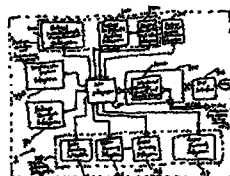




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<p>(21) International Application Number: PCT/US99/06505</p> <p>(22) International Filing Date: 24 March 1999 (24.03.99)</p> <p>(30) Priority Data:</p> <table border="0"> <tr> <td>09/047,146</td> <td>24 March 1998 (24.03.98)</td> <td>US</td> </tr> <tr> <td>09/157,778</td> <td>21 September 1998 (21.09.98)</td> <td>US</td> </tr> <tr> <td>09/274,265</td> <td>22 March 1999 (22.03.99)</td> <td>US</td> </tr> </table> <p>(63) Related by Continuation (CON) or Continuation-in-Part (CIP) to Earlier Applications</p> <table border="0"> <tr> <td>US</td> <td>09/157,778 (CIP)</td> </tr> <tr> <td>Filed on</td> <td>21 September 1998 (21.09.98)</td> </tr> <tr> <td>US</td> <td>09/047,146 (CIP)</td> </tr> <tr> <td>Filed on</td> <td>24 March 1998 (24.03.98)</td> </tr> </table> <p>(71) Applicant (for all designated States except US): METRO-LOGIC INSTRUMENTS, INC. [US/US]; 90 Coles Road, Blackwood, NJ 08012 (US).</p> <p>(72) Inventors; and</p> <p>(75) Inventors/Applicants (for US only): GOOD, Timothy, A. [US/US]; 1501 Little Gloucester Road, D-17, Blackwood, NJ 08012 (US). ZHU, Xiaoxun [CN/US]; Apartment 1608, 834 Chestnut Street, Philadelphia, PA 19107 (US). WILZ,</p>		09/047,146	24 March 1998 (24.03.98)	US	09/157,778	21 September 1998 (21.09.98)	US	09/274,265	22 March 1999 (22.03.99)	US	US	09/157,778 (CIP)	Filed on	21 September 1998 (21.09.98)	US	09/047,146 (CIP)	Filed on	24 March 1998 (24.03.98)	<p>David, M. [US/US]; 10 Union Way, Sewell, NJ 08080 (US). ROCKSTEIN, George, B. [US/US]; 210 Princeton Road, Audobon, NJ 08106 (US). COLAVITO, Stephen, J. [US/US]; 3520 Edgewater Lane, Brookhaven, PA 19015 (US). BLAKE, Robert, E. [US/US]; 762 Fairview Avenue, Woodbury Heights, NJ 08097 (US). AU, Ka, Man [US/US]; 1224 Devereaux Avenue, Philadelphia, PA 19111 (US). GHOSH, Sankar [IN/US]; 10955-2 East Keswick Road, Philadelphia, PA 19154 (US). KOLIS, George [US/US]; 5037 Jackson Avenue, Pennsauken, NJ 08110 (US). SCOTT, Ian, A. [GB/US]; 505 Homestead Avenue, Haddonfield, NJ 08022 (US). AMUNDSEN, Thomas [US/US]; 620 Glen Court, Turnersville, NJ 08012 (US). GERMAINE, Gennady [US/US]; 1805 The Woods II, Cherry Hill, NJ 08033 (US). DEHENNIS, Andrew, D. [US/US]; 7615 Front Street, Cheltenham, PA 19012 (US). DICKSON, Leroy [US/US]; 16035 Caputo Drive - Unit B, Morgan Hill, CA 95037 (US). KNOWLES, Carl, Harry [US/US]; 425 East Linden Street, Moorestown, NJ 08057 (US).</p> <p>(74) Agent: PERKOWSKI, Thomas, J.; Thomas J. Perkowski, Esq., P.C., Soundview Plaza, 1266 East Main Street, Stamford, CT 06902 (US).</p> <p>(81) Designated States: AL, AM, AT, AT (Utility model), AU (Petty patent), AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, CZ (Utility model), DE, DE (Utility model), DK, DK (Utility model), EE, EE (Utility model), ES, FI, FI (Utility model), GB, GE, GH, GM, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK (Utility model), SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).</p> <p>Published With international search report.</p>
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(54) Title: AUTOMATED SYSTEM AND METHOD FOR IDENTIFYING AND MEASURING PACKAGES TRANSPORTED THROUGH A LASER SCANNING TUNNEL



(57) Abstract

A fully automated package identification and measuring system, in which omni-directional laser scanning systems (10, 101, 107) are used to read bar codes on packages entering the tunnel, while a package dimensioning subsystem (600) is used to capture information about the package prior to entry into the tunnel. Mathematical models are created on a real-time basis for the geometry of the package and the position of the laser scanning beam used to read the bar code thereon. The mathematical models are analyzed to determine if collected and queued package identification data is spatially and/or temporally correlated with package measurement data using vector-based ray-tracing methods, homogeneous transformations, and object-oriented decision logic so as to enable simultaneous tracking of multiple packages being transported through the scanning tunnel.