

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
10 August 2006 (10.08.2006)

PCT

(10) International Publication Number
WO 2006/083297 A3

- (51) International Patent Classification:
G06K 9/00 (2006.01)
- (21) International Application Number:
PCT/US2005/020748
- (22) International Filing Date: 10 June 2005 (10.06.2005)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
60/578,734 10 June 2004 (10.06.2004) US
- (71) Applicant (for all designated States except US):
SARNOFF CORPORATION [US/US]; 201 Wash-
ington Road, Princeton, New Jersey 08540 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **ZHAO, Wenyi**
[CN/US]; 196 Matlook Place, Somerset, New Jersey
08873 (US). **NISTER, David** [SE/US]; 2268 Camberling
Drive, Lexington, Kentucky 08536 (US). **HSU, Stephen,**
Charles [US/US]; 1134 County Mill Drive, Cranbury,
New Jersey 08512 (US).
- (74) Agent: **MOSER, Raymond, R.**; Moser IP Law Group,
1040 Broad Street, 2nd Floor, Shrewsbury, NJ 07702 (US).

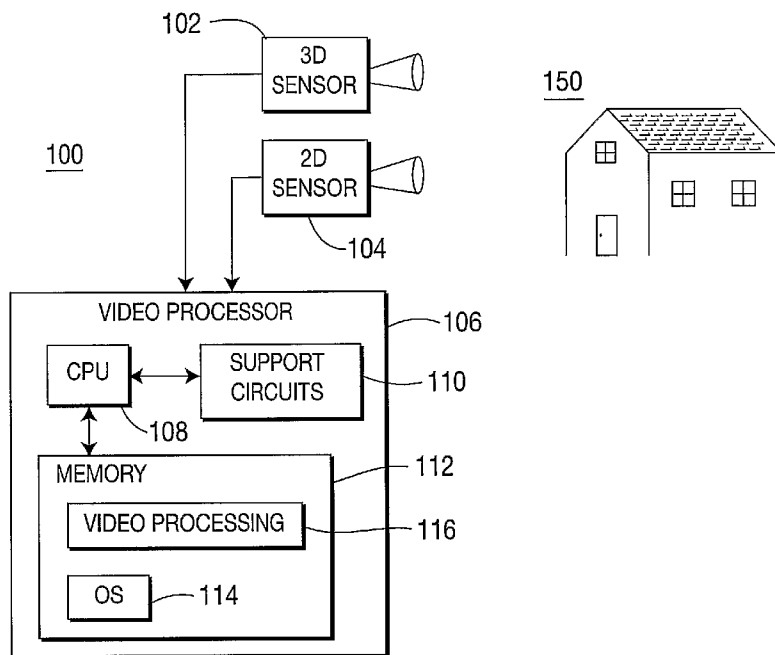
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, 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, 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

(88) Date of publication of the international search report:
25 January 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.

(54) Title: METHOD AND APPARATUS FOR ALIGNING VIDEO TO THREE-DIMENSIONAL POINT CLOUDS



(57) Abstract: A method and apparatus for performing two-dimensional video alignment onto three-dimensional point clouds. The system recovers camera pose from camera video, determines a depth map, converts the depth map to a Euclidean video point cloud, and registers two-dimensional video to the three-dimensional point clouds.

WO 2006/083297 A3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US05/20748

A. CLASSIFICATION OF SUBJECT MATTER

IPC: G06K 9/00(2006.01)

USPC: 382/154

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 382/154

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EAST, IEEE

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 6,639,594 B2 (ZHANG et al) 28 October 2003 (28.10.2003), all.	1-10
A	US 5,963,664 A (KUMAR et al.) 5 October 1999 (05.10.1999), all.	1-10

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents:	
"A" document defining the general state of the art which is not considered to be of particular relevance	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"E" earlier application or patent published on or after the international filing date	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search
24 June 2006 (24.06.2006)

Date of mailing of the international search report

27 JUL 2006

Name and mailing address of the ISA/US
Mail Stop PCT, Attn: ISA/US
Commissioner of Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Authorized officer

Sherali Ishrat

Telephone No. 571-272-7398

Facsimile No. (571) 273-3201