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[Continued on next page]

(54) Title: PASSIVE ELECTRO-OPTICAL TRACKER

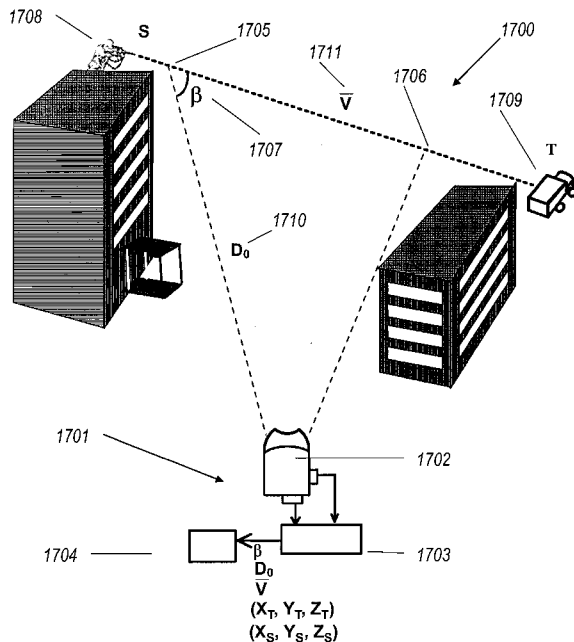


FIG. 17

(57) Abstract: A passive electro-optical tracker uses a two-band IR intensity ratio to discriminate high-speed projectiles and obtain a speed estimate from their temperature, as well as determining the trajectory back to the source of fire. In an omnidirectional system a hemispheric imager with an MWIR spectrum splitter forms two CCD images of the environment. Three methods are given to determine the azimuth and range of a projectile, one for clear atmospheric conditions and two for nonhomogeneous atmospheric conditions. The first approach uses the relative intensity of the image of the projectile on the pixels of a CCD camera to determine the azimuthal angle of trajectory with respect to the ground, and its range. The second calculates this angle using a different algorithm. The third uses a least squares optimization over multiple frames based on a triangle representation of the smeared image to yield a real-time trajectory estimate.



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PCT/US2010/024877**A. CLASSIFICATION OF SUBJECT MATTER***F41G 3/16(2006.01)i, F41G 3/06(2006.01)i, F41G 7/20(2006.01)i, G01S 1/70(2006.01)i, G01S 3/00(2006.01)i*

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)

F41G 3/16; H04N 7/18; B64C 13/18; F41G 7/22

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

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

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

eKOMPASS(KIPO internal) & Keywords: tracking, temperature, hot, speed, velocity, infrared, image, camera, omnidirectional

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|-----------|--|-----------------------|
| A | 1999 IEEE Computer Society Conference on Computer Vision and Pattern Recognition SHREE K. NAYAR, VENKATA PERI, `Folded Catadioptric Cameras`, p217-p223 See Abstract; figure 2. | 1-20 |
| A | KR 10-0663483 B1 (Samsung Electronics Co., Ltd.) 02 January 2007 See Abstract; claims 1-32; figures 1-7. | 1-20 |
| A | KR 20-0240864 Y1 (BEK Engineering Co., Ltd.) 12 October 2001 See Abstract; claim 1; figure 3. | 1-20 |
| A | JP 08-075396 A (TECH RES & DEV INST OF JAPAN DEF AGENCY) 19 March 1996 See Abstract. | 1-20 |

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|--|------------------|-------------------------|------------------|
| KR 10-0663483 B1 | 02.01.2007 | US 2007-0035617 A1 | 15.02.2007 |
| KR 20-0240864 Y1 | 12.10.2001 | None | |
| JP 08-075396 A | 19.03.1996 | JP 2782580 B2 | 06.08.1998 |