



[Volume XXXIX-B1](#)

Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci., XXXIX-B1, 503-508, 2012  
www.int-arch-photogramm-remote-sens-spatial-inf-sci.net/XXXIX-B1/503/2012/  
doi: 10.5194/isprsarchives-XXXIX-B1-503-2012  
© Author(s) 2012. This work is distributed  
under the Creative Commons Attribution 3.0 License.

## A LOCATION-TRACKING TESTBED USING VISION-ASSISTED SCHEME FOR WIRELESS SENSOR NETWORKS

F. Tsai<sup>1,2</sup>, Y. S. Chiou<sup>1</sup>, and H. Chang<sup>2</sup>

<sup>1</sup>Center for Space and Remote Sensing Research, National Central University, Zhongda Rd., Zhongli, Taiwan

<sup>2</sup>Department of Civil Engineering, National Central University, Zhongda Rd., Zhongli, Taiwan

**Keywords:** Alpha-Beta Filtering, Kalman Filtering, Location Tracking, Normalized Cross Correlation, WSN

**Abstract.** This paper presents the performance of an efficient location tracking algorithm based on Alpha-Beta ( $\alpha$ - $\beta$ ) filtering with vision-assisted in a wireless sensor network (WSN) environment. With a vision-assisted calibration technique based on normalized cross-correlation scheme, the proposed approach is an accuracy enhancement procedure that effectively removes system errors causing uncertainty in measuring a dynamic environment. That is, using the vision-assisted approach to estimate the locations of the reference nodes as landmarks, an  $\alpha$ - $\beta$  tracking scheme with the landmark information can calibrate the location estimation and improve the corner effect. The experimental results demonstrate that the proposed location-tracking algorithm combining vision-assisted scheme with  $\alpha$ - $\beta$  filtering approach can achieve an accurate location very close to the traditional Kalman filtering (KF) algorithm in a ZigBee positioning platform. As compared with the KF-based approach, the proposed tracking approach can avoid repeatedly calculating the Kalman gain and achieve reasonably good performance with much lower computational complexity.

[Conference Paper](#) (PDF, 635 KB)

Citation: Tsai, F., Chiou, Y. S., and Chang, H.: A LOCATION-TRACKING TESTBED USING VISION-ASSISTED SCHEME FOR WIRELESS SENSOR NETWORKS, Int. Arch. Photogramm. Remote Sens. Spatial Inf. Sci., XXXIX-B1, 503-508, doi: 10.5194/isprsarchives-XXXIX-B1-503-2012, 2012.

[Bibtex](#) [EndNote](#) [Reference Manager](#) [XML](#)

