



DECLARATION OF GORDON MACPHERSON

I, Gordon MacPherson, am over twenty-one (21) years of age. I have never been convicted of a felony, and I am fully competent to make this declaration. I declare the following to be true to the best of my knowledge, information and belief:

1. I am Director Board Governance & IP Operations of The Institute of Electrical and Electronics Engineers, Incorporated (“IEEE”).
2. IEEE is a neutral third party in this dispute.
3. I am not being compensated for this declaration and IEEE is only being reimbursed for the cost of the article I am certifying.
4. Among my responsibilities as Director Board Governance & IP Operations, I act as a custodian of certain records for IEEE.
5. I make this declaration based on my personal knowledge and information contained in the business records of IEEE.
6. As part of its ordinary course of business, IEEE publishes and makes available technical articles and standards. These publications are made available for public download through the IEEE digital library, IEEE Xplore.
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8. The article below has been attached as Exhibit A to this declaration:

A.	D. Zetu, et al, “Extended-range hybrid tracker and applications to motion and camera tracking in manufacturing systems”, IEEE Transactions on Robotics and Automation, Vol. 16, Issue 3, June 2000.
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9. I obtained a copy of Exhibit A through IEEE Xplore, where it is maintained in the ordinary course of IEEE’s business. Exhibit A is a true and correct copy of the Exhibit, as it existed on or about December 29, 2021.
10. The article and abstract from IEEE Xplore show the date of publication. IEEE Xplore populates this information using the metadata associated with the publication.

11. D. Zetu, et al, "Extended-range hybrid tracker and applications to motion and camera tracking in manufacturing systems" was published IEEE Transactions on Robotics and Automation, Vol. 16, Issue 3. IEEE Transactions on Robotics and Automation, Vol. 16, Issue 3 was published in June 2000. Copies of this publication was made available no later than the last day of the publication month. The article is currently available for public download from the IEEE digital library, IEEE Xplore.
12. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under 18 U.S.C. § 1001.

I declare under penalty of perjury that the foregoing statements are true and correct.

Executed on: 1/6/2022

DocuSigned by:
Gordon MacPherson
E768DB210F4E4EF...

EXHIBIT A



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Extended-range hybrid tracker and applications to motion and camera tracking in manufacturing systems

Publisher: IEEE

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Abstract:

Extended- or long-range tracking effectiveness is crucial for the incorporation of mobile robots into manufacturing systems. In this paper, we conceptualize and develop a prototype long-range hybrid tracker based on a combination of a laser tracker and a magnetic tracker and apply the concept to the following two applications: (1) extended-range human motion tracking on factory floors and (2) factory floor object reconstruction from camera images. The easily portable system not only utilizes the strengths of a laser tracker in tracking mobile objects over long ranges in large environments, such as a manufacturing shop floor and the strength of a magnetic tracker to compensate for violation of line-of-sight constraint, but it also reduces the overall cost by reducing the number

head and hand motion in a manufacturing environment with those of an avatar in a virtual manufacturing environment and (2) a mathematically simpler and practical camera self-calibration technique for the creation of three-dimensional objects in a virtual environment from camera images.

Published in: IEEE Transactions on Robotics and Automation (Volume: 16 , Issue: 3, Jun 2000)

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