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Remote calibration, conducted over the internet, offers a potentially faster, cheaper, and more accurate option.



The first step in collecting any measurement is to calibrate the measuring equipment. Measured values must be related to agreed-upon standards through a process of calibration and traceability. Traditionally, this calibration happens in a central laboratory after which the calibrated instruments are shipped to their destinations.

However, this movement can introduce additional error, either during shipping or at the measurement location, that leads to reduced accuracy in measurement. For instance, modern industrial and agricultural systems require measurements in diverse conditions that cannot be replicated in a lab environment.

Fang et al. cover recent advancements in the field of remote calibration. They outline existing methods and propose directions for future research.

“We hope we can put forward some directions that are worth studying and can arouse people’s interest and promote technological progress in this area,” said author Lide Fang.

In some cases, calibration can be performed by sending standards to the site. Onsite calibration, rather than in the lab, ensures that the field environment cannot interfere. However, errors caused by transportation are still present, making this an imperfect solution.

Another option is to perform the calibration itself remotely, by transmitting data between the field instrument and the lab without any physical transportation of equipment. This method eliminates location-based error, but currently only works with non-physical standards such as time and frequency.

The authors suggest directions for additional work to improve this remote method by lowering the calibration cost and time while broadening its scope.

“Future research could apply the remote calibration method to more calibration objects, such as current, voltage, and other parameters,” said Fang.

Source: “Remote value transmission and traceability technology of measuring instruments based on wireless communication,” by Lide Fang, Yiming Li, Sihan Duan, and Kang Lan, *Review of Scientific Instruments* (2023). The article can be accessed at <https://doi.org/10.1063/5.0109480>.

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