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Title: Automated Calibration of Stopwatches and Timers

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Automated Calibration of Stopwatches and Timers

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Overview

- Introduction
- Calibration
- Issues
- Solutions
- Results
- Future
- Conclusion

Introduction

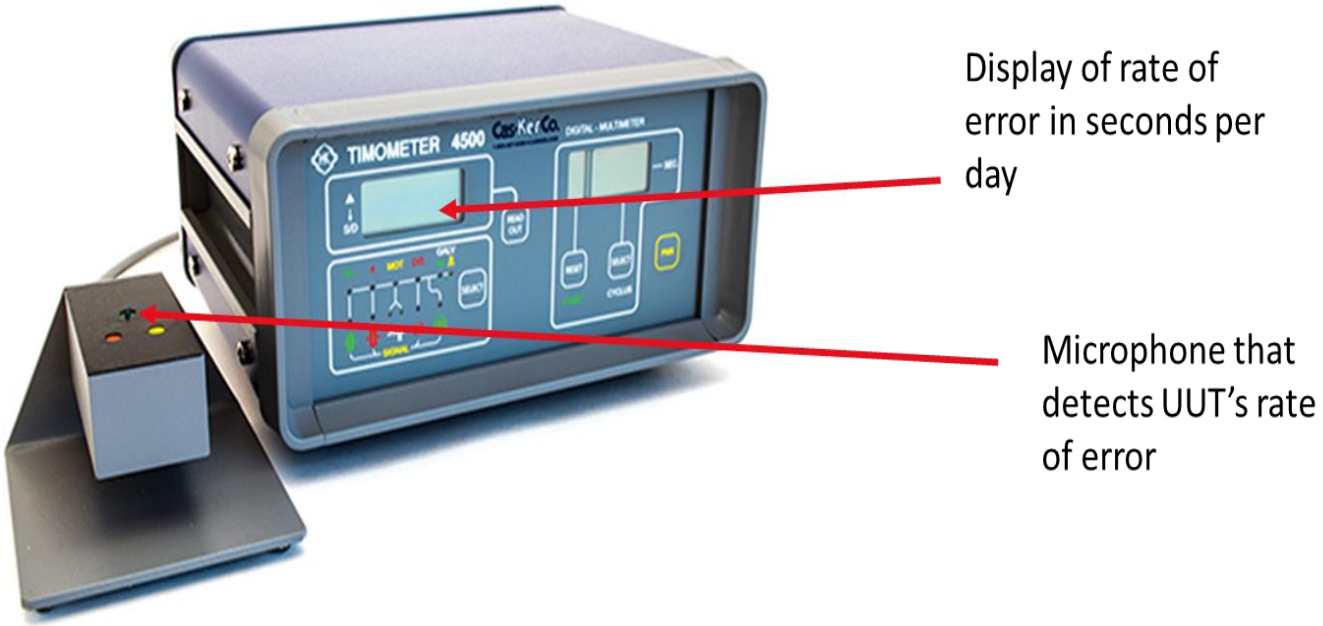
- Creating a solution for outdated calibration procedures
- Stopwatches and Timers are being calibrated manually due to lack of direct interfacing with a computer
- Implementation across other calibration procedures in the future

Calibration

- Calibration is a process of comparing a known measurement to a unit under test (UUT).
- Accuracy of measurements diminishes over time, thus the need for the measuring instrument to be calibrated
  - Adjustments/corrections are applied if the UUT has reported an Out-Of-Tolerance (OOT) result on the “As Found” data
- Results and uncertainties are recorded on all devices for traceability
- Timers and Stopwatches
  - Uses a standard device called the HK Timometer 4500
  - UUT placed on microphone to measure rate of error

HK Timometer 4500

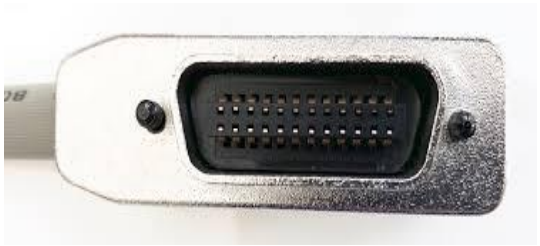
- Readings necessary for calibration displayed on standard
- Manual data entry
  - Does not write data to a computer
  - Operator inputs the data into a sheet within our calibration reporting software

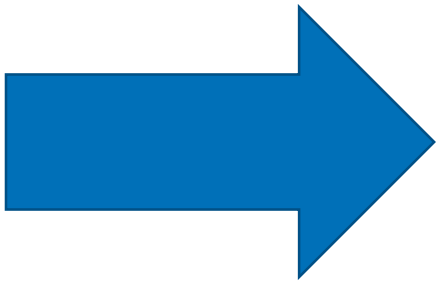


Source: Cas-Ker Co.

Issues

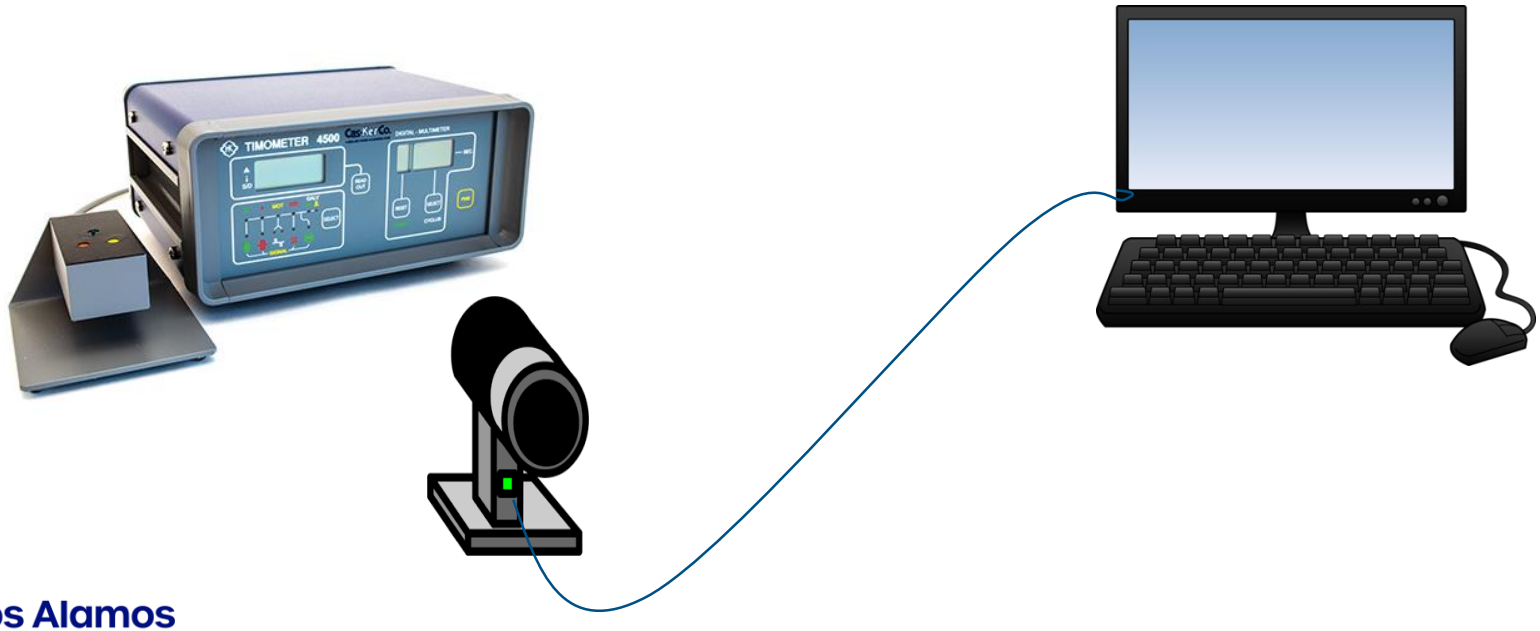
- Many calibration procedure can not be completely automated traditionally
- Manual procedures often take a longer amount of time
- Human error is more prominent in manual calibration procedures



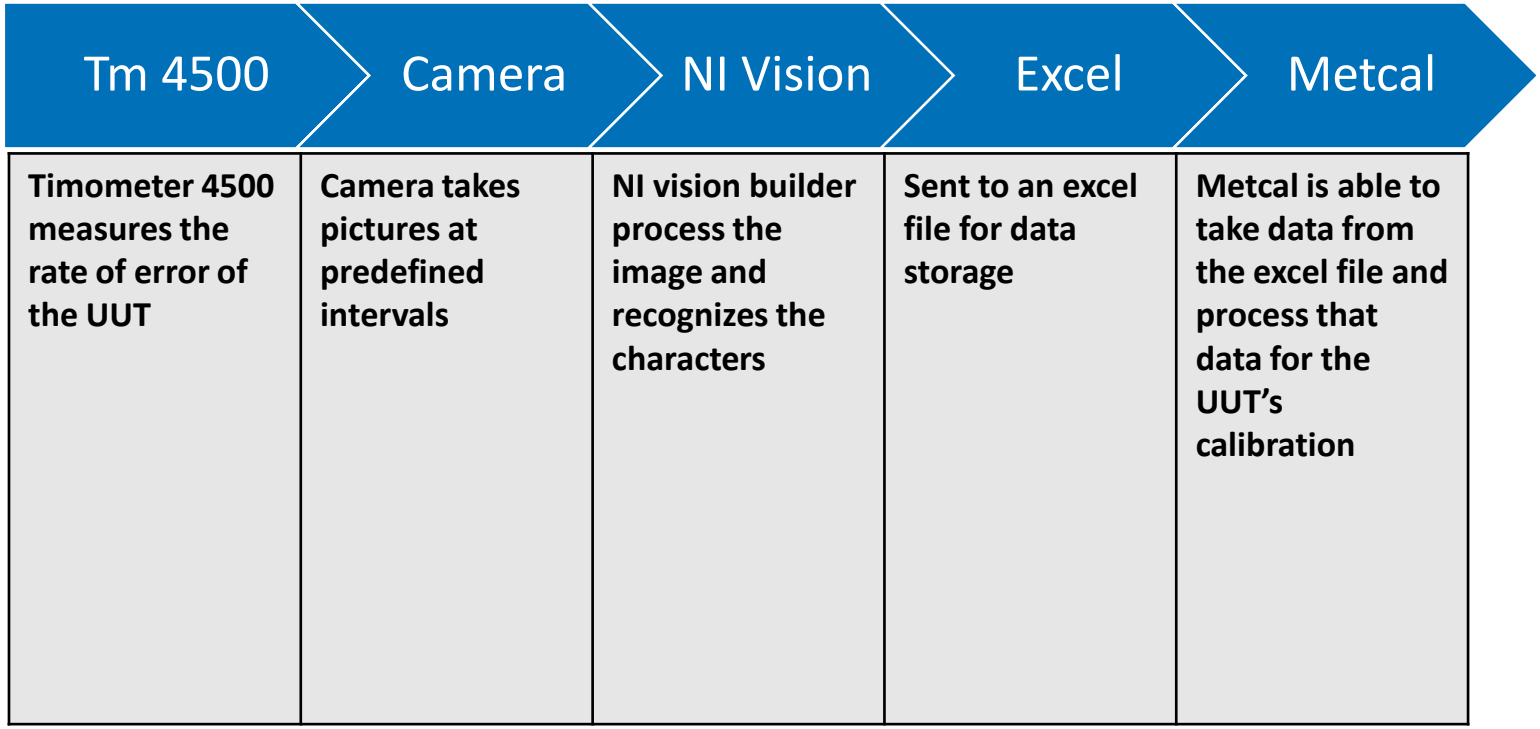


Solution Approach

- A way to read data from the device or calibrator without any type of serial/digital connection
- Image processing and text recognition
- Using software to process the images, text recognition and write to the computer



Flow of Data


Tm 4500
Camera
NI Vision
Excel
Metcal
Timometer 4500 measures the rate of error of the UUT
Camera takes pictures at predefined intervals
NI vision builder process the image and recognizes the characters
Sent to an excel file for data storage
Metcal is able to take data from the excel file and process that data for the UUT's calibration

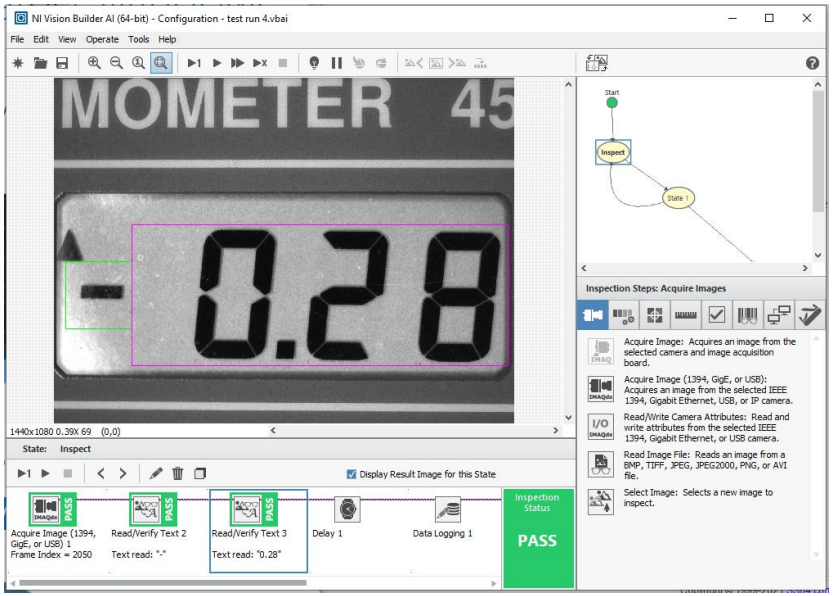
Results

Pros

- Allows operator to work on other calibrations
- Reduces human error
- Lower cost long term

Cons

- Cost to implement
- Takes comparable amount of time



Conclusion

- Many calibration procedures and methods are outdated.
- This project is beneficial to the calibration of stopwatches and timers but is more a proof of concept to be implemented across an entire calibration lab.
- Further implementation will show the potential to save time, effort and possibly accuracy, being one of the most important things in calibration.

Questions?

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