

# Design, development and implementation of an application with optical character recognition – OCR – in digital images for taking the reading of the measurements and recording the calibration values of the attenuation scale in decibels of the time domain optical reflectometers – OTDRs.

Juan Miguel Ortiz Meléndez, mortiz@cenam.mx, Metrologist in laser sources, CENAM, México. 2025 A.



## INTRODUCTION.

Currently, in the optical fiber laboratory of the Centro Nacional de Metrología - CENAM - the calibration service of the optical time domain reflectometers - OTDRs is carried out. During the development of the calibration, the attenuation scale of the OTDR is characterized. For calibration, it is required to take the readings of the attenuation measurements using paper and pencil, to later capture the results of the measurements in the service's spreadsheets on the laboratory computer for analysis\* FIG. 1. It is then mandatory to find a way to automate the manual process of taking the readings of the results, as well as the recording of the calibration values in their spreadsheets.

## BACKGROUND.

In telecommunications, an OTDR is an optical - electronic instrument used to characterize and diagnose a fiber optic network, FIG. 2.

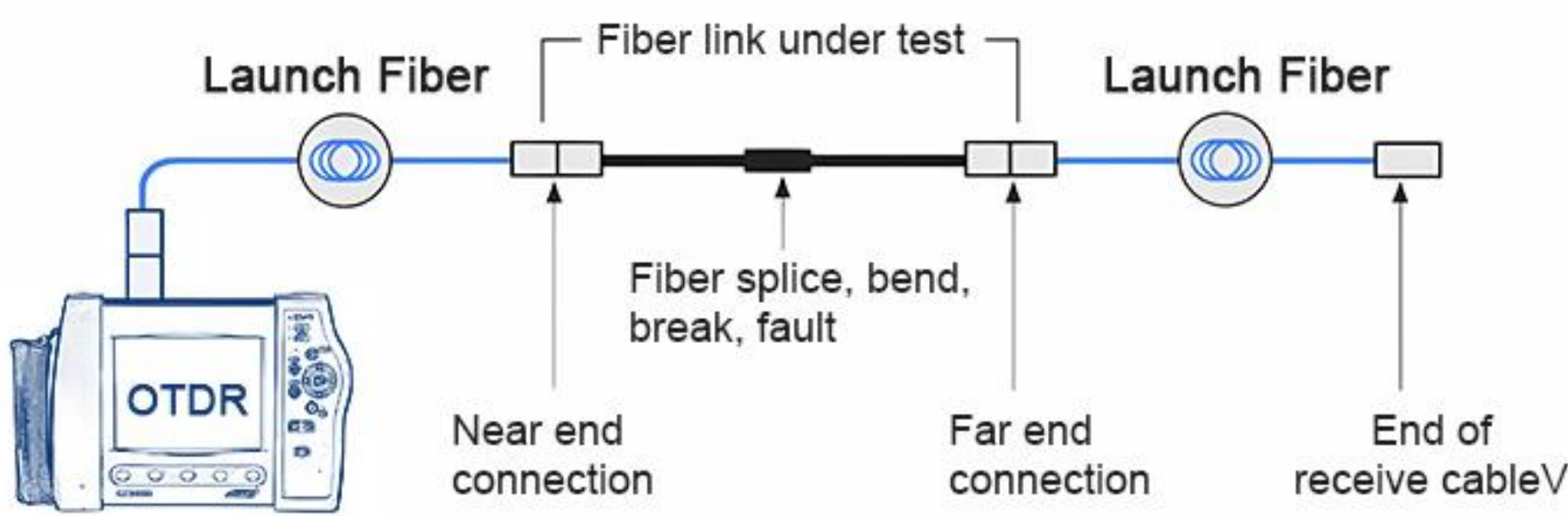


FIG. 2 - The OTDR in a fiber optic configuration.

\*A calibration service consists of 32 paper formats with more than 100 data per format.

- [1] Reflectómetro óptico de dominio en el tiempo - OTDR - Wikipedia, la enciclopedia libre.
- [2] Reconocimiento óptico de caracteres - OCR - Wikipedia, la enciclopedia libre.
- [3] Pajares, G. y de la Cruz, J.M (2007). Visión por computador. Imágenes digitales y aplicaciones.
- [4] National Instruments, www.ni.com.

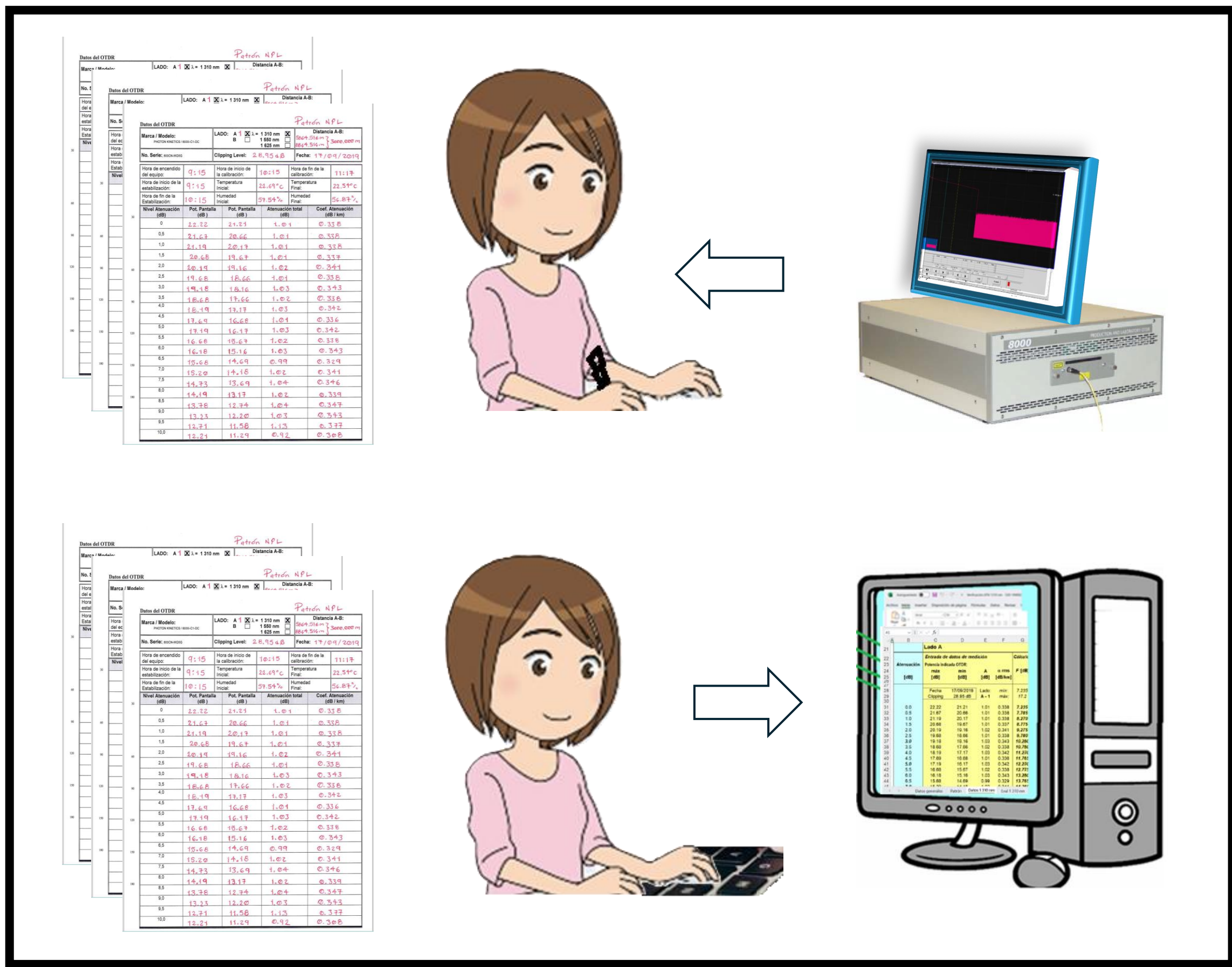


FIG. 1 - Manual data capture and recording.

A tool is introduced that solves this situation: optical character recognition - OCR. OCR is a process of digitizing texts from images of symbols or characters that belong to a certain alphabet, and thanks to this, the data recognized from the images can be identified and stored and thus, be able to interact with these characters. This project is focused on obtaining, from the images on the OTDR screen, the readings of the values of the results of the measurements of the calibration of the attenuation scale in decibels of the OTDRs and preparing a report.

## METHODS.

Below is the OCR system module that is responsible for extracting the characters of interest. The input is the digital image from the OTDR and the output are the numbers that we have been able to recognize, FIG. 3.

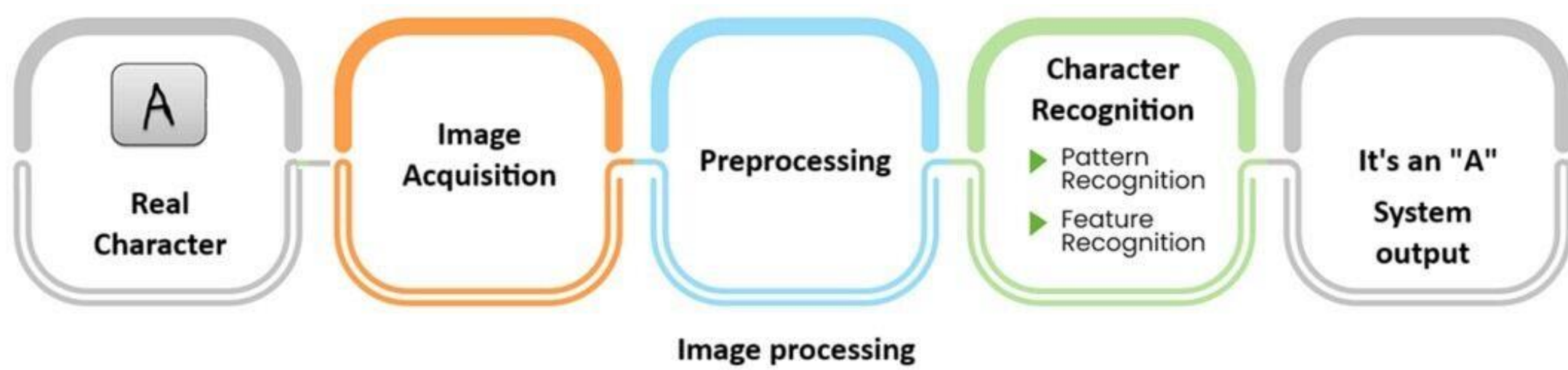


FIG. 3 – OCR module design.

## RESULTS.

Information obtained through OCR with 100 % of accuracy, FIG. 4.

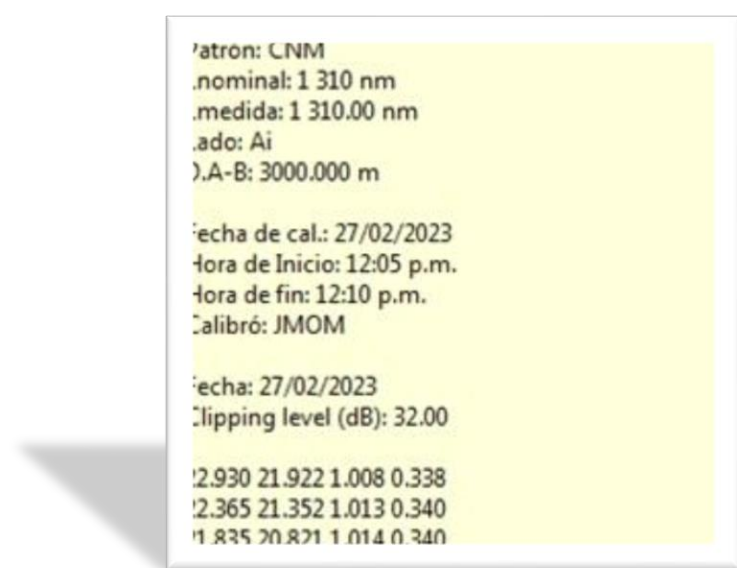


FIG. 4 – App Report extract.

## CONCLUSION.

A fully functional LabVIEW App was designed, developed and implemented, providing a solution to the project, FIG. 5.

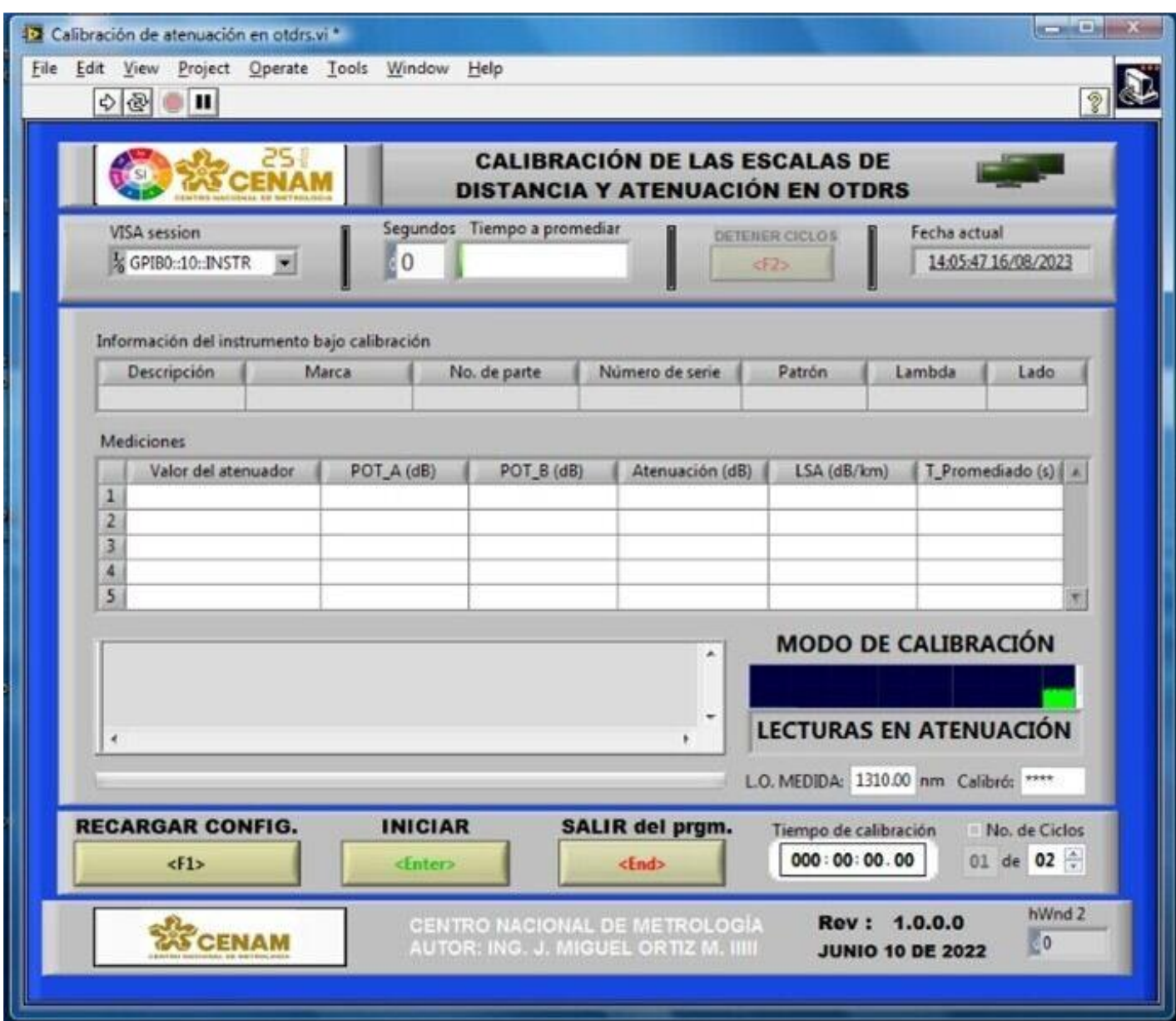


FIG. 5 - App in LabVIEW with OCR implemented. VDM the NI.