Problem Statement and Goals
Measuring Microstructure Changes During Thermal Treatment

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Table 1: Revision History

Date	Developer(s)	Change
Sept 25	Edwin Do	Initial commit with names
Sept 25	Edwin Do	Add list of goals and new table format
...	...	...

1 Problem Statement

The Department of Materials Science and Engineering would like to measure the microstructure changes during thermal treatment by looking at the conductivity changes in real-time when a sample undergoes thermal treatment. The changes can occur very quickly and it is crucial to read real-time data at a high enough acquisition rate. The equipment We need to create an application that is compatible with the window's based computer in the Department of Materials Engineering. This computer has a port that is compatible with the existing nano-voltmeter. In addition, the application must be able to read and display real-time data at a high acquisition rate to provide the most accurate data.

[You should check your problem statement with the problem statement checklist. —SS] [You can change the section headings, as long as you include the required information. —SS]

1.1 Problem

1.2 Inputs and Outputs

[Characterize the problem in terms of "high level" inputs and outputs. Use abstraction so that you can avoid details. —SS]

1.3 Stakeholders

The stakeholders of this project include Dr. Hatem Zurob (Supervisor) and anyone who is interested in observing the resistivity values in microstructures.

1.4 Environment

The environment of this project includes the use of a current source, nano-voltmeter, a Window's based computer provided by the Department of Materials Engineering and Science.

2 Goals

Goals	Reason and measurement
Real-time monitoring of conductivity	A key feature to measure conductivity changes during thermal treatment. This can be measured by comparing the acquisition rate and how quickly the data is updated in the GUI.
Remote access of the application	There may be jobs that take an extensive amount of time to complete. This will allow the user to check on the progress remotely. This can be measured by testing how accurate the progress is updated on the remote device.
Window Based Application that can be easily installed	The computer used to connect to the nano-voltmeter and the current source will be using Windows as its operating system. This can be measured by looking at how successful the installation is and the time it required to be installed.
Control acquisition rate up to 100 times per second	An acquistion rate of 100 times per second is necessary to provide the required granularity so that the data will be useful. This can be measured by observing the acquisition rate of the equipment and its output.
Display data as plots and text files	The data must be displayed as plots so provide a visual representation of the data. Outputting the data to text files can allow the data to be ready for other uses/applications. This can be measured by observing how successful and accurate the application outputs the results to plots and text files.

Table 2: List of goals

3 Stretch Goals

Stretch Goals	**Reason and measurement**
Real-time monitoring of conductivity	A key feature to measure conductivity changes during thermal treatment. This can be measured by comparing the acquisition rate and how quickly the data is updated in the GUI.
Remote access of the application	There may be jobs that take an extensive amount of time to complete. This will allow the user to check on the progress remotely. This can be measured by testing how accurate the progress is updated on the remote device.
Window Based Application that can be easily installed	The computer used to connect to the nano-voltmeter and the current source will be using Windows as its operating system. This can be measured by looking at how successful the installation is and the time it required to be installed.

Table 3: List of stretch goals