# Product Design Specification Final Version
# Mohs TurnAround Time Tracking
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**Function**:

The goal of this project is to modify and update the existing Turnaround Time Tracking system used in the Mohs surgery laboratory. Mohs surgery involves the removal of tissue specimens from the patient and subsequent laboratory work on each specimen. To ensure the quality and efficiency of this procedure, the laboratory has adopted a time tracking system. Currently, the physician or lab technicians are tasked with punching paper time cards at each transition in the laboratory process. Physical time cards are inefficient and may lead to misplaced or incomplete data. Thus the team is tasked with creating a more automated turnaround time tracking system that utilizes the existing barcode on each tissue specimen.

**Client requirements**:

- The timestamps that must be recorded are:
    - when the tissue specimen arrives at the lab
    - when a technician begins to work on the tissue specimen
    - when the finished slide is returned to the physician
    - when the slide has been read by the physician
- The barcode contains 2 patient identifiers and will be used to assign individual specimens to the time at which they were scanned at each stage. All of this information must be recorded on a computer in Google Sheets.

- The system must be able to handle cases in which a specimen needs additional work in the laboratory. Additional timestamps must be recorded.
- Eliminate human error from the system and minimize the manual work done to produce the timestamp data.

**Design requirements:**

1. Physical and Operational Characteristics
    a. *Performance requirements*:
        i. The system will be used every weekday, with busier days on Monday, Tuesday, and Thursday.
        ii. It should decrease turnaround times
        iii. It should decrease the frequency and severity of timing errors
    b. *Safety*:
        i. The barcodes used should be HIPAA compliant
        ii. The scanners used need to be antimicrobial and have the ability to be sanitized
        iii. General laboratory equipment safety requirements should be met
    c. *Accuracy and Reliability:*
        i. The system should be able to record the time between each station to the nearest second for time less than 24 hours
        ii. Should be able to differentiate between different sites being scanned
        iii. Any scans need to be automatically uploaded to the Google Sheet

d. *Life in Service*:
    i. The system should be able to track time upwards of 10 hours but not over 24 hours (sites enter the lab and are completed on the same day) of all active sites in the laboratory.
    ii. The maximum anticipated volume is 20 sites per day, however, the system should be able to handle more if a site needs additional stages.
    iii. The system must be able to handle upwards of five sites being continuously circulated through the lab.
e. *Shelf Life*:
    i. System should last a minimum of 1 week without charging or the offloading of data
    ii. The overall life span of the system should be upwards of 3 years
f. *Operating Environment*:
    i. Cause minimal disruption to the workplace (no significant increase to processing time for sample $\alpha = .05$)
g. *Ergonomics*:
    i. Lab physician and lab technicians must be able to use the system with relative ease
h. *Size*:
    i. Should be portable in order to be moved around the lab when needed
    ii. Involves the use of at least one scanner and one computer in the lab

iii. The future possibility of obtaining up to six scanners in use at one time and getting a second computer in the lab

i. *Weight*:

i. Should be no more than 15 lbs (tentative value) - must be able to be easily moved by lab members as needed

j. *Materials*:

i. Products included in the system need to be sterilizable as they are a part of a laboratory and should be antimicrobial.

k. *Aesthetics, Appearance, and Finish*:

i. No specific requirements for the appearance of the system have been identified

2. Production Characteristics

a. *Quantity*:

i. One unit

b. *Target Product Cost*:

i. The ideal budget is $200 with the ability to use already existing equipment in the lab with it.

3. Miscellaneous:

a. *Standards and Specifications*:

i. No FDA approval required, any uploading data must be HIPAA compliant and not breach patient confidentiality

b. *Customer*:

i. Digitize the system as much as possible

ii. Maintain barcode/patient label system already in use

c. *Patient-related concerns*:

i. The data from the time tracking will have to be confidential as well as any patient information that goes along with it due to HIPAA.

d. *Competition*:

i. The current time card system at the Mohs lab

ii. Sunquest Laboratory™ Specimen Management Routing and Tracking (SMART) system - this system could not work because of its inability to work in their EPIC system