LIMS Team Interview Guide

Interviewee code:	
Interviewee role:	
Interviewee gender:	□ Male □ Female
Interview date:	
Interview time and duration:	
Interviewers:	

Please note: these questions are open-ended to encourage the respondent to discuss topics related to the study. In such discussions, additional questions and prompts may be used to encourage the respondent to fully explain his or her answer. These questions and prompts include "Can you tell me a bit more?" "I'm not sure I quite understand about [repeat respondent's words]," "You said [repeat respondent's words], could I ask you a bit more about that?" or "Could you explain more about what you meant in saying [repeat respondent's words]."

The purpose of this interview is to understand how human factors-based process models helped or did not help the development of the LIMS software for the SHIELD efforts.

Participation in this study is voluntary. You may change your mind at any time and discontinue participating in this study. [Hand out another copy of the information sheet to the interviewee, if s/he would like to see one.]

There is minimal risk associated with this interview. Your contact information will be kept by the research team to allow us to contact you again, but it will never be linked to your interview responses. Only researchers associated with this project will have access to the data gathered.

Do you have any questions about the study? Are you willing to proceed with the interview?

Is it OK to audiotape the interview?

First, we are going to ask you some questions about your experience and process for developing software.

1. Can you tell us a little bit about your background and experience with developing software applications?
    a. What about applications for use in clinical processes, like laboratory testing?
2. What is your experience working on an interdisciplinary team?
    a. How does the type of team influence how you go about developing the software application?

3. Based on your experience, do you think it is important to understand the work the software application is used for? Why or why not?
    a. How would understanding the work impact how you would design the software? Why?
    b. What is your typical approach to understanding work when you are developing software applications?
        i. Do you use any diagrams, figures, models and so on to help you?
            1. [If yes], can you show us some? How do these help you?
            2. What would make these more helpful to you?
        ii. Who is typically responsible for creating these diagrams, figures, or models? e.g., software engineers, project managers, or customers
        iii. Can you share any examples with us?

Next, we are going to ask you some questions about how you went about designing the LIMS for the SHIELD efforts.

1. What was your role in the development of this LIMS?
2. When you got involved in the development of the LIMS, what did you do to understand the work the software was used for?
    a. What, if anything, did you do to try to understand the diagnostic test procedure?
        i. Do you think this is important in software development? Why or why not?
        ii. Probe for at patient registration (specimen collection), laboratory process and reporting results
    b. Did you look at any of the process diagrams created in the mobileSHIELD project? Here are some of them [*share screen with diagrams]*
        i. Were any of these useful in understanding the lab process or the requirements of the LIMS?
            1. [if yes] probe: which ones? Why? How?
                a. Overall Process diagram
                b. Data/IT Flow process diagram
        ii. Were these diagrams easy to understand without being given instructions or clarifications?
            1. [if yes] probe: which ones? Why? How?
                a. Overall Process diagram
                b. Data/IT Flow process diagram
            2. [if no] probe: what instructions were you given?
        iii. How were these different than what you would normally do in your design process?
            1. Probe for each diagram mentioned
                a. Overall Process diagram
                b. Data/IT Flow process diagram

        iv. What would have made this diagram more useful?
            1. *Probe for each diagram mentioned*
                a. Overall Process diagram
                b. Data/IT Flow process diagram
        v. Was any information you needed missing from the diagram?
            1. *Probe for each diagram mentioned*
                a. Overall Process diagram
                b. Data/IT Flow process diagram
3. How did you incorporate the users in the design of the LIMS?
    a. How did you identify the users or stakeholders?
    b. Which users did you consider?
    c. Were stakeholder diagrams useful for this?
        i. Why?
4. How did you communicate design changes to the rest of the team?
    a. Were process diagrams useful for this?
    b. How would you improve the process diagrams?
5. What is your experience participating in a Failure Modes and Effects Analysis (FMEA)?
    a. Did you participate in the FMEA for the lab procedure?
        i. *[if yes]* probe: How did the FMEA influence the development of the LIMS?
        ii. *[if no]:* no further questions on FMEA.

Closing Questions

1. Who else was involved in developing the LIMS?
    a. Did they use the diagrams? Why or why not?
    b. Do you think it would be useful for us to talk to them?
2. Is there anything else you would like to tell us?
3. Do you have any questions for us?
4. Would it be okay if we reached out to you for clarifications in the future?

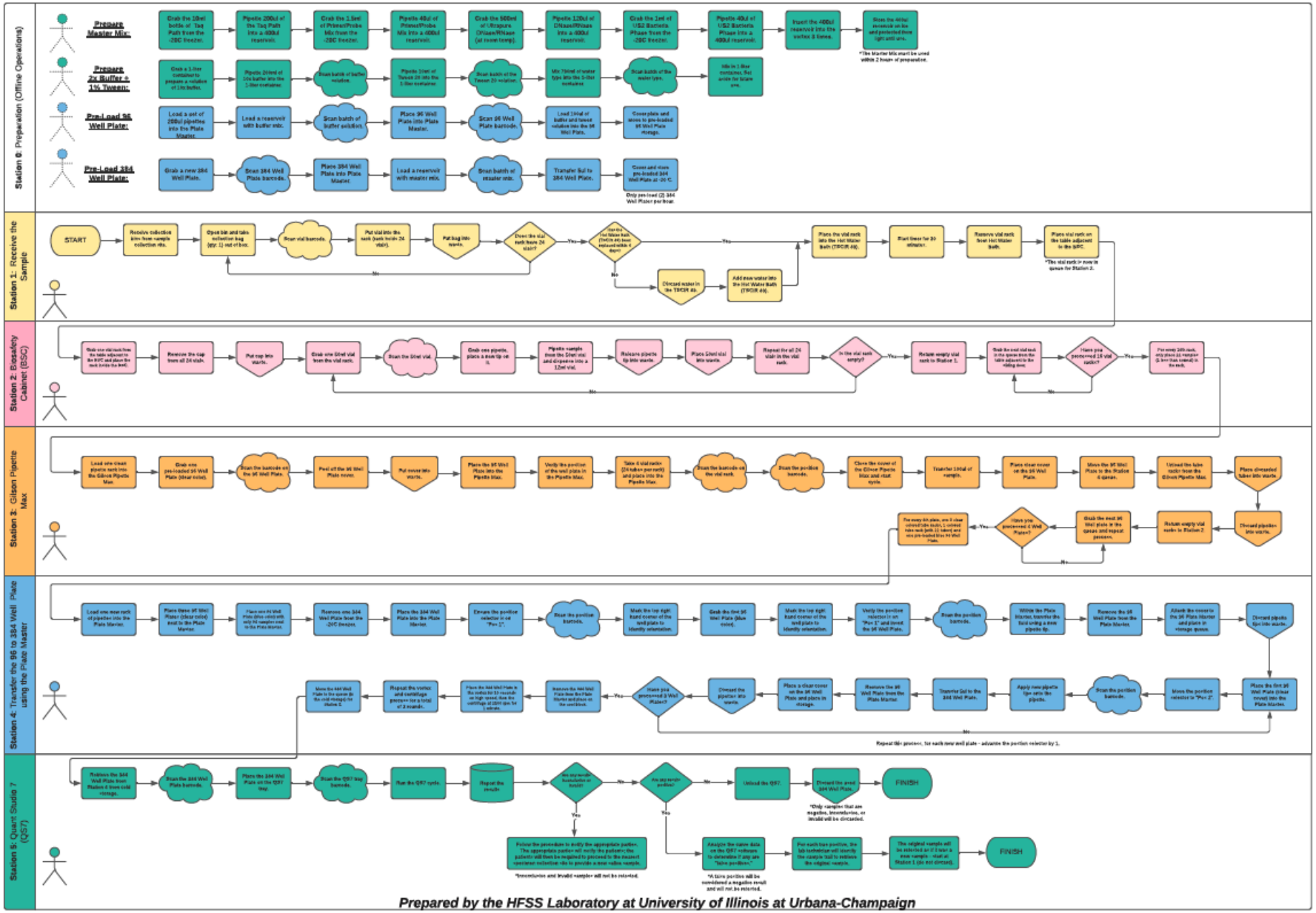
Thank you very much for your time and participation.

ILLINOIS
ISE | Industrial & Enterprise Systems Engineering
GRAINGER COLLEGE OF ENGINEERING

Overall Process Flow Chart

(Current as of 15 Sep 2020)

HFSS
HUMAN FACTORS IN SOCIOTECHNICAL SYSTEMS



Prepared by the HFSS Laboratory at University of Illinois at Urbana-Champaign

ILLINOIS
ISE | Industrial & Enterprise Systems Engineering
GRAINGER COLLEGE OF ENGINEERING

Data Process Flow Chart

(Current as of 20 Nov 2020)

NTS

HFSS
HUMAN FACTORS IN SOCIOTECHNICAL SYSTEMS

Notes:

1. The "Offline Operations" or preparation of the Buffer and Master Mix are annotated by the orange symbol and orange outline. These processes are independent of the main operation and can be performed at any time.

Assumptions:

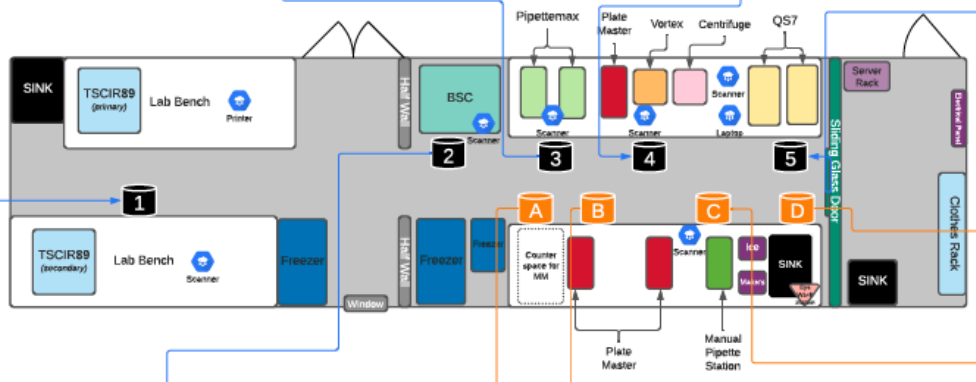
1. At the beginning of each Lab Tech's shift, they will scan their badge [*Badge_Barcode*]. This variable wil be carried through the database and alloted to each variable, similar to a time stamp. This is to help with training and QA/QC if there are errors.

2. The database will also assign a time stamp [*Time_Stamp*] that will be assigned to the [*Master_ID*] in the database.

Carryover	Input	Output
1. [*Master_ID*], [*Rack_ID*].	1. Scan barcode on Pipette Max [*Equipment_ID*]. *Note: The name of the machine is pre-populated in the system. 2. Scan barcode on the 96 Well Plate [*96_Plate_ID*]. 3. Scan barcode on Rack 1 of 4 [*Rack_POS1*]. 4. Scan barcode on Rack 2 of 4 [*Rack_POS2*]. 5. Scan barcode on Rack 3 of 4 [*Rack_POS3*]. 6. Scan barcode on Rack 4 of 4 [*Rack_POS4*]. *Note: The buffer solution on the 96 Well Plate is assumed to have been assigned to a plate and already scanned. This information is in the database and mapped to its respective plate.	1. [*Master_ID*], [*96_Plate_ID*], [*Well_Plate_Position*]*. *The [*Well_Plate_Position*] is a static mapping based on: [*Rack_POSx*].

Carryover	Input	Output
1. [*Master_ID*], [*96_Plate_ID*], [*Well_Plate_Position*]	1. Scan barcode on Plate Master [*Equipment_ID*]. *Note: The name of the machine is pre-populated in the system. 2. Scan barcode of 384 Well Plate [*384_Plate_ID*]. 3. Scan barcode of 96 Well Plate from Pos 1. [*Sample_96_Plate_POS1*]. 4. Scan barcode of 96 Well Plate from Pos 2. [*Sample_96_Plate_POS2*]. 5. Scan barcode of 96 Well Plate from Pos 3. [*Sample_96_Plate_POS3*]. 6. Scan barcode of 96 Well Plate from Pos 4. [*Sample_96_Plate_POS4*]. *Note: The Master Mix on the 384 Well Plate is assumed to have been assigned to a plate and already scanned. This information is in the database and mapped to its respective plate.	1. [*Master_ID*], [*384_Plate_ID*], [*384_Well_Plate*]*. *The [*384_Well_Plate*] is a static mapping based on: [*Sample_96_Plate_POSx*].

Carryover	Input	Output
1. [*Master_ID*], [*384_Plate_ID*], [*384_Well_Plate*].	1. Scan barcode on QS7 [*Equipment_ID*]. *Note: The name of the machine is pre-populated in the system. 2. Scan barcode of 384 Well Plate, this will be matched with [*384_Well_Plate*].	1. Each well position will provide a test result (Positive, Negative, Inconclusive). The database then matches the result based on [*384_Well_Plate*] variable to the sample's [*Master_ID*]. 2. If a test is returned as Inconclusive, the database will return the [*Well_Plate_Position*] variable from the 96 Well Plate. At the end of the day, the sample will be re-tested starting from the 96 Well Plate station.



Carryover	Input	Output
1. Physical barcode on vial.	1. Scan vial rack: [*Rack_ID*]. 2. Scan barcode: [*Sample_ID*].	1. Store rack and vial barcodes as [*Sample_ID*] and [*Rack_ID*] in the database as [*Master_ID*], [*Rack_ID*].

Pre-Load Plate Master 384 Well Plate

Carryover	Input	Output
1. [*Master_Mix_ID*].	1. Scan Plate Master Equipment ID [*Equipment_ID*]* *Note: The name of the machine is pre-populated in the system. 2. Scan barcode of 384 Well Plate [*384_Plate_ID*]. 3. Scan batch of Master Mix [*Master_384Well*].	1. [*384_Plate_ID*].

Carryover	Input	Output
1. [*Master_ID*]* and [*Rack_ID*]. *Each sample has a unique one.	1. Re-scan vial rack barcode [*Rack_ID*] to ensure that it matches from Station 1.	1. [*Master_ID*], [*Rack_ID*].

Prepare 2x Buffer + 1% Tween

Carryover	Input	Output
1. None.	1. Scan 200 ml of 10x buffer [*Buffer_ID*]. 2. Scan 10 ml of Tween 20 [*Tween_ID*]. 3. Scan 790 ml of Water [*Water_ID*].	1. [*Buffer_Mix_ID*]* is a static mapping of [*Buffer_ID*], [*Tween_ID*], and [*Water_ID*].

Prepare Master Mix

Carryover	Input	Output
1. None.	1. Scan Taq Path Batch Multiplex 1-Step Master [*Taq_Path_ID*]. 2. Scan Primer/ Probe Mix [*Primer_ID*]. 3. Scan DNase and RNase Batch [*D_R_Nase_ID*]. 4. Scan US2 Bacteria Phase Batch [*US2_ID*].	1. [*Master_Mix_ID*]* is a static mapping of [*Taq_Path_ID*], [*Primer_ID*], [*D_R_Nase_ID*], and [*Water_ID*].

Pre-Load Plate Master 96 Well Plate

Carryover	Input	Output
1. [*Buffer_Mix_ID*].	1. Scan Plate Master Equipment ID [*Equipment_ID*]* *Note: The name of the machine is pre-populated in the system. 2. Scan batch of buffer mix [*Buffer_96Well*]. 3. Scan 96 Well Plate [*96_Plate_ID*].	1. [*96_Plate_ID*].

Prepared by the HFSS Laboratory at University of Illinois at Urbana-Champaign