Software Development Management Plan

Team Members

Participant Number	Member Names
1 (Team Leader)	Christopher Weiner
2	Huy Nguyen
3	Josh Bell
4	Cameron McCawley
5	Jacob Bean
6	Doug Lloyd
7	Jared Leibowitz

TA Name	Eric Prather

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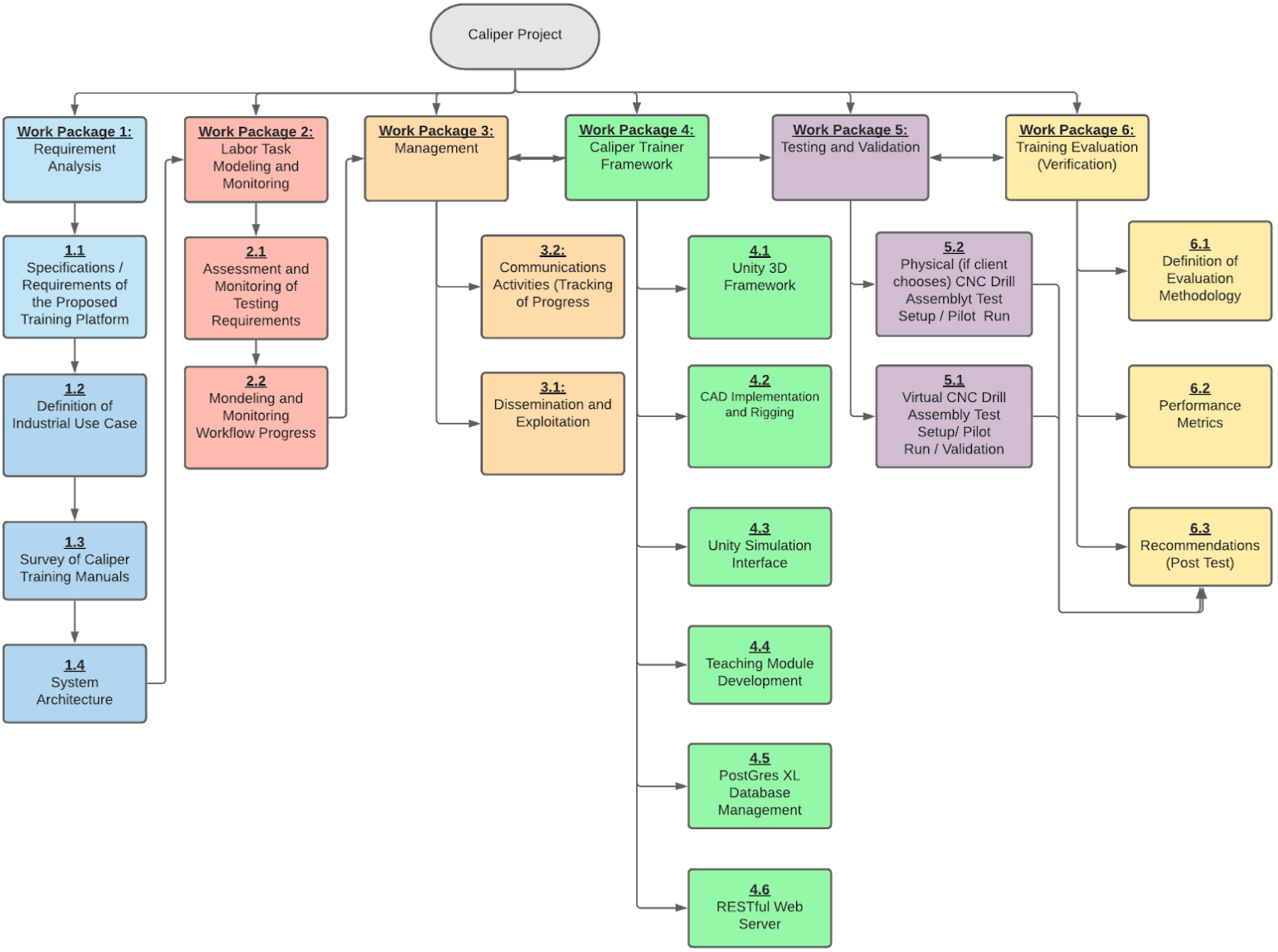
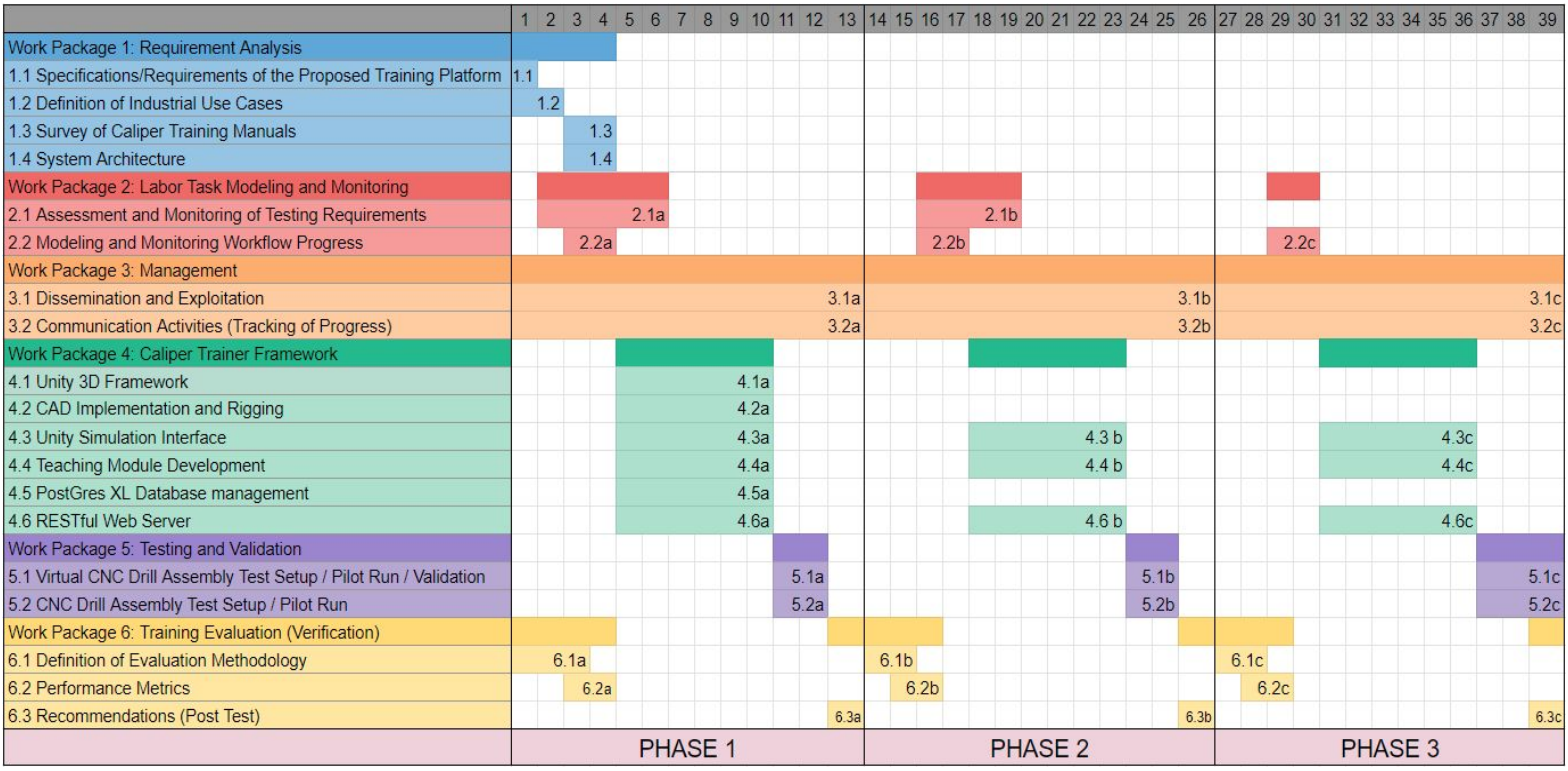
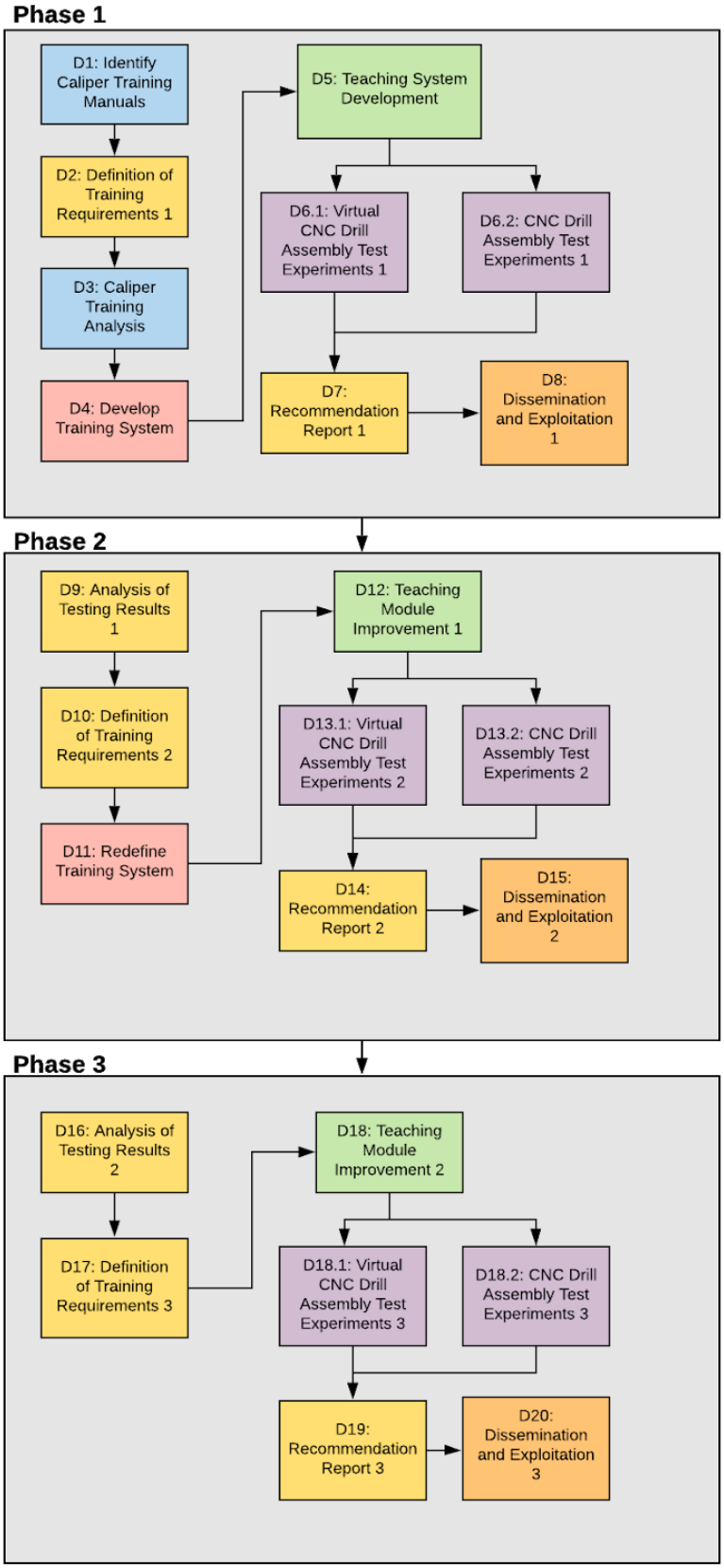
Work Breakdown Structure:



Project Timeline:



Project Logic Model



List of Work Packages

Work Package No.	Work Package Title	Lead Participant No	Lead Participant Short Name	Hours	Start Week	End Week
1	Requirement Analysis	3	Josh	150	W1	W4
2	Labor Task Modeling and Monitoring	6	Doug	493	P1: W2 P2: W16 P3: W29	P1: W6 P2: W19 P3: W30
3	Management	2	Huy	1110	W1	W39
4	Caliper Trainer Framework	5	Jacob	1230	P1: W5 P2: W18 P3: W31	P1: W10 P2: W23 P3: W36
5	Testing and Validation	4	Cameron	502	P1: W11 P2: W24 P3: W37	P1: W12 P2: W25 P3: W39
6	Training Evaluation (Verification)	1	Chris	610	P1.a: W1 P1.b: W13 P2.a: W14 P2.b: W26 P3.a: W27 P3.b: W39	P1.a: W4 P1.b: W13 P2.a: W17 P2.b: W26 P3.a: W29 P3.b: W39
Total person(hours)-months:				4095		
Overall Start and End Weeks foreseen:					**W1**	**W39**

Work Package Plan

The software that we have developed will utilize a Unity-based application to teach and test the users within the given specifications to use a caliper and to ensure that these skills will be applicable in a real-world setting. Each step of the software management plan has been broken down into work packages that describe the specifics for how we will tackle the development of the platform, and how each step is integral for the overall delivery of the system.

- Work Package 1, our goal is to research existing caliper manuals and find a way to effectively translate a caliper training manual into a three-dimensional simulated version.
- Work Package 2 is utilizing our knowledge from the first Work Package and finding the best method for teaching the required skills for the user in that field along with setting up a plan to monitor and improve the development process.
- Work Package 3 is the management of the development of this software, ensuring no problems arise, and if they do solve them in a timely manner that both the client and ourselves will be satisfied with.
- Work Package 4 is the creation of the software program that will train the user and test their abilities inside our Unity and CAD platform, hosted on a web server for easy access for the client and trainee.
- Work Package 5 is the Testing and Validation of the program, this package will be our team testing the limits of our program and looking for any mistakes that we might have overlooked, and fixing them for a future iteration of the software.
- Work Package 6 is the Training Evaluation where we will evaluate the data from the testing and see how the program and user performed, and we will ask for user feedback to look for ways to better implement our software to ensure better usability. That data will be used in Work Package 2 to further improve the program through Work Package 4, ensuring that the client will be satisfied with our testing and training software suite.

Work Package Number	1			Leader		Josh Bell		
Work Package Title	Requirement Analysis							
Participation Number	1	2	3	4	5	6	7	
Short Name of Participant	Chris	Huy	Josh	Cameron	Jacob	Doug	Jared	Total Hours
Hours per Participant	60	0	15	15	0	60	0	150
Start Month/Week	Wk 1		End Month/Week			Wk 4		

Objectives

- Work with the client to agree upon specifications for the training system.
- Develop system architecture for underlying training and testing systems.
- Research caliper training and testing techniques.
- Develop industrial use cases for future iterations of the system.

Description of Work

The leader, Josh Bell, will be overlooking Work Package 1, the Requirement Analysis. We will have Chris discovering the needs and necessities of the training platform in Unity, they will find out what this program will need to be created from scratch, what needs to be implemented in, and what is already made in Unity. Doug will find the industrial cases for the caliper's uses, this will be so we know how to create the training for the user and so it provides real case scenarios that may be used in the future. Chris and Doug will be surveying the caliper Training manuals to understand what needs to be taught in this program. Finally, Cameron will be in charge of the systems architecture, discovering what needs to be done for the full program to work.

Deliverables

Phase 1: The main deliverable from this Work Package is the identification of the caliper training manuals and caliper training analysis, this information will be used in the implementation of the caliper testing program.

Objective Deliverables:

- We worked with the client and agreed on the specifications for the training system
- The system architecture is finished and is ready for training and testing systems
- Thorough research has been completed about caliper training and testing techniques!
- An industrial use case was completed! Now we can rest easy for future iterations of this system.

Relationships to other Work Packages

- **Input:**
  - There is no input from other Work Packages.
- **Output:**
  - This Work Package is used in Work Package 2,4,5, and 6
- **Dependencies:**
  - This is the first Work Package saying that this does not have any dependencies on other Work Packages.

Work Package Number	2			Leader		Doug Lloyd		
Work Package Title	Labor Task Modeling and Monitoring							
Participation Number	1	2	3	4	5	6	7	
Short Name of Participant	Chris	Huy	Josh	Cameron	Jacob	Doug	Jared	Total Hours
Hours per Participant	53	0	156	156	0	45	83	493
Start Month/Week	Wk 2 Wk 16 Wk 29		End Month/Week			Wk 6 Wk 19 Wk 30		

Objectives

- Develop and work with changes that occur with the testing process to ensure that the model we have created for the training and testing modules is within specifications for the client's needs.
- Evaluate our timelines so ensure that everything is kept on track to be able to deliver on time.

Description of Work

The leader of Work Package 2, Doug Lloyd, will be overseeing the work that is done for this portion of the project. For the first task, the assessments and the monitoring of the testing requirements will be done by Josh and Cameron. This is needed to figure out what is needed to test the user's abilities in using the caliper. For the other task in this portion of the Work Package, it will be run by Jared and Chris. The task of modeling and monitoring the workflow progress is to ensure the workflow is being done and completed in a timely manner and that there are no issues with the modeling and monitoring.

Deliverables

Phase 1: The main deliverable for Work Package 2 is the knowledge on what to test the user on in the caliper training assessment.
Phase 2 & 3: This will be after the first testing and we will have knowledge of our mistakes and perhaps change what we are assessing for the caliper training assessment for the future.

Objective Deliverables:

- We were adaptable to the changes and the testing process went smoothly. The client's needs were met and our client is extremely pleased
- We have been keeping track of everyone's time spent on the project via a through excel document

Relationships to other Work Packages

- **Input:**
  - This Work Package will take input from Work Package 1, 5, and 6.
- **Output:**
  - This Work Package is used in Work Package 4 and 5.
- **Dependencies:**
  - This Work Package, for Phase 1, will need to wait to start until Work Package 1 has its starting information, for Phase 2 and 3, will need to wait until the first testing of the caliper training assessment and onward testing from Work Package 5 and 6.

Work Package Number	3			Leader		Huy Nguyen		
Work Package Title	Management							
Participation Number	1	2	3	4	5	6	7	
Short Name of Participant	Chris	Huy	Josh	Cameron	Jacob	Doug	Jared	Total Hours
Hours per Participant	0	0	555	0	555	0	0	1110
Start Month/Week	Wk 1		End Month/Week			Wk 39		

Objectives

- Communicate with the client to ensure that needs are consistently met as progress for the project advances promptly.
- Create and write reports that will allow the project to be used by the client beyond the scope of this work plan, and that future iterations can reference so that the life expectancy of the system will last until such a time that a new one must be developed.
- Facilitate discussion amongst the team and continued progress through the development timeline as expected.

Description of Work

The leader of Work Package 2, Huy Nguyen, will be overseeing the work that is done for this portion of the project. For the first task, Josh will be communicating directly with the client to ensure their needs are met. Secondly, Jacob will create reports on a monthly basis discussing the results and progress of development and testing, and instructing the client on how to use the package. Finally, Josh and Jacob will facilitate discussion amongst the development team and ensure that the project runs smoothly.

Deliverables

Phase 1 - 3: The main deliverable for each phase of work package 3 is to communicate well with management so they are aware of how the project is going. By communicating well with the upper management we are able to accurately develop what the customer wants and can be agile to the customer's needs.

Objective Deliverables:

- Monthly report discussing the results and progress of development and testing. Distribution of document to relevant key actors within the development umbrella as well as client(s).

Relationships to other Work Packages

- **Input:**
  - This Work Package will take input from Work Package 1, 2, 4, 5, and 6.
- **Output:**
  - This Work Package is used in Work Package 1, 2, 4, 5, and 6.
- **Dependencies:**
  - This Work Package is agile and changes what it depends on as the project goes on.

Work Package Number	4			Leader		Jacob Bean		
Work Package Title	Caliper Trainer Framework							
Participation Number	1	2	3	4	5	6	7	
Short Name of Participant	Chris	Huy	Josh	Cameron	Jacob	Doug	Jared	Total Hours
Hours per Participant	270	30	180	180	30	270	270	1230
Start Month/Week	Wk 5 Wk 18 Wk 31			End Month/Week		Wk 10 Wk 23 Wk 36		

Objectives

- Begin construction through Unity
- Work with Unity to allow for CAD implementation in the environment
- Work on GUI for a comfortable user interface experience
- Getting the training and teaching module set up
- Allowing the company to import/export new CAD models into the database
- A web server will be set up to host everything needed to make the user's experience smooth

Description of Work

For the 4th Work Package, the caliper Trainer Framework, this will be run by Chris Weiner. This work package will be about the creation of the program that teaches the user how to handle a caliper correctly. The first task is the 3D framework in Unity, this will be the initial implementation of our Unity world, this will be run by Chris. Next is the CAD implementation and rigging into an already created world run by Huy, this will be adding the CAD work into Unity so that we can use its programs inside of Unity. Then we will create the simulation interface in Unity to create the environment for the user's knowledge of the caliper can be tested, this will be done by Jacob. We will then have Doug and Jared oversee the teaching module development, this will be the program that creates specific problems for the user. For the PostGres database, this will be run by Cameron. They will ensure that the data can be stored and used for our caliper project. Finally, the Restful web server will be controlled by Josh. They will ensure that the web server is up and running and will maintain that status.

Deliverables

Phase 1: The main deliverable of Work Package 4 is the completion of an all-inclusive framework that facilitates the actual testing. This will include Unity, CAD, web server, GUI, and database components that interface with each other to create a functional platform. Initial construction will take place in Phase 1.

Phase 2: Post-test recommendations from Work Package 6 will guide our continued development of the aforementioned components. We will work to revise and refine any components which are missing functionalities or features that we have identified as beneficial.

Phase 3: Post-test recommendations from Phase 2 Work Package 6 will allow us to eliminate any remaining bugs and polish all of the aforementioned components. Phase 3 of development should be nearly exclusively focused upon refinement, rather than core functionality or new features.

Objective Deliverables:

- Completion of Unity 3D framework scaffolding
- Model rigging and implementation in CAD, document + demonstration
- Completion of GUI and caliper simulation controls
- Completion of a teaching module for Unity simulation
- Completion of the database for CAD data storage
- Completion of the web server for hosting the training simulation

Relationships to other Work Packages

- **Input:**
  - This Work Package will take input from Work Package 1.
- **Output:**
  - This Work Package is used in Work Packages 2, 3, 5, and 6.
- **Dependencies:**
  - This Work Package is dependent on Work Package 1 since Work Package 1 outlines the specifications of the training platform.

Work Package Number	5			Leader		Cameron McCawley		
Work Package Title	Testing and Validation							
Participation Number	1	2	3	4	5	6	7	
Short Name of Participant	Chris	Huy	Josh	Cameron	Jacob	Doug	Jared	Total Hours
Hours per Participant	105	0	105	105	0	90	97	502
Start Month/Week	Wk 11 Wk 24		End Month/Week			Wk 12 Wk 25		

Objectives

- Creation and specification of evaluation metrics and methodology
- Definition/reporting of performance metrics in the post-test setting to user/client
- Recommendations for refinement of test scenario/assets after a pilot run of the simulation

Description of Work

The leader, Cameron McCawley, will be overseeing Work Package 5, which is Testing and Validation. Doug and Jared will be responsible for creating and working with the client to generate a testing methodology that ensures the teaching modules are giving the trainee the skills necessary for working with the caliper in a real-world setting. After this, Cameron and Josh will be writing a report that shows how the testing results will be delivered to the client, to see if it is following their specifications. Once adequate testing has been performed with the system, whether it is virtual or physical per the client's specification, Chris will be writing a report for further recommendations as to system improvements, or guidelines to ensure a smoother testing process once the system goes live.

Deliverables

Phase 1 & 2: The main deliverables of Work Package 5 are the same in Phase 1 and Phase 2, it is the completion of the virtual/physical test of the CNC drill assembly test utilizing the caliper. Metrics/results from Work Package 5 are then fed into Work Package 6 which will be used to provide recommendations to the team as to how to continue development and refine the product.

Phase 3: While the platform is out and being used there will be ongoing bug and issue fixing, this will get information back from the tests being done and will change the platform when necessary to accommodate any issues not found during Phase 1 and 2.

Objective Deliverables:

- Documentation outlining the proper setup of the testing scenario/environment. Physical or virtual depending on client choice.
- Facilitate pilot run/validation to gather metrics utilized in WP6 recommendations.

Relationships to other Work Packages

- **Input:**
  - This Work Package will take input from Work Package 4
- **Output:**
  - This Work Package is used in Work Package 6.
- **Dependencies:**
  - This Work Package will depend on Work Package 4 since that is where the actual project is being designed to be physically used by the user.

Work Package Number	6			Leader		Chris Weiner		
Work Package Title	Training Evaluation (Verification)							
Participation Number	1	2	3	4	5	6	7	
Short Name of Participant	Chris	Huy	Josh	Cameron	Jacob	Doug	Jared	Total Hours
Hours per Participant	97	0	129	129	0	120	135	610
Start Month/Week	Wk 1 Wk 13 Wk 26 Wk 39		End Month/Week			Wk 4 Wk 16 Wk 29 Wk 39		

Objectives

- Defining how to approach our task
- Taking surveys, metrics, etc. to gather data
- Getting user feedback

Description of Work

The leader of the work package 6, Training Evaluation, will be managed by Jacob Bean. Chris will be responsible for creating and outlining test methodology and evaluation parameters. Secondly, Josh and Cameron will be responsible for deciding what performance metrics will be reported to the client/user and how these will be presented. Finally, Doug and Jared will be evaluating and adapting recommendations for upcoming work packages and phases.

Deliverables

Phase 1: The main deliverable for Phase 1 of Work Package 6 will be the initial testing of the system, before it is fully implemented, working with wireframe models and a click-through prototype to ensure that the usability of the application is up to the standards.

Phase 2: The main deliverable for Phase 2 of Work Package 6 will be the product testing of the application, working with the functioning prototype, and taking measurements to allow for further refinement in subsequent passes of development and testing.

Phase 3: The main deliverable for Phase 3 of Work Package 6 will be further improvements to the existing system as a user and client feedback comes in, and write a subsequent report of recommendations to deliver to the client for the continued support of the system, to ensure longevity for training and testing of the caliper simulation, as well as other tools that can be developed.

- Documentation outlining evaluation methods and performance metrics to be reported to user/client
- Documentation outlining recommended changes/refinements to the software pending client approval

Relationships to other Work Packages

- **Input:**
  - This Work Package takes input from Work Package 5.
- **Output:**
  - This Work Package's output is used in Work Package 2, 3, and 4.
- **Dependencies:**
  - This Work Package is dependent on Work Package 4 and 5, as recommendations for further development cannot be provided without pilot testing (Work Package 5) and framework of the platform (Work Package 4) in working order.

Summary of Staff Effort

	WP1	WP2	WP3	WP4	WP5	WP6	Total person-hours over the 39 weeks
1 / Chris	60	53	0	270	105	97	585
2 / Huy	0	0	555	30	0	0	585
3 / Josh	15	156	0	180	105	129	585
4 / Cameron	15	156	0	180	105	129	585
5 / Jacob	0	0	555	30	0	0	585
6 / Doug	0	83	0	270	97	135	585
7 / Jared	0	83	0	270	97	135	585
Total Person hours per Work Package	150	493	1110	1230	502	610	