



AR Remote Rendering Application

Engineering Specification Document



| **UCCS CE/ECE Senior Design Team**  Jack Brock  Amber Dolezal  Austin Hobbs  Amyleila Mejia  Stefano Signorelli | | **UCCS Project Sponsors**  William B. Micheal  Dr. Omid Semiari |
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**Project Specification Intent**

Dr. Omid Semiari’s research interests include wireless communications, machine learning, cross-layer network optimization, signal processing, and context-aware networks with an emphasis on new technologies such as connected and autonomous vehicles, wireless extended reality, and industrial IoT. Recently, he has collaborated with students and alumni in MINDS LAB to conduct research on ultra-reliable low-latency communications, machine learning and communications, millimeter wave and terahertz communications, context-aware networks, autonomous vehicles and platoons, and wireless extended realities. Well within his research interests Dr. Semiari has requested to start pursuing a new project with this year’s ECE Senior Design Team, to design cutting-edge communication that would enable an AR/VR device to utilize a host computer for its processing. Such an upgrade will further the team’s efforts to focus on split rendering, in an attempt to decrease battery consumption and increase memory availability.

**Project Requirements**

The following is a list, in order of importance according to the sponsors, requiring the remote rendering device to:

* accompany a set of documents specifying every piece of software and its functionality
* allow the AR/VR device will connect to a wifi-router in order to communicate to the host computer
* perform the app rendering and processing will be done on the host computer
* improve runtime and battery life
* allow the app rendering and processing will be done on the host computer
* identify the playing cards that a person is holding
* determine the value of the cards that are given to the player
* determine the value of the cards held by the dealer
* display the value of the cards that are on the table
* display the statistics for next move that the player should perform
* determine if the player should hit, split, or stand for their next move

**Parameters and Target Values**

To ensure each of the project requirements are met, verifiable engineering parameters and accompanying target values are identified as follows. This remote rendering device will:

* be implemented using a HoloLens
* have a total system latency will be under two seconds
* improve battery life by at least TBD
* display the probability of success for each move the player could perform
* display a graphic and play a sound when player hits a card count of twenty-one
* play a sound when player wins the game

**Planned Modeling Activity**

For this project, there will not be any modeling.

**Agreement to Project Specification**

This document describes the specifications to successfully complete this project, including the project requirements, engineering parameters, and target values. The sponsor agrees the information presented in these documents accurately and fully captures the scope of the design project. The UCCS CE/ECE Design Team agrees to deliver a working solution to the Customer that satisfies the design requirements to the best of their ability. This form serves as an agreement between the Customer and the UCCS Design team.

**PROJECT SPONSORS**

|  | Dr. Omid Semiari |  |
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| Signature | Print Name  Bill Michael | Date |
| Signature | Print Name | Date |

**UCCS DASE / ECE DESIGN TEAM REPRESENTATIVES**

|  | Jack Brock |  |
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| Signature | Print Name  Amber Dolezal | Date |
| Signature | Print Name  Austin Hobbs | Date |
| Signature | Print Name  Amyleila Mejia | Date |
| Signature | Print Name  Stefano Signorelli | Date |
| Signature | Print Name | Date |