

Union Pacific Multimedia Wall CyRIS (May15-19) Project Plan

Team Members:

Randy Groh
Alex Haynes
Brandon Kuha
Brylee Raupp-Timmons
Ian Rosenbery
Maria Vognsen
Aaron Zatorski

Advisors:

Dr. Manimaran Govindarasu
Brock Ascher

Table of Contents

- I. [Executive Summary](#)
- II. [Project Plan](#)
- III. [Problem Statement](#)
- IV. [Deliverables](#)
- V. [Requirements](#)
 - [Ticker](#)
 - [Stellarium Screensaver](#)
 - [Stellarium Application](#)
 - [Music Machine](#)
 - [Directory Search](#)
 - [Club & Research Spotlight](#)
 - [Daily Brain Bytes](#)
- VI. [Use Cases](#)
 - [Ticker](#)
 - [Stellarium Screensaver](#)
 - [Stellarium Application](#)
 - [Music Machine](#)
 - [Directory Search](#)
 - [Club & Research Spotlight](#)
 - [Daily Brain Bytes](#)
- VII. [Project Schedule](#)
- VIII. [Risks](#)
- IX. [Tasks and Responsibilities](#)

I. Executive Summary

At the current time, the interactive wall is a group of 12 (4 wide x 3 tall) - 55in LED displays that are linked together to create a larger display. The Union Pacific Multimedia Wall, also known as CyRIS, is the name of this display and project. Currently, the display does not utilize the interactive potential that the hardware possesses and lacks “curb” appeal that gets potential users interested. The design objectives for this project are as follows:

1. Effectively utilize the Intuiface software
2. Develop and implement applications utilized by users
 - a. Ticker App for Lab Information
 - b. Stellarium
 - i. New Screensaver
 - ii. Application
 - c. Music Machine
 - d. Directory Search
 - e. Club & Research Spotlight | CMS
 - f. Daily Brain Bytes
3. Develop a creative interface that attracts users
4. Modularize progress for future groups

The team has created a general plan for being successful in completing the project goals. The first step is to get-to-know the Intuiface software so that the team can further utilize it to develop new applications and understand the possibilities. Through this process, the team will be able to discover if what is desired is feasible or not. With knowledge of the capabilities, the team can then further develop a plan more accordingly in order to create more comprehensive requirements. Once the team starts creating applications that meet requirements, the team will test frequently and fix any errors or bugs that arise. When everything is done, the team will have a finished product that can be displayed on the wall for everyone to use.

Currently, the team is in the process of understanding the Intuiface software and getting a grasp on the previous team’s progress. Based on the research done, wall response times, calibration and accuracy, and hardware limitations will constrain the requirements. One of the next steps is to discover a way to make a more responsive wall within the constraints of the IR sensors. Following steps will be to do some maintenance on the hardware and previous applications, start to develop and

experiment with the new designs, determine how to integrate them into Intuiface, and begin testing with the ultimate goal of deployment.

II. Project Plan

The team's overall goal is to create a more appealing interface that meets modern expectations. The goal will be achieved by creating several applications for the CyRIS wall that will induce ISU students' and by-passers' curiosity about the display. These applications will create an intuitive, interactive, entertaining, and informative experience. The applications will be constructed in such a way that users can find desired information quickly or experience an engaging diversion.

The team's plan is to research ways of embedding applications into the Intuiface platform so that all applications are cohesive. After discovering different ways to do this, the team will research ways to create a more intuitive and useful interface that involves all the available applications. Being able to launch available applications from the main display with minimum navigation and delay is our ideal approach. Being able to research and development new applications effectively will be the team's major goal in order to be successful. If new ideas, research or possibilities arise that could potentially provide value, the team will discuss and decide if and/or how it can be included into the team's overall goal.

III. Problem Statement

The current interface and content displayed on the CyRIS wall is uninteresting, unintuitive, sluggish, and lacks to demonstrate the interactive potential that the hardware can provide. The goal is to create new applications that will take advantage of the hardware's potential, as well as be easily discoverable and managed by future teams and project owners. All new applications will be integrated into the current system, or newly updated system, when finished, if feasible.

IV. Deliverables

a. Apps to Revise / Maintain

i. Webcam Viewer

1. The user can view and read information about publicly accessible video feeds of various engineering labs, campus webcams, and other engineering or science related feeds. (NASA, ESA, Cagliari University, Polar Science Center, etc.)

ii. Staff Directory

1. The user can read short bios about the staff within Coover Hall and their research. Their contact information and a photograph will also be visible.

iii. Campus Map with CyRide Integration

1. An interactive map of the Iowa State University campus with live data about the CyRide bus system. The user can select a route and a building location to see upcoming arrival times.

iv. Social Media

1. Twitter

- a. An interactive, scrollable feed of CoE related tweets

2. Facebook

- a. Events and status updates from the CoE Facebook page

3. RSS

- a. ISU and Technology related headlines that appear in a scrollable feed.

v. Front Page

1. The layout and appearance of the main page of the wall will be updated to include icons for launching the existing and newly deployed applications, and widgets for those without an icon.

vi. Launch Applications in a better fashion

1. Rather than transition from Intuiface to a java application and then back when it exits, all applications moving forward will be developed and executed within the Intuiface framework.

b. Apps to Develop

i. Ticker

1. The ticker app shows available workstations in Coover Hall by leveraging the LabStats API. It Dynamically updates. Shows the available labs per hour and which stations are available in the open labs.

ii. Stellarium Screensaver

1. The wall uses the open source project Stellarium to provide a map of current constellations visible from Ames, Iowa as a screensaver.

iii. Stellarium Application

1. The Stellarium Application utilizes open source code that allows a user to view constellations from the wall's current geo-location, other hemispheres or cultures and interact with the night sky. Users can view details about the constellations and learn about the universe.

iv. Music Machine

1. The Music Machine application allows one or two users to drag an instrument into the play area and play music. Users can record their performance and save it on the wall. Users can click recordings and listen to past demonstrations. Users can vote on recordings and track their stats on the leaderboard.

v. Club & Research Spotlight | CMS

1. The Club & Research Spotlight shows showcased content submitted to the department such as research projects ongoing in the department or projects being undertaken by engineering clubs. Student newsletter could also be a source of information or stories, and the application is sufficiently flexible to support the display of many types of content and media.

vi. Daily Brain Byte

1. This widget will display daily updated text or images that is pulled from various sources. This content could be a quiz, fact, engineering puzzle/problem, or tech / science joke. These can be submitted by students as well as pulled from online databases.

vii. Directory Search

1. The Directory Search application allows a user to do an alpha search for any ISU faculty or students for various information (contact, phone number, any available info on ISU directory site) using a

text-input solution. This differs from the existing staff directory in that it is not limited to just the staff of Coover hall.

V. Requirements

Ticker

Details: The ticker app shows available workstations by leveraging the LabStats API. Live/dynamically updates. Shows the available labs per hour and which stations are available in the open labs.

Functional Requirements:

Display available labs with details: Number open stations, OS, etc.

Contains schedule of the labs (future free times)

Scrollable list

Scalable sizes via pinch or button (a method to be determined)

Sortable (OS, Floor, building, availability)

Non-functional Requirements:

LabStats API must poll new data every 5 min.

Scalable with minimal quality loss ($\frac{3}{4}$ screen size MAX)

Sort within 1 sec

Stellarium Screensaver

Details: The wall uses the open-source project Stellarium to provide a map of current constellations visible from Ames, Iowa as a screensaver.

Functional Requirements:

Stop screensaver on touch (Message, "Touch to Start").

Screensaver shows user current constellation based on location.

Screen saver isn't interactive except for single touch to exit.

Non-functional Requirements:

Dynamically start each night at sunset and 5 min of inactivity has been reached during sunset to sunrise.

Dynamically stop each morning at sunrise.

On touch should start main display within 2 sec

Stellarium Application

Details:

App utilizing an open-source project that allows a user to view constellations from current geo-location, other hemispheres or cultures and interact with them. View details about the constellations and navigate around them.

Functional Requirements:

Be able to view an interactive constellation based on various locations, cultures and details.

Launch covers entire screen

Can get back to home screen from within application

Non-functional Requirements:

App should always be in English.

App updates view on every user prompt - real time

Music Machine

Details:

Application allows one or two users to drag out an instrument to play area and play music. Users could record their playing and save it on the wall. Passing users could click recordings and listen. Vote up and down possible.

Functional Requirements:

Users can hear the notes played real time

Users can play two instruments (piano and drums)

Users can record

Users can play a recording back

Users can stop a playback.

Show a loading animation during playback load

Administrators can delete any recording if necessary.

Users can up or down vote.

Organize recordings by vote.

Name recording.

Demo playback.

Non-functional Requirements:

Notes being playback are loaded from midi file in realtime

Capable of playing two instruments at the same time without delay

Users can save recording for a maximum of 1 min.
Users can save recording of a minimum time of 8 secs.
Playback loading 5 seconds wait time max
Playback stop instantaneous
Users can only up or down vote a recording once per full length of the playback
Organizing is updated real time per vote
Name recordings using selected dictionary of valid and relevant appropriate words
Demo playback of at least 16 secs.
Wall IR sensor constraint (Minimize Touch Delay)

Directory Search

Details:

Allows a user to do an alpha search for any ISU faculty or students for various information (contact, phone number, any available info on ISU directory site) using a text-input solution.

Functional Requirements:

Switch between faculty and student search
Search alpha A-Z
Search through text-input solution
Display Faculty or student info such as Name, Availability, email, department and anything available on the normal ISU directory search.

Non-functional Requirements:

Input solution does not have accessible hot keys or window keys
Searches complete within time constraint of ISU network

Club & Research Spotlight | CMS

Details: shows users showcased content such as research projects ongoing in the department or projects being undertaken by engineering clubs. Student newsletter could be a source of information or stories?

Functional Requirements:

Stories contain description, images, titles, video, and author
Stories can be submitted through a web based content management system
Stores are scrollable
Stories are selectable
Images in stories can be zoomed (Facebook-like overlay)

Links to engineering club pages can be clicked. (Might present a security vulnerability)

Non-functional Requirements:

Images zoom (and de-zoom) within 1 second

Stories load within 2 seconds

Scalable with minimal quality loss ($\frac{3}{4}$ screen size MAX)

Scrolling is smooth

Daily Brain Bytes

Details: This widget will display daily updated text that is pulled from various sources.

This text includes possibly a quiz, fact, engineering puzzle/problem, tech / science joke.

This could be submitted by students.

Functional Requirements:

The content will be easy to read and unobtrusive to the main display

Content can be submitted through a web based content management system

Non-functional Requirements:

New content will be polled at midnight each day.

If content is unreachable the application will hide the chrome for that content.

VI. Use Cases

Ticker

- User can select lab to view future open times
- User can scroll through lab listings

Stellarium Screensaver

- User touches screen saver to close screensaver

Stellarium Application

- User can view all current constellations visible from Ames, Iowa
- User can swipe the globe-view left or right to rotate and view more constellations
- User can tap on a constellation and receive information about it.

Music Machine

- Goal: Create own instrument(s) soundtrack and save for peer listening
 - User launches application by touching icon
 - Exception: Application could have been previously launched and no launch is necessary
 - User brings instrument(s) into playing area via a swipe on the touch screen
 - Extension: User removes instrument(s) from playing area via a swipe on the touch screen
 - User presses the “record” icon via touch screen to begin recording
 - User “plays” instrument(s) via touch screen presses
 - User presses the “stop” icon via touch screen to end recording
 - Exception: The user exceeds time limit for recording and “recording mode” ends
 - Extension: User presses the “play” icon via touch screen to review recording
 - User presses the “save” icon via touch screen to submit recording
 - User presses the “exit” icon via touch screen to exit application
- Goal: Listen to submitted recordings and vote on preferences
 - User launches application by touching icon
 - User scrolls through saved tracks via touch screen
 - User presses the “playback” icon via touch screen to start individual playback
 - User listens to playback
 - User presses the “up vote” icon via touch screen to give recording a point

- User presses the “exit” icon via touch screen to exit application

Directory Search

- Search the CPRE directory
- Select and view directory profiles

Club & Research Spotlight | CMS

- Goal: Upload a story to be reviewed for the wall
 - User loads web application via browser
 - User signs into web application
 - User enters text into text boxes
 - User uploads pictures from computer
 - Optional: User uploads video from computer
 - User submits story by a “submit” button
 - User logs out of web application
- Goal: Review a submitted story to place on wall
 - Admin loads web application via browser
 - Admin signs into web application
 - Admin clicks “review submissions” button
 - Admin selects story from list
 - Admin reviews story
 - Admin clicks “approve” or “disapprove” based upon decision
 - User logs out of web application
- Goal: Manage existing stories on wall
 - Admin loads web application via browser
 - Admin signs into web application
 - Admin clicks “currents stories” button
 - Admin reviews list of current stories
 - Admin removes existing stories by clicking “X” button
 - Admin clicks “delete” button on confirmation popup
 - User logs out of web application
- Goal: View stories on wall
 - User scrolls through stories on wall via touch screen
 - User selects story by touch
 - User views story
 - Expansion: User touches photo and it expands to screen
 - Optional: Expansion: User touches video and it expands and plays on screen
 - User closes story by touching “X” icon

Daily Brain Bytes

- User can view content and interact by reading a joke or daily fact
- User can interact with content (quiz or puzzle) by selecting multiple choice answer via touch

VII. Project Schedule

Task Name	Start	Finish	Q3			Q4			Q1			Q2		
			Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
1 Familiarization with codebase and project specification cr	09/17/14	09/30/14			■									
2 App Maintenance discovery	10/01/14	10/08/14				■								
3 Developing	10/08/14	10/15/14				■								
4 App maintenance discovery	10/15/14	10/22/14					■							
5 Developing	10/22/14	10/31/14					■							
6 Implementation of UI layout / App Testing	11/01/14	11/17/14					■							
7 Testing, Development, Presentation	11/17/14	12/01/14						■						
8 Mistakes / Challenges unforeseen	12/01/14	01/16/15						■	■	■				
9 Bugs being addressed	01/12/15	01/19/15								■				
10 Retrospection on previous semester	01/12/15	01/19/15								■				
11 Start developing new apps	01/19/15	01/30/15								■				
12 Development of new apps	02/01/15	04/01/15								■	■	■		
13 User testing / breaking things	04/01/15	04/13/15											■	
14 Revisions based on resluts	04/13/15	04/24/15												■
15 Deployment, documentation, presentation	04/25/15	05/15/15												■

VIII. Risks

Running java applications inside Intuiface

The previous team for this project launched their applications as separate java applications instead of being attached to Intuiface. A major goal for this project is to merge past and future applications with Intuiface; failure to find a good way to do this would be a major setback.

IR Beam limitations on user input

Using IR beams to detect user input has a sizeable delay when compared to modern touch screens which may inhibit the team's ability to make applications requiring rapid user input. Some applications may also feel slow or unresponsive if this isn't accounted for.

Utilizing/Locating previously implemented code

In order to improve/modify the code that has already been made, it first needs to be found. So far there has been difficulty in locating the actual source code for the applications which may deter progress for longer than originally planned if this continues. When the code is pinned down, its' general structure/organization also has potential to slow progress if done in an ad hoc manner.

IX. Tasks and Responsibilities

- a. Randy Groh - Team Leader
 - i. The Team Leader will liaise between the senior design team and the client as well as be the main contact for the department advisor.
 - ii. CMS | Club & Research Spotlight
 - iii. Daily Brain Byte
- b. Alex Haynes - Penetration Tester & Brainstorm Dynamo
 - i. The Brainstorm Dynamo will generate creative ideas and features for both existing applications and new programs to develop. This member must be careful both to neither dismiss new ideas out of hand, or be sensitive to valid concerns about the viability of new concepts.
 - ii. Directory Search
 - iii. Ticker
- c. Brandon Kuha - Webmaster
 - i. The Webmaster creates and manages the team website. The site contains the weekly project reports and will be the main reference for the project.
 - ii. CMS | Club & Research Spotlight
 - iii. Daily Brain Byte
- d. Ian Rosenbery - Code Tester/Evaluator
 - i. The Code Tester/ Evaluator determines how robust and user-proof an application is. He or she will stress the system and push it to the limit, checking edge and corner cases to see if the applications become unresponsive or behave improperly. Bugs discovered will be reported along with reproduction steps to limit the showstopper errors that make it to deployment.
 - ii. Music Machine
 - iii. Stellarium Application
- e. Brylee Raupp-Timmons - Key Concept Owner
 - i. The Key Concept Owner has a strong vision for the project and knows what needs to be done next. They keep the group on task and make the team aware when resources are being expended incorrectly.
 - ii. Music Machine
- f. Maria Vognsen - Key Concept Owner
 - i. The Key Concept Owner has a strong vision for the project and knows what needs to be done next. They keep the group on task and make the team aware when resources are being expended incorrectly.
 - ii. Ticker

- g. Aaron Zatorski - Communications Director
 - i. The Communications Director drafts communiques, prepares the weekly team reports, and has final say in the formatting of all documentation and written dialogue. They are responsible for collating and organizing the paperwork behind the project in order to track progress and facilitate retrospective analysis.
 - ii. Stellarium Screensaver
 - iii. Stellarium Application