

Mobile Navigation Control for Planetary Web Portals

-- Trek Controller --



The Team

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- Frank Navarrete - iOS Architecture Lead
- Kevin Parton - Documentation Lead
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Agenda

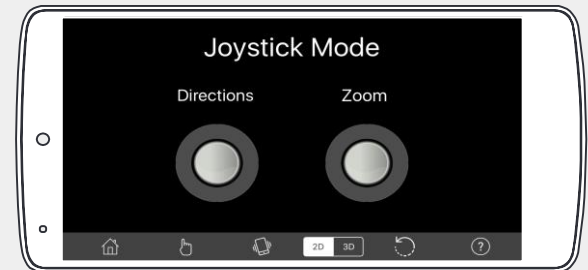
- 1 Overview
- 2 Demo
- 3 Technical Implementation
- 4 Additional Features
- 5 Questions?



Overview

The Project

Develop a mobile controller which allows users to navigate any Trek Portal without the use of a mouse or keyboard.



Concept



● Features

○ Platforms

- iOS
- Web



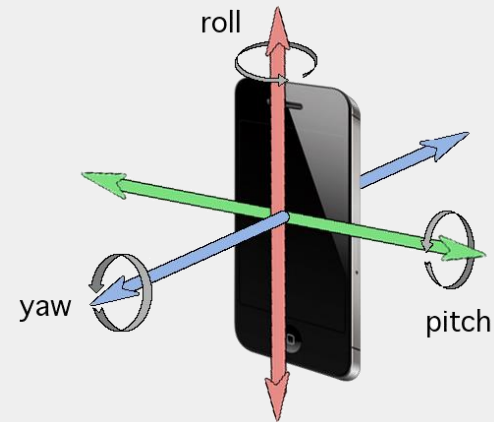
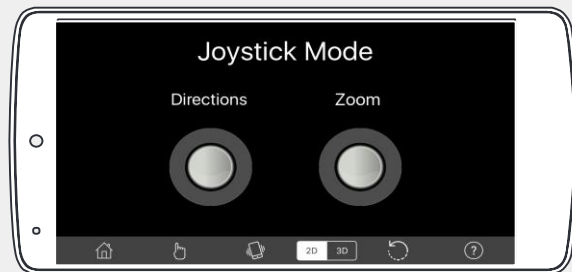
WWW



● Features

○ Controller Modes

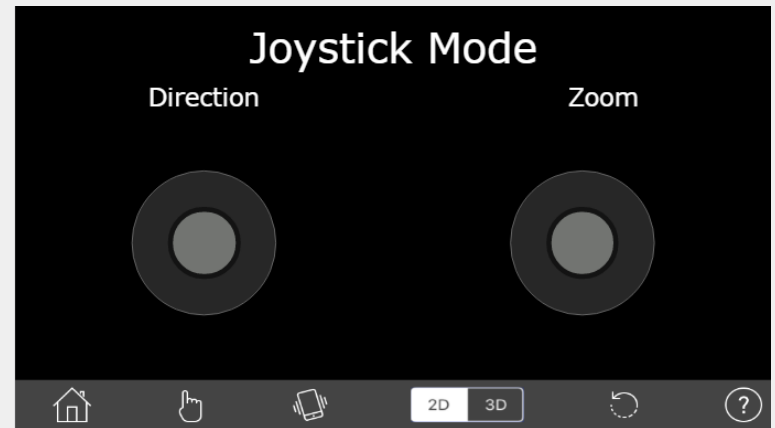
- Touch-Swipe
- Joystick
- Motion (iOS)



● Features

○ Controller Functions

- 2D | 3D
- 8-way movement
- Zoom in, out
- Reset View



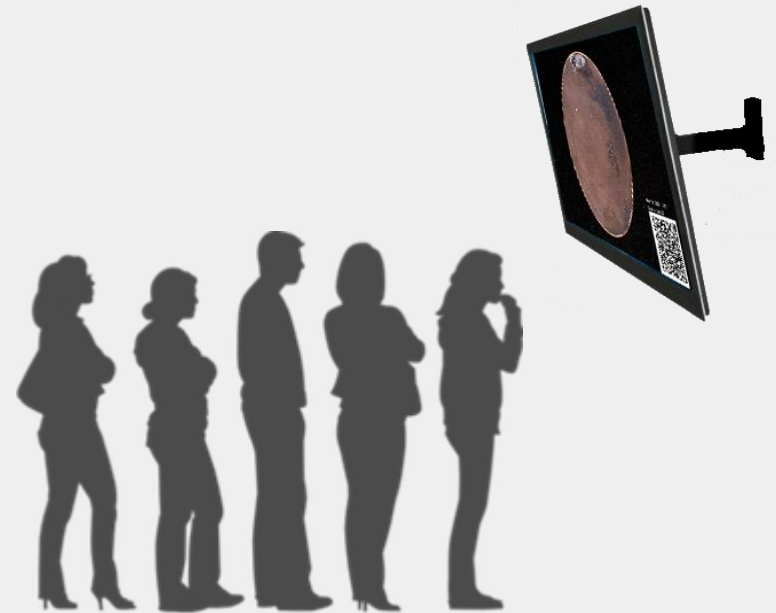
● Features

○ Connection Management

- QR- & Verification-code
- Queue

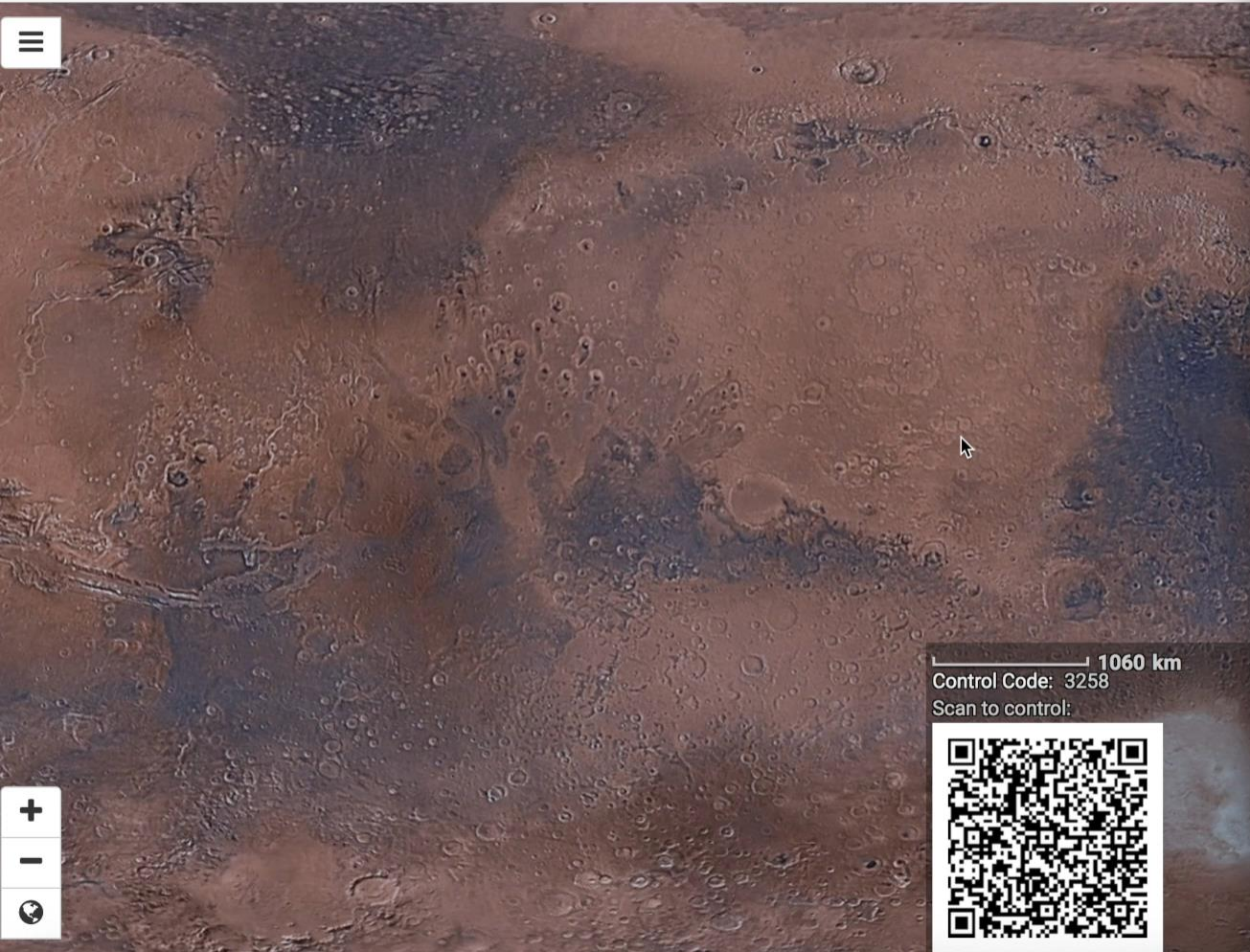
Extras

- Mars Fast Facts
- Weight on Mars
- About Trek Controller
- Social Media





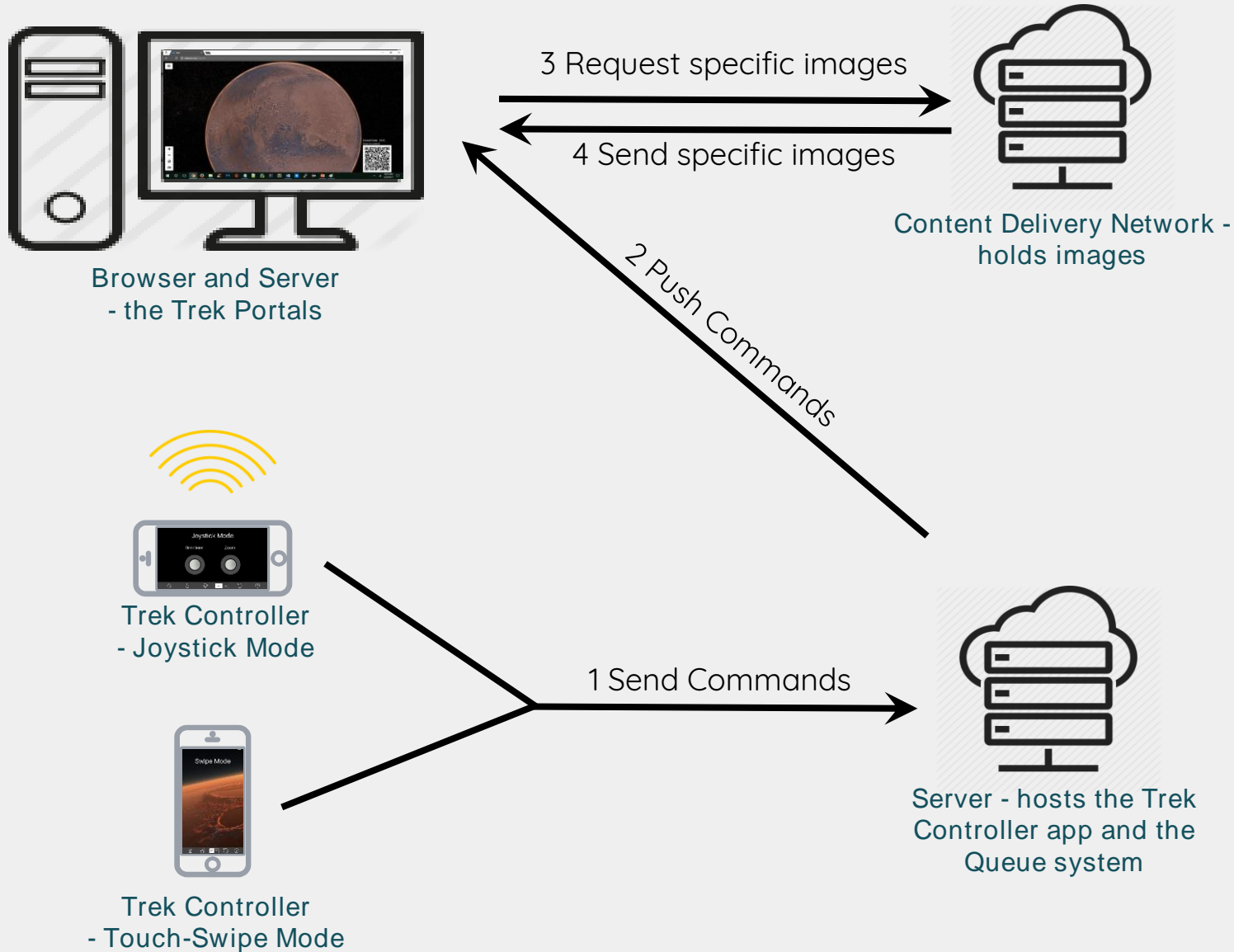
Demo





Technical Implementation

- Application Flow





Server

Servlet

- Concurrent Controllers & Trek Instances
- SSE
 - Routing
 - Session Object
 - Concurrent Map with Key

Server Sent Event (SSE)

- Unidirectional Events
 - No need for bidirectional communication
- Faster to implement



Front End — Controller

Touch-Swipe

- Web & iOS
 - Swipes
 - Pinches
- API

Joystick

- Web
 - nippleJS
- iOS
 - SpriteKit
- API

Motion

- iOS
- No zoom motion
- API



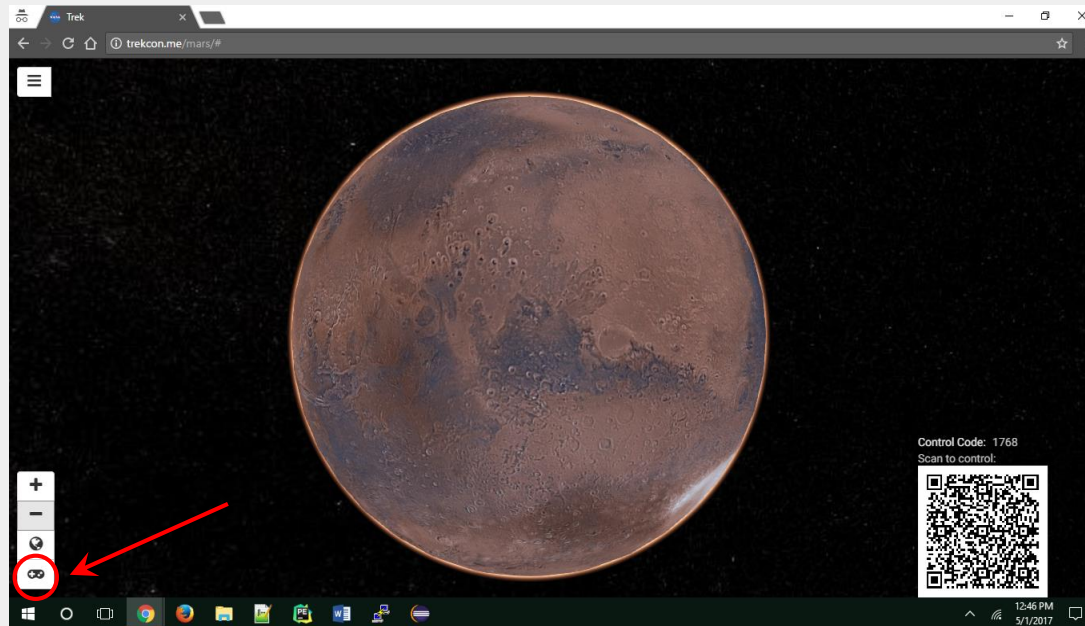
Front End — Trek

2D View

- ArcGIS Map

3D View

- Game Controller
- On-Tick Listener





Front End — Trek

QR

- Overlay
- 4-digit code
- White border
- Amount of info





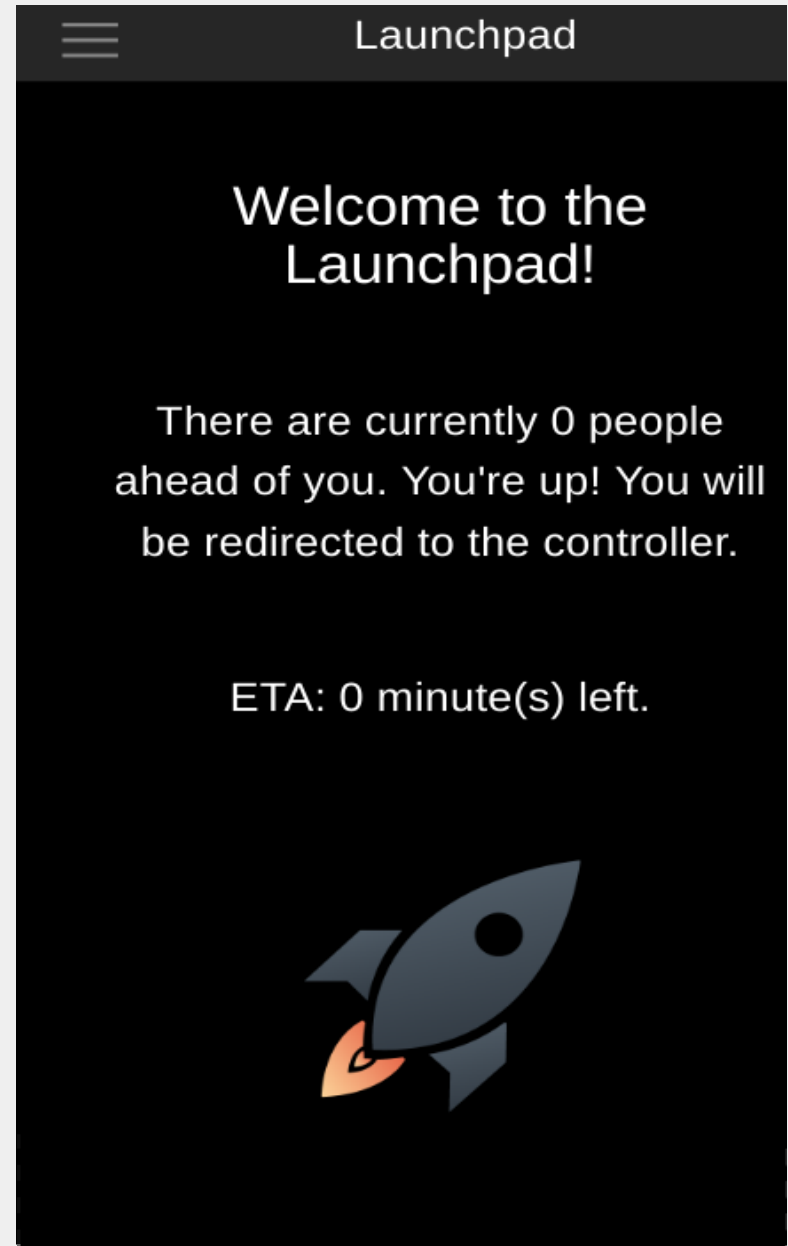
Queue

Back-End

- MySQL
- Cookies
 - Controller ID
 - Trek ID

Front-End

- SSE
- Position Updates
- Redirect to Controller



• Development Timeline


• **Alpha** Dec 16, 2016

- 3D
- Touch-Swipe
- Joystick

• **Beta** April 7, 2017

- 2D
- Motion (iOS)
- Routing
- Design

• **Final** May 5, 2017

- Queue
- Bug-free 

● Additional Features

- Motion (Web)
- Rotate
- Help
- Screenshots
- Bookmarks
- Presenter Mode
- JPL News

• Technology & Challenges



Standalone Site

- Javascript
- Dojo



SSE

- Servlets
- Disconnects



Design Flow

- Refining implementation details



iOS

- Swift
- Compatibility



Web

- Javascript
- Compatibility



Bugs

- QA

● Conclusion

- ◦ Communication architecture
- ◦ User-friendly front-end
- ◦ 8-way movement and zoom
- ◦ Queueing system



QUESTIONS?