MICHIGAN STATE
UNIVERSITY

Project Plan Presentation
Gate Hazard Geo-Mapping

The Capstone Experience

Team United Airlines Airport Operations

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Fall 2021

From Students…
     …to Professionals

Functional Specifications

- United Airlines employees encounter hazards around the gates they work at. To ensure everyone is aware of these hazards, the Airport Operations Team has created a list of all the hazard information. This data is in a non-uniform format, which can lead to some hazards being missed by employees.

- To combat this, UA envisions a mobile application which can display this hazard information and highlight the exact location on a map in an organized way.

- UA hopes this app will allow employees to avoid any dangerous situations and increase their safety.
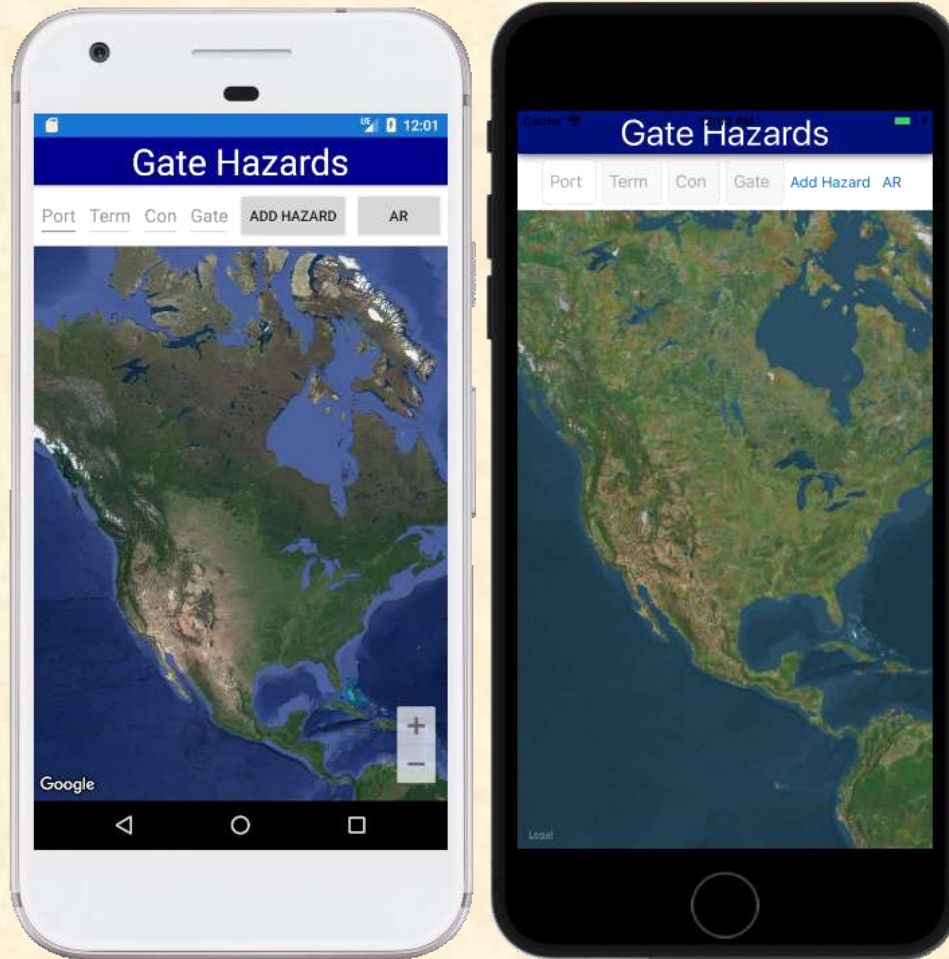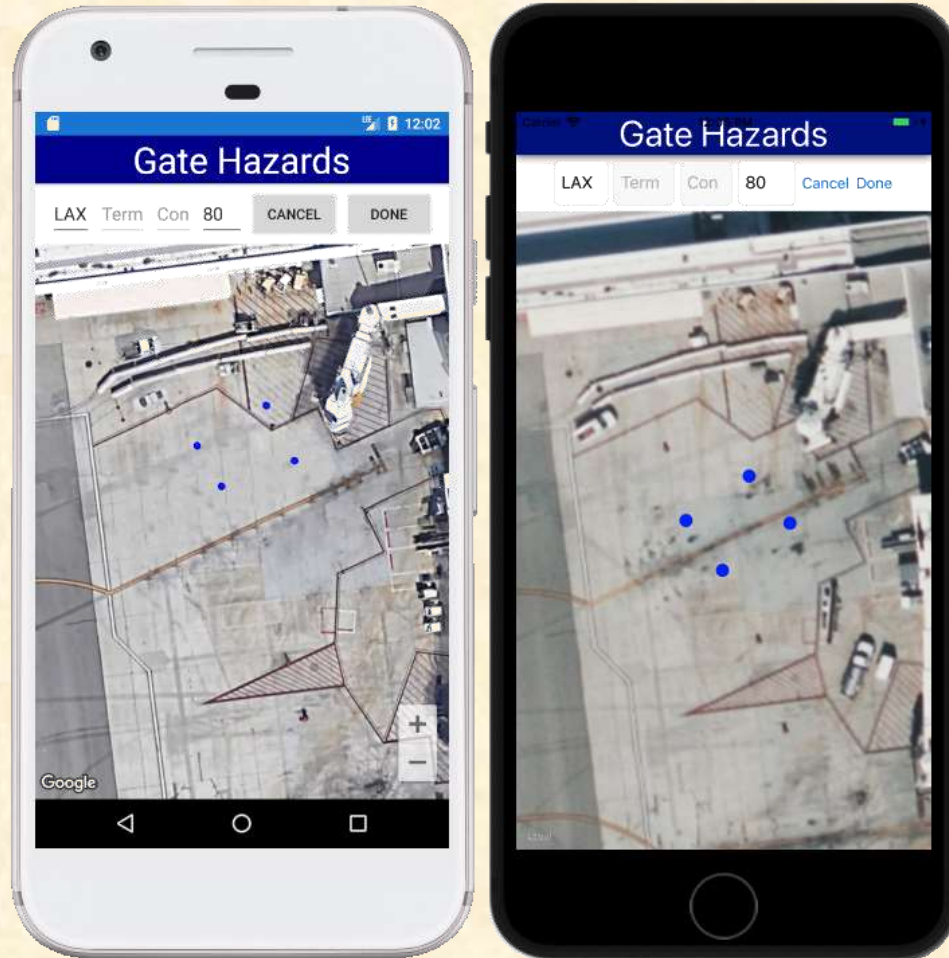
Design Specifications

- The application must be device-agnostic, working on both Android and iOS
- The app with display a map, able to focus on a specific area by selecting airport, terminal, concourse, and gate from a drop-down menu
- The main view will be of a 2D map with hazards visible as outlined shapes
- Hazards will be displayed by gate, and filtered by affected department
- Administrators may add hazards and update hazard information
- There will be a web interface to add new airports, as well as hazards outside of the application
- If time permits, an AR view of the hazards will be included in the mobile apps
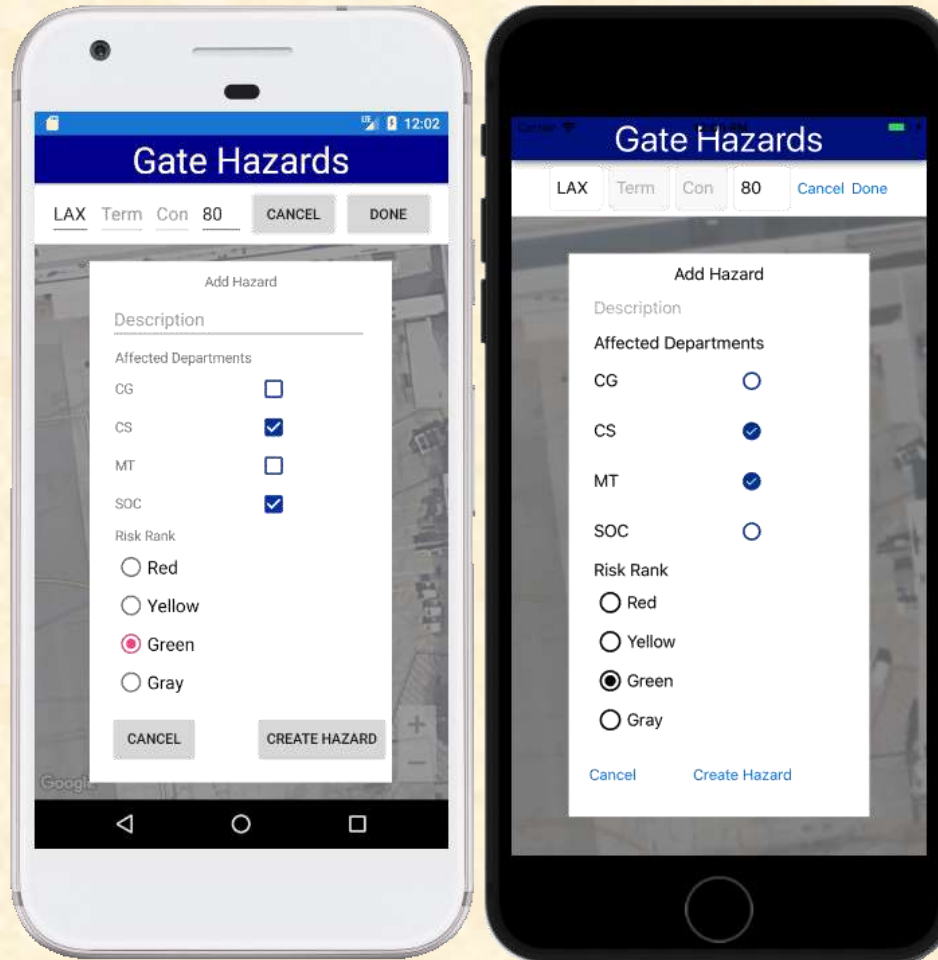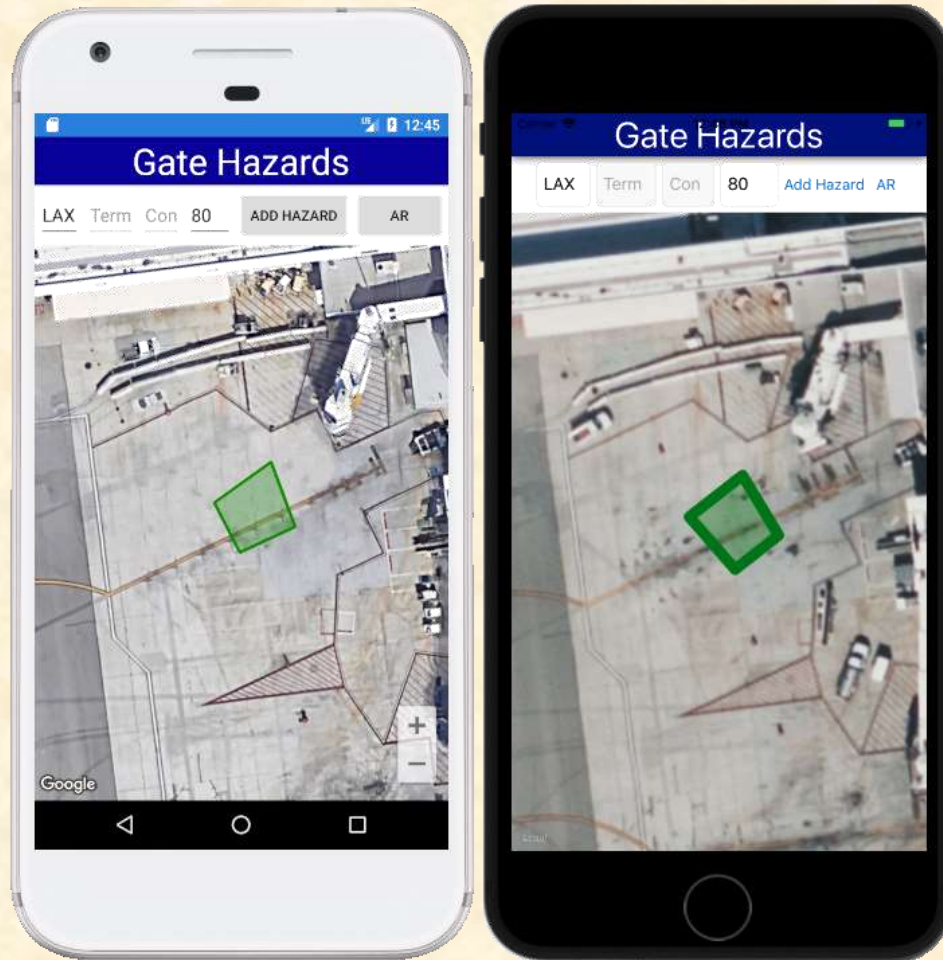
Screen Mockup: Opening Screen
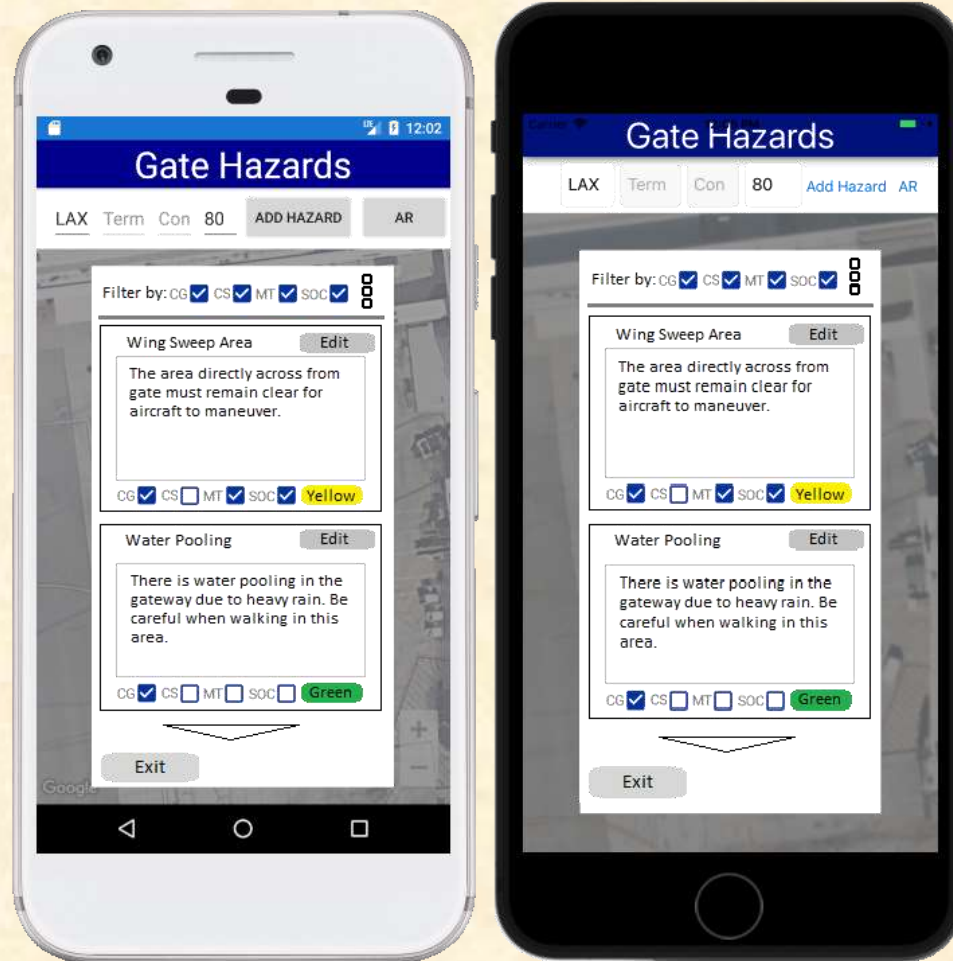
Screen Mockup: Add-Hazard Points

Screen Mockup: Hazard Details

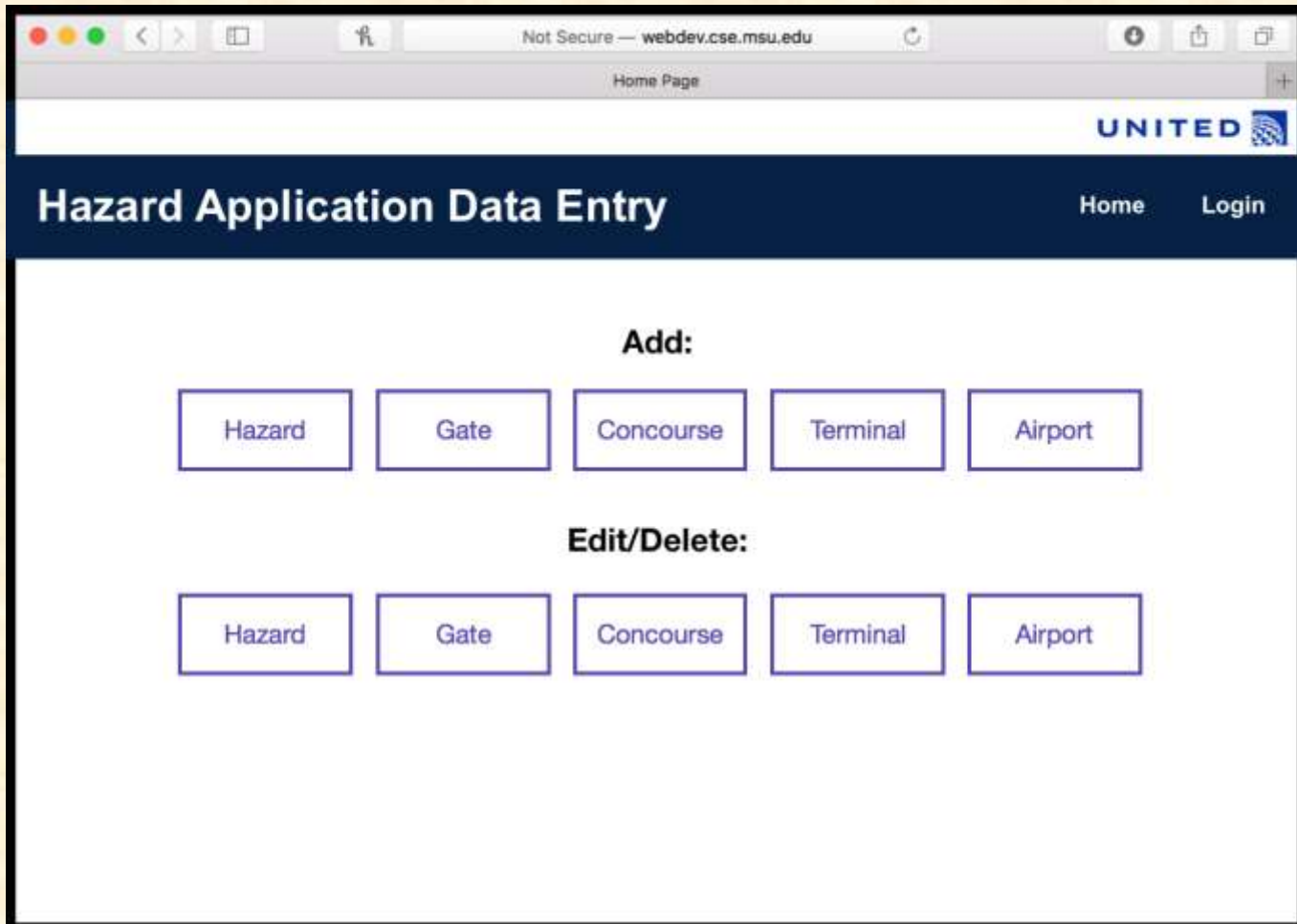# Screen Mockup: Hazard 2D View

Screen Mockup: Hazard List View

Screen Mockup: Main Web Page

Screen Mockup: Add Hazard Page
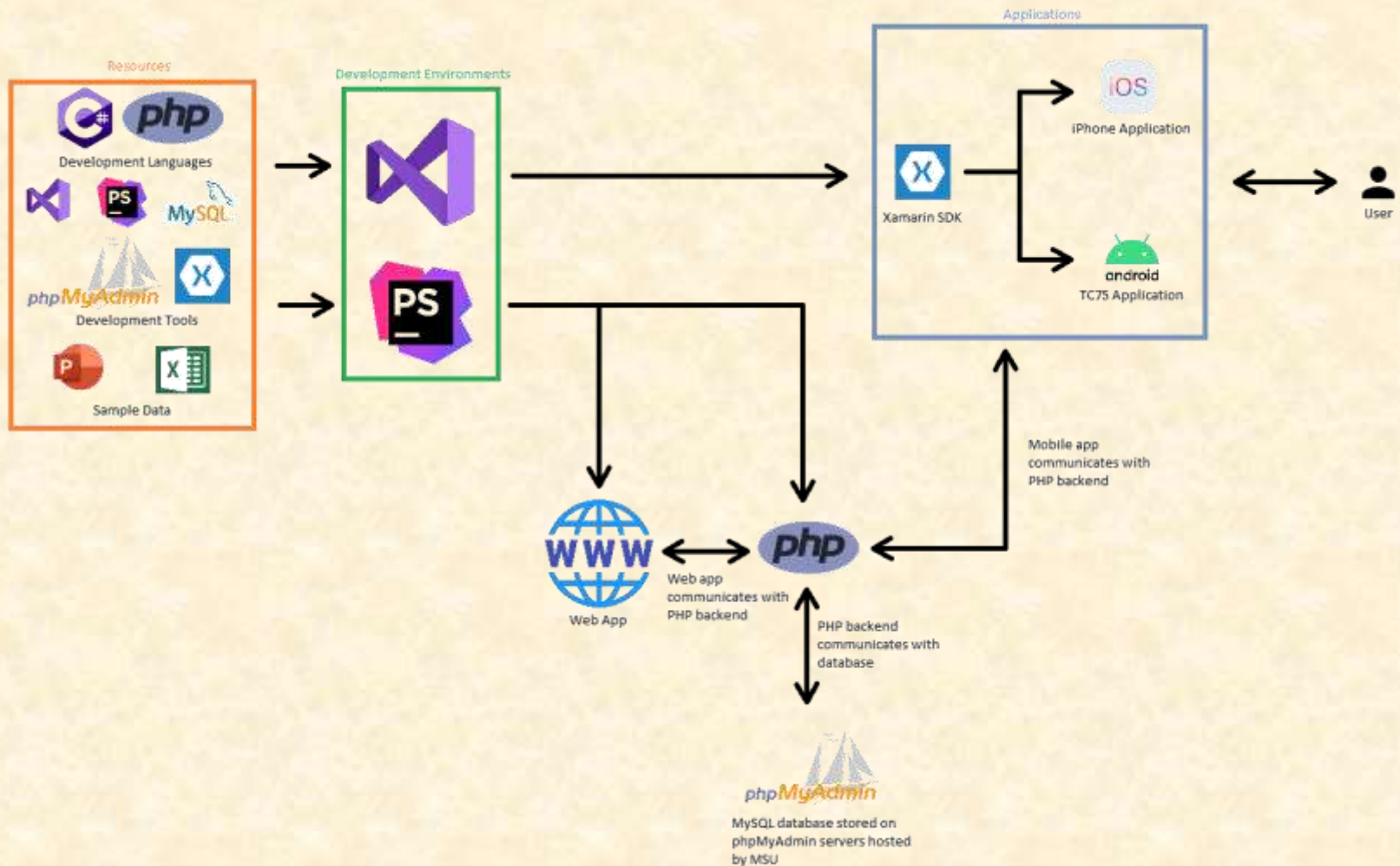
Technical Specifications

- End user can access app on iPhone 6+ or Zebra TC75 Scanner

- App developed in Visual Studio 2019 using C# and the Xamarin platform

- Backend and website developed in PHP using PhpStorm

- Server hosted on phpMyAdmin and supports a MySQL database

- User can manually enter hazard data on the website to upload to the database

System Architecture

System Components

- Hardware Platforms
  - iPhone 6+ running iOS 12.5.4 and newer
  - Zebra TC75 Scanner running Android 4.4 and 5.1
- Software Platforms / Technologies
  - Visual Studio 2019
  - PhpStorm
  - GitLab
  - phpMyAdmin
  - Xamarin

Risks

- Ensure our User Interface is intuitive and user friendly
  - Description: The application UI must be created so that users are able to navigate the app intuitively
  - Mitigation: Testing with United Airlines employees to polish the design to their needs

- Different map software on iOS and Android
  - Description: Unable to get same map software on iOS and Android using Xamarin efficiently
  - Mitigation: Utilize Xamarin's ability to share functionality across both platforms

- Difference in functionality across platforms
  - Description: Required Android and iOS versions are different (Android is much older)
  - Mitigation: Pointedly developing for both platforms at the oldest operating system versions

- Non-uniform hazard data
  - Description: The hazard data is non-uniform and has to be entered in manually, which can be inefficient
  - Mitigation: Make it quick and easy to add, edit and delete hazards to reduce the time needed to manually enter the data

- Android 4.4 bug in Xamarin
  - Description: Android 4.4 has a bug in Xamarin when it comes to making network calls with http clients
  - Mitigation: Force android to use TLS 1.2 instead of the default network communication method

Questions?

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