MICHIGAN STATE UNIVERSITY

Project Plan

Mobile Avionics Weather Application

The Capstone Experience

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From Students…
…to Professionals

Project Overview

- Tablet based application for iOS and Android platforms.
  - Main focus is iOS.
- Retrieve and display weather data in a format useful for aviation industry.
- Easy to use and intuitive UI.

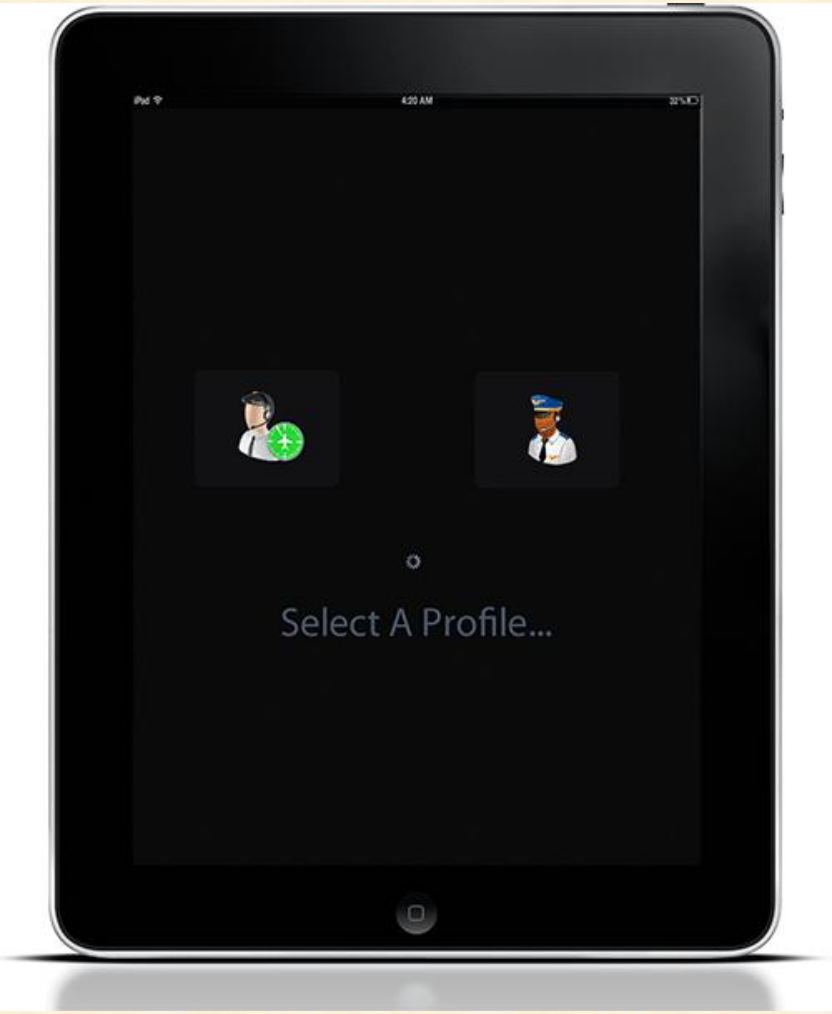
Functional Specifications

- Layered architecture
- API back end
  - Retrieves information from NDFD servers.
  - Parses and presents data to interface layer.
- GUI front end
  - Profile System.
  - Viewing Window.
    - FAA Sectional Charts (default screen).
  - Radar Overlay
    - Overlay radar images above FAA sectional charts.

Design Specifications

- Profile selector
  - User has the option to choose between preconfigured profiles, or to customize their own.
- REST services
  - Retrieve weather data via REST requests from NDFD's servers
- Display Graphical Map
  - Displays map of the users current region.
  - Radar overlay along with a text section that contains most relevant data.
  - User has the option to refresh weather data, return to profile selector screen, or navigate to the overlay options menu.
- Overlay Options Menu
  - Drop down menu gives user full control over what overlays are display on the map.
- Display Raw Data
  - The user has the option to view all data in text format.

Screen Mockup: Profile Selector



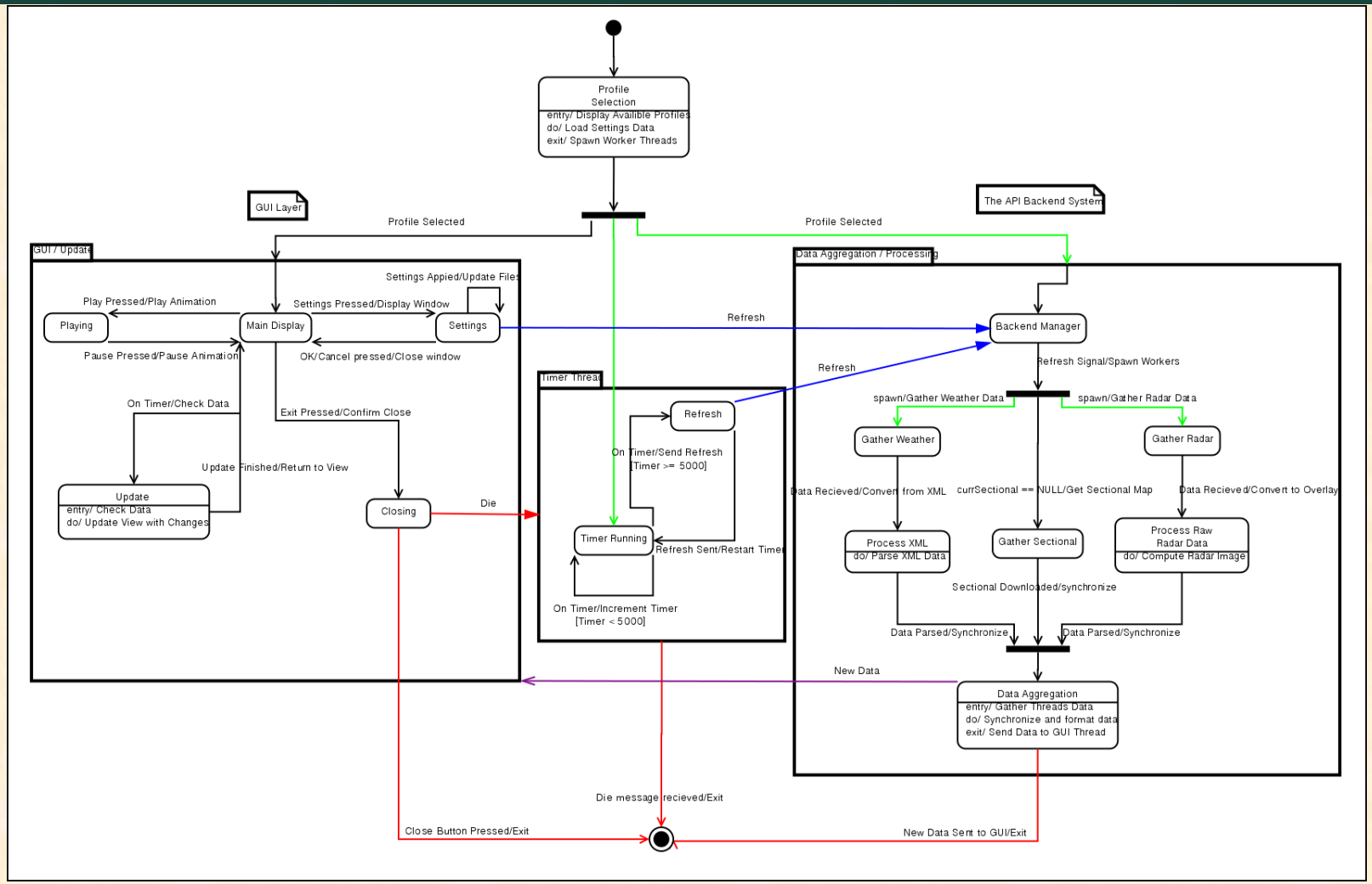
Screen Mockup: Graphical Display Screen

Screen Mockup: Overlay Options Menu

Technical Specifications

- User Interface
  - Allows user to interact with applications functionalities.
  - Designed in objective-c using X-code.
- Rest Services
  - National Digital Forecast Database provides REST based weather retrieval service.
  - Application uses tablets GPS/Internet capabilities to obtain coordinates, and send an HTTP request that contains a query string containing the input expected by the service.
  - Service responds by sending an XML document using DWML (digital weather markup language) dialect.
- Tablet GPS and Internet Capabilities
  - In order to function properly, application needs internet and GPS connectivity.
  - Use of external true GPS device is necessary above a certain altitude and or velocity.

System Architecture



System Components

- Hardware Platforms
  - iPad tablet
  - Motorola Xoom
  - MacBook Pro
  - iMac
- Software Platforms / Technologies
  - iOS 5
  - Xcode
  - Eclipse
  - Gingerbread

Testing

- Hello World Application on iPad.
- Hello World Application on Android.
- Working REST services request on iOS 5 emulator.

Risks

- High Level Risks
  - Completely new to iOS and Android development.
  - Displaying Radar Image Overlay.
    - Converting text based radar data into graphical overlay.
  - Loss of Internet/GPS capabilities above a certain altitude.
    - Application is completely dependent upon Internet/GPS connectivity.
- Medium Level Risks
  - FAA sectional charts are 5.1 gigabytes uncompressed, and 2.5 gigabytes compressed.
    - Possible storage capacity problem.
- Low Level Risks
  - NDFD servers only update weather data every 45 minutes.
  - Saving custom settings and profiles to tablet devices.