

Flight Planning Calculator

Software Requirements Specification Outline

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Introduction

This document specifies the requirements for the development of a “Flight Planning Calculator (FPC),” by Mac Daddy Inc. A FPC is a utility that allows pilots to perform various flight related calculations and conversions. The FPC has the ability to perform unit conversions (e.g., distance, speed, temperature, angle, and pressure). In addition, the FPC can calculate heading, ground speed, wind corrected angle, wind speed, wind direction, true airspeed, density altitude, runway winds, flying distance, course. The FPC is an Android mobile application that is used for pre-flight and during flight operations.

The FPC Software Requirements Specification (SRS) is derived from the customer’s Flight Planning Calculator needs statement. The purpose of this document is to specify the needs the customer wants for this system and the way that Mac Daddy Inc. has understood what those needs are. This document was prepared by the Mac Daddy Inc.

Team Project Information

Members/ Roles

- Team Leader: Adam Cossu
- Quality Manager: Jun Ma
- Planning Manager: Kenneth Kungania
- Design Manager: Stephen Woodford

Schedule

- Project Planning – 02/06/2012
- Requirements – 02/13/2012
- Architecture/Design - 02/29/2012
- Cycle 1 Construction – 03/6/2012
- Integration Testing – 03/14/2012
- Cycle 2 Construction – 03/26/2012
- System Testing – 04/04/2012
- Postmortem Analysis – 04/18/2012

Statement of Functional Requirements

This section provides a description of the functional requirements for the Flight Planning Calculator.

Initialize Requirements

- 4.1.1. The Flight Planning Calculator will be able to load data from a text file.
- 4.1.2. The text file is provided by the user.
- 4.1.3. The text file must include one airport per line.
- 4.1.4. Each line must be formatted with an Airport ID, signified with three capital letters, and Latitude and Longitude measurements in radians.

Unit Conversion Requirements

- 4.2.1. The calculator will convert distance units of statute miles, nautical miles, and kilometers.
- 4.2.2. The calculator will convert speed units of miles per hour (mph), knots, and kilometers per hour (kph).
- 4.2.3. The calculator will convert temperature units of Celsius, Fahrenheit, Kelvin, and Rankin.
- 4.2.4. The calculator will convert angle units of degrees, minutes, seconds, and radians.
- 4.2.5. The calculator will convert pressure units of milli-bars and inches of mercury at 60 degrees Fahrenheit.

Calculation Requirements

Heading, Ground Speed, and Wind Corrected Angle

- 4.3.1. The FPC will allow the user to enter the wind speed.
- 4.3.2. The user will be able to select which units to use for wind speed in mph, knots, kph.
- 4.3.3. The FPC will allow the user to enter the wind direction.
- 4.3.4. The user will be able to select which units to use for wind direction in degrees, seconds, minutes, or radians.
- 4.3.5. The FPC will allow the user to enter the true airspeed.
- 4.3.6. The user will be able to select which units to use for true airspeed in mph, knots, or kmh.
- 4.3.7. The FPC will allow the user to enter the course.
- 4.3.8. The course must be input in degrees.
- 4.3.9. The FPC will calculate the heading in degrees.
- 4.3.10. The FPC will calculate the ground speed in knots.
- 4.3.11. The FPC will calculate the wind correction angle in degrees.
- 4.3.12. The output will be displayed for the user on the FPC.

Wind Speed and Direction

- 4.4.1. The FPC will allow the user to enter the ground speed.
- 4.4.2. The user will be able to select which units to use for ground speed in mph, knots, kph.
- 4.4.3. The FPC will allow the user to enter the true airspeed.
- 4.4.4. The user will be able to select which units to use for true airspeed in mph, knots, or kmh.
- 4.4.5. The FPC will allow the user to enter the course.
- 4.4.6. The course must input in degrees.
- 4.4.7. The FPC will allow the user to enter the heading.
- 4.4.8. The heading must input in degrees.
- 4.4.9. Using the ground speed and true airspeed, the FPC will calculate the wind speed.
- 4.4.10. The wind speed units will be the same as the units used for ground speed.
- 4.4.11. The calculated wind speed will display on the FPC.
- 4.4.12. Using the course and heading, the FPC will calculate Wind Direction.
- 4.4.13. The wind direction units will be in degrees.
- 4.4.14. The calculated wind direction will display on the FPC.

True Airspeed

- 4.5.1. The FPC will allow the user to enter the indicated airspeed.
- 4.5.2. The user will be able to select which units to use for indicated airspeed in mph, knots, or kmh.
- 4.5.3. The FPC will allow the user to enter the mean sea level altitude.
- 4.5.4. The course altitude must be input in feet.
- 4.5.5. The user will be able to select which units to use for true airspeed in mph, knots, or kmh.
- 4.5.6. The FPC will calculate the true airspeed in the same units used.
- 4.5.7. The true airspeed will display for the user on the FPC.

Density Altitude

- 4.6.1. The FPC will allow the user to enter the pressure altitude
- 4.6.2. The user will be able to select which units to use for pressure altitude, either milli-bars or inches of mercury at 60° F.
- 4.6.3. The FPC will allow the user to enter the outside air temperature.
- 4.6.4. The user will be able to select which units to use for the outside air temperature in Celsius, Fahrenheit, Kelvin or Rankin.
- 4.6.5. The FPC will calculate the altitude in feet.

Runway winds

- 4.7.1. Using runway and wind direction and wind speed, the FPC will calculate the runway crosswind and runway headwind.
- 4.7.2. The user will be able to select which units to use for speed in mph, knots, kph.
- 4.7.3. The direction must be in degrees.

Flying Distance between Airports

- 4.8.1. The FPC will calculate the flying distance between the airports by using the ID's of two airports.
- 4.8.2. The user will be able to select which units to use for speed in mph, knots, kph.
- 4.8.3. The user will be able to select which units to use for distance in miles, nautical miles, kilometers.

Course between Airports

- 4.9.1. Using two ID's the FPC will calculate the course between the airports
- 4.9.2. The course will be output in degrees

User Interface

- 4.10.1. The FPC shall provide a user interface
- 4.10.2. The user interface will use a command line, text format
- 4.10.3. The user interface will have a menu from where the user will select a flight planning function to perform
- 4.10.4. The user interface will have a textbox where the user can input data required
- 4.10.5. The user interface will display output information.

Non-Functional Requirements

- 5.1. Exception Handling
 - 5.1.1. The FPC will notify the user of any incorrect input entry that does not satisfy the condition of the input.
 - 5.1.2. Upon notification, the FPC will allow the user to re-enter the input.
- 5.2. The FPC will calculate up to two decimal places.
- 5.3. The user will be able to have access a user/reference manual that will include:
 - 5.3.1. A systematic processes section on how to properly use the FPC.
 - 5.3.2. A "frequently asked questions" section with answer
 - 5.3.3. A section that explains the possible units for each entry
 - 5.3.4. Contact information for any technical difficulties.