

Yayasan Jasa Aviasi Indonesia



Jungle Jepps

Software Requirements Specification Document

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Document History and Distribution

1. Revision History

Revision #	Revision Date	Description of Change	Author
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2. Distribution

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1. Introduction

Yayasan Jasa Aviiasi Indonesia (YAJASI), a partner organization with JAARS and Wycliffe Global Alliance, is in need of a suite of software tools to manage runway diagrams.

1.1 Purpose

This document serves to define the specifications for developing the set of software tools to be used by YAJASI and/or Wycliffe partner organizations. It serves as an agreement between YAJASI and the developer in that the developer will provide an end product in accordance with these specifications.

This document is subject to change based on input from YAJASI and the developer pending approval by YAJASI and acceptance by the developer.

1.2 Scope

Jungle Jepps, while an existing product in use by YAJASI, can no longer be upgraded. It's source code was lost in a house fire. Thus Jungle Jepps needs to be recreated and expanded with a new suite of software tools.

The suite of software tools to be developed includes the following:

- Jungle Jepps Desktop: A Windows desktop application used for creating, editing, and managing runway diagrams.
- Jungle Jepps Mobile: An iOS mobile application used for viewing runway diagrams with local storage synchronized to Jungle Jepps desktop. Strong consideration should be given for cross-platform readiness on an Android device.

YAJASI's goal with the recreation of Jungle Jepps is to create a product with the following outcomes:

- An easy-to use, and customizable interface for both the Desktop and Mobile applications.
- The aforementioned applications written in an open-source programming language which does not require YAJASI or JAARS to purchase a proprietary license to maintain the source code.
- A central database structure that can be run as a stand-alone, or can be integrated with existing database tables.
- A simple synchronization model that is stable and reliable allowing multiple devices to receive the most current information from the central database and central file repository which is managed by the desktop application.

1.3 Definitions, Acronyms, and Abbreviations

1.3.1 Acronyms

- IDE – Integrated Development Environment, a software developer's programming application
- JJ – Jungle Jepps
- SRS – Software Requirements Specification Document, (i.e. this document)
- YAJASI – Yayasan Jasa Aviasi Indonesia, an Indonesian organization devoted to supporting the work of Bible translation through aviation services. YAJASI is a partner organization with Wycliffe Global Alliance.

1.3.2 Definitions

- Aircraft Type – A model of aircraft as designated by the aircraft manufacture. For this document, a Boeing 727 and a Boeing 737 are two different types of aircraft.
- JAARS – A WBT partner organization offering worldwide logistics and technical services. In this context, JAARS provides airmen recruiting and training services as well as aviation operations oversight to various sites around the world. JAARS and WBT are interchangeable terms in this document.
- Operations Database – A pre-existing database (MS SQL, MySQL, PostgreSQL, MSmdb, MSacddb, etc.) that stores runway information pertinent to the Jungle Jepps program. This database is not a part of the standard Jungle Jepps software suite.
- Runway Diagram – A document normally produced on a half sheet of paper with a Portrait orientation. The word diagram may be misleading in that by itself it indicates a drawing or graphic. However, the Runway Diagram document includes both a textual description as well as a graphic drawing of the runway.
- Runway Identifier – A unique 3 to 5 character alphanumeric code representing one runway.

1.4 Overview

This SRS contains detailed information concerning the creation of the Jungle Jepps software suite. The format of the document was adapted from the IEEE Guide to Software Requirements Specifications (Std 830-1993).

The entire Jungle Jepps Software suite is contained in this document. There are actually two pieces of software to be developed for two separate operating systems / computing devices. Combining the suite of two products into one document was done to aid YAJASI in the creation of the document.

The products are described in pairs in sections 1 and 2. Each product is described individually its own section (sections 3 & 4) for the products' specific requirements.

2. The Overall Description

Missionary pilots around the world serving with WBT / JAARS partner organizations rely on runway diagrams for each village runway. The purpose of a runway diagram is to describe the location and physical characteristics of the runway. It also serves as the official document for the operating procedures at the runway. Pilots read the runway diagram before landing to brief themselves on the uniqueness of the location. Pilots must then fly an approach to landing based on the safety parameters detailed on the diagram.

2.1 Product Perspective

Wycliffe / JAARS have been offering oversight for aviation operations around the world for many years now. Throughout these years, runway diagrams were often drawn by hand. Data pertinent the runway was placed on the diagram in a standard layout, but the diagram was mainly hand-written. Many sites now use an Office Suite to create their runway diagrams; however, there is one site (YAJASI) who has greatly benefitted from a Legacy Jungle Jepps program.

A screen shot of the Legacy Jungle Jepps program:

The screenshot shows the 'Jungle Jepps - [JungleJepps - Abmisibil (ABM)]' window. It has a tabbed interface with 'General' selected. The form contains the following fields and sections:

- Strip ID:** ABM Abmisibil (dropdown)
- Elevation:** 5900 Feet
- Strip Agency:** AMA (dropdown)
- Slope:** 4
- Strip Class:** NO (dropdown)
- Touchdown Zone:** 2
- Latitude:** S 04:40.41
- Longitude:** E 140:34.51
- VHF Frequency:** 123.0 (dropdown)
- Length:** 594 Meters
- Width:** 20 Meters
- Fuel:** (dropdown)
- Aircraft Limitations - Kilos:**

	Landing	Takeoff	Other	Class
H295	-0	-90 / 16		R
PC6	-0	-0		N
- Status:** Last Printed: 6/21/2011, Last Modified: 6/21/2011 11:36:32 AM
- Navigation:** Previous, Next, First, Last buttons.
- Buttons:** Add New, Delete, Quit.

(A) Legacy Jungle Jepps Program

YAJASI was fortunate to have the human resources available to create a computer program to manage a database of runway information. That human resource was a man named Glenn who continues to serve with JAARS in a different capacity. The program

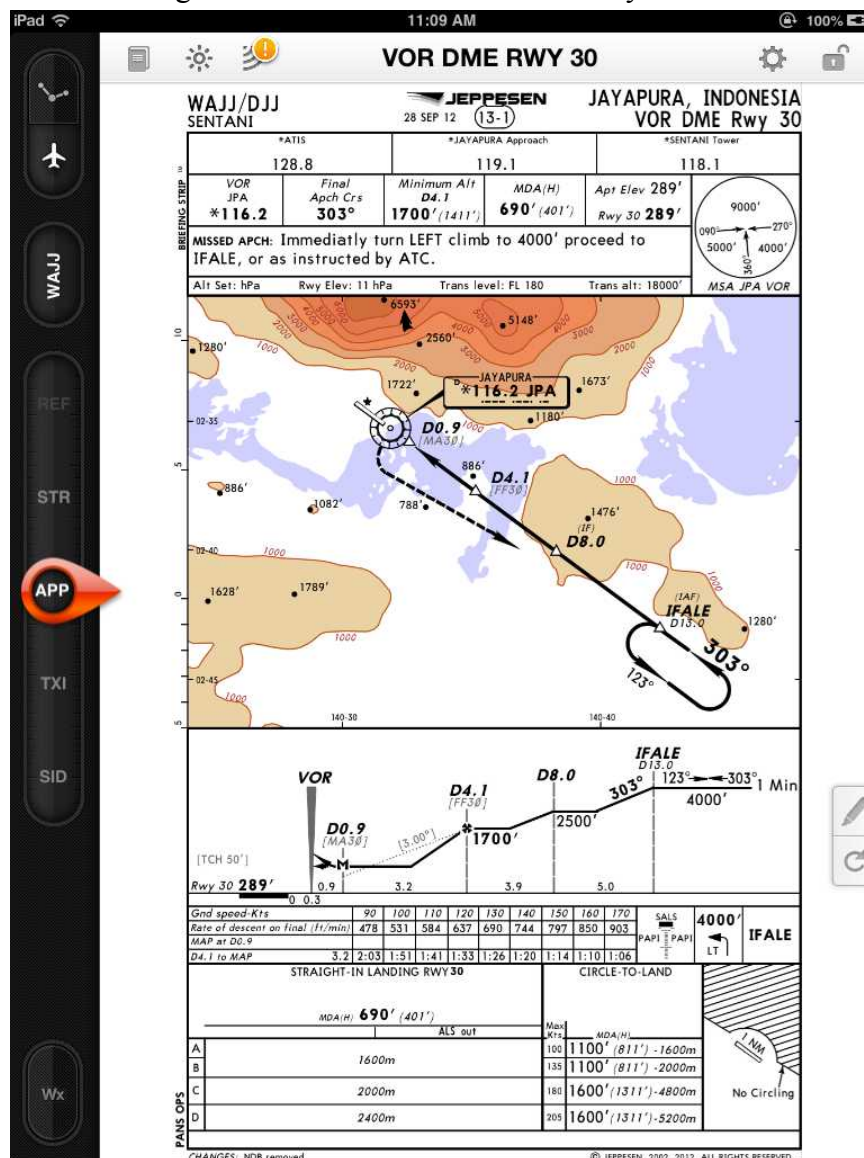
used the database to create a pre-formatted diagram which was printed and carried in each airplane. Unfortunately the source code for the original Jungle Jepps burned in a house fire and the project has been stalled since then (2008).

(B) iPads in the Cockpit

YAJASI and other JAARS operations are now using iPads in every airplane cockpit. A variety of apps are used to streamline the pilot's duties. The iPad has been used to replace nearly all paper documents that were traditionally carried in the cockpit. Currently a PDF version of the 'old' Jungle Jepps output is being stored on the iPad; however the interface is inefficient and time consuming to work with.

(C) Comparable Commercial Products

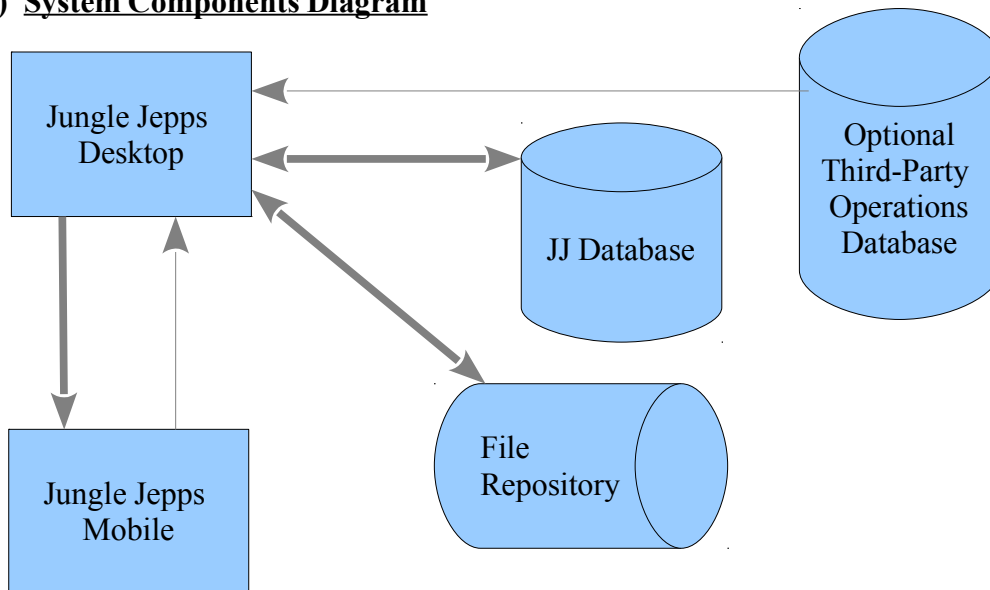
YAJASI and other JAARS operations use a compatible product by the Jeppesen company (pictured below). Jeppesen is a commercial US company that sells aviation navigation charts to the aviation industry. YAJASI maintains a



subscription with this company to receive the latest navigation charts and airport diagrams available. However, because most of our flying is done in remote areas of the world, useable diagrams for our runways are either nonexistent or inaccurate from Jeppeson. We rely on Jeppeson's iPad app only for referencing airport diagrams of the commercial airports we frequent.

A commercial product by ESRI is available for creating custom runway diagrams. This program is quite robust but does not include a corresponding iPad app.

(D) System Components Diagram



2.1.2 System Interfaces

The Jungle Jepps software suite needs to interface with a variety of data storage locations: a file repository, a central database, and a third-party database.

(A) File Repository

The file repository is a basic file structure that is used to store PDF files and standard-format image files. Runway layouts will be drawn using other software such as Adobe Illustrator, Inkscape, Libre Office Draw, or others. The resulting image files will then be imported into Jungle Jepps to be stored in JJ's file repository.

Jungle Jepps default output will be as a PDF document. One PDF file will be created for each aircraft type for every runway in the database. The files are 2 pages in length with a page size of 8.5in x 5.5in, or alternatively A5. These files need to be stored in the JJ file repository for retrieval by the Jungle Jepps Mobile application.

(B) JJ Database

A Database shall be used to store textual descriptions of the runways as well as a change history. The textual descriptions are divided into various fields. Data from these fields is used to create the complete runway diagram. The database must be configurable to use a local desktop storage (possibly SQL Lite) or remote storage (e.g. MySQL or PostgreSQL on a network server).

The structure of the database revolves around the runway identifier. Two runways can exist at one airport, but these would be classified as two different data sets. For each runway, a runway diagram is created for each aircraft type that is capable of using that runway. Thus one runway can have multiple diagrams, one for each aircraft type.

(C) Third-Party Operations Database

The ability to read data from an optional third-party operations database shall also be included. Many operations have an existing database of runways that is used for daily operations such as pilot training, customer ticketing, and customer billing. These existing databases are generally anything that can be accessed through ODBC including Microsoft SQL Server tables, MySQL tables, PostgreSQL tables, Microsoft Access mdb / accdb files, Microsoft Excel spreadsheet files, Open/Libre Office database/spreadsheet files, and possibly others.

Often the third-party database will contain the primary runway information like runways' identifier, name, latitude/longitude position, and class. Therefore, while these fields must be available in the JJ Database, they may be trumped by the fields in the third-party database. In other words, some users will choose to have all data stored in the JJ Database while others will select specific fields in the JJ Database that are to be ignored and read from the third-party database instead.

2.1.3 User Interfaces

Two interfaces shall be created in the Jungle Jepps software suite. The first is Jungle Jepps Desktop which is used on a Microsoft Windows PC. The second is Jungle Jepps Mobile which is used on an Apple touch-screen device.

(A) Jungle Jepps Desktop

Jungle Jepps Desktop (JJ Desktop) is a software application that is used for creating and managing a set of runway diagrams for a given region of the world. The app is a data management program for entering and updating text descriptions.

YAJASI realizes that synchronization functions may require the development of a small windows background service to handle the process. However, it is preferable that the file and data transfers be completed without this additional service.

(B) Jungle Jepps Mobile

Jungle Jepps Mobile (JJ Mobile) is a iOS application that is used for viewing and annotating runway diagrams that are created with the JJ Desktop app. The app is essentially a PDF browser with simple controls for selecting files. The app further allows users' annotated PDF files (flattened) to be forwarded to the desktop application via email.

2.1.4 Hardware Interfaces

JJ Desktop shall run on Microsoft Windows 7 or newer release, either 32 bit or 64 bit.
JJ Mobile shall run on iOS version 6.0 or newer.

2.1.5 Software Interfaces

JJ Desktop shall have the ability to open a PDF file created by JJ Desktop using the PC's default PDF reader application (e.g. Foxit Reader, Adobe Reader, etc.).

JJ Mobile shall have the ability to be called from another application and automatically open the runway diagram for the called runway identifier and aircraft type. Furthermore, upon completion of viewing the desired runway diagram after any length of time, the user will have the ability to return to the caller app with one touch.

2.1.6 Communications Interfaces

Synchronization between the JJ Desktop app and the JJ Mobile app shall be done using a wireless protocol. YAJASI is not adept at in-house development with wireless synchronization and cannot therefore provide detailed guidance for this operation. YAJASI does specify that the selection of TCP/UDP ports used for synchronization be done in accordance with ports noted as available by the Internet Assigned Numbers Authority (IANA.org).

It should be noted that in day-to-day operations, multiple instances of JJ Desktop will be installed on multiple computers. However, some sites will choose to only install one instance of JJ Desktop.

In the case of JJ Mobile, there will nearly always be multiple iOS devices running the JJ application. Each instance of JJ Mobile must have synchronization capabilities.

2.1.7 Memory Constraints

Physical RAM memory usage for the Jungle Jepps applications shall be limited to the following:

- JJ Desktop – 70,000 K
- JJ Mobile – None specified

2.1.8 Operations

(A) Modes of Operation

- ***Create / Edit*** – The user creates new or edits existing runway diagrams in the JJ Desktop interface. Multiple users can create/edit runway diagrams simultaneously from separate instances of JJ Desktop.
- ***PDF Printing*** – The user prints the PDF that was output from the JJ Desktop interface. Printing is done by opening the PDF with the PC's default PDF Reader application. JJ Desktop reports are also viewed/printed through the the PDF Reader.
- ***Viewing*** – The user views a runway diagram in JJ Mobile. After a runway is selected, the user can swipe through the multipage PDF document associated with that runway.

(B) Synchronizing

The JJ Mobile application shall attempt synchronization at 6 hour intervals. Synchronization should not be attempted if the iOS device does not have a WiFi connection. A user may also force a synchronization job to occur by commanding this function from the navigation bar in the JJ Mobile.

Synchronization shall be completed whether or not the JJ Desktop application is active. This may require more development for synchronization in the JJ Mobile application. If this approach is not feasible, then a background windows service may need to be developed to host the file and data transfer.

Synchronization shall be done in such a way that an interruption to the synchronization job does not adversely affect the use of the JJ Mobile app. A suggested method would be the following scenario. A new PDF Runway Diagram is ready to download from JJ Desktop to JJ Mobile. The existing PDF remains the active file in JJ Mobile until the new PDF has completely transferred to the mobile device and the old file can safely be deleted.

(C) Backup Functions

Jungle Jepps does not need to offer it's own backup facility. Backing up the JJ File Repository and JJ Database will be responsibility of the administrator on site.

2.1.9 Site Adaptation Requirements

(A) JJ Desktop

JJ Desktop shall be installed by the diagram manager or site administrator with the use of an installation wizard.

The user shall be prompted for the location of the JJ File Repository. This can be an existing repository created by a previous installation of JJ Desktop on a separate PC, or a new repository created by a first-time installation of JJ Desktop.

The user shall also be prompted to select either a local database or a remote database hosted on a network server to serve as the central JJ Database. When selecting a network server hosted database, the user shall be prompted to select an existing schema or to create a new one. If the user requests to create a new schema, the installation wizard shall run scripts to create the schemas tables.

(B) JJ Mobile

JJ Mobile shall be installed using the App Store or iTunes. Upon initial use of the app, the app will attempt to make a synchronization connection by searching the WiFi network.

Users should be able to configure this connection in the iOS Setting app.

2.2 JJ Desktop Functions

The following are descriptions of the major functions that JJ Desktop will perform. The description of functions assumes that the layout of the program is as follows.

A tabbed data entry form shall form the main interface of the program. The content area shall fill up the remaining area of the screen. The main application window shall be sizable and individual elements within the application shall resize accordingly.

2.2.1 Tab Selection Bar

The tab selection bar will contain each of the tab headings that can be selected to change pages. In addition to these headings, a control shall be placed on the rightmost position of the bar. This control will be the Aircraft Type Selection.

(A) Aircraft Type Selection

The Aircraft Type Selection control is a drop-down list box where the user can select the aircraft type. Use of this control refreshes the Runway Selection list located on the first tab page and changes all screens to the data of the first runway in that list.

2.2.2 General Function of Individual Tab Pages

The content area of the individual pages is to be laid out in a multi-column format with labels for each entry control either above or to the left of the field. Most field titles (labels) are customized in the Settings area of the program. These custom titles are used in the PDF output file.

Changes to data in each field result in an immediate update of the JJ Database. In other words, the user is not required to 'Save' any changes. Updates to the database should be done upon exiting the edited field by any means including (but not limited to) use of the Tab key, the Enter key, or by clicking on another control.

A text field with focus shall have a different background color than the rest.

2.2.3 Individual Tab Page Descriptions

The following are descriptions of each individual tab. The first three tabs will be labeled with the selected runway identifier and will change when a new runway is selected. As an example the runway identifier KIW will be used.

(A) KIW Data

The Runway Data page contains such fields as the Runway Identifier, Runway Name, Latitude / Longitude, Runway Numbers, Expiration Date, etc. The Runway Identifier control is what changes the active runway for all other pages. Most of the fields in this form are either numerical or short text fields. In the PDF output, data from these fields is displayed at the top of the Runway Diagram.

The data entry fields are laid out in the left column of the page. Furthermore, if the user has opted to store certain fields in a third-party operations database, the fields remain read only at all times.

The data tab displays the distance and bearing to the runway from two different locations, the home runway and a secondary runway. This information is later displayed in the PDF for the pilot to read prior to departing on his/her flight to the destination runway.

The Data page also contains controls to view and publish the runway diagram PDF file. The view button opens the PDF file for viewing with the computer's default PDF reader. The publish button creates a new PDF file, with the most recent user changes.

A right column of the page displays a single image. It is an overhead or elevation view drawing of the runway that is either scanned or created by a third-part image program. A control will be available on this page to import the image file.

The Data page further contains a table in the right column (under the image). The table displays a log of the changes made to the Runway Diagram. A log entry would contain the date and a short description like "Diagram Image changed by

<user>” or “Weather Patterns text added by <user>” or “Surface text was updated by <user>”. In these examples “<user>” is the active username in Windows.

(B) KIW Text

The Notes page contains two columns of seven customizable memo fields for a total of 14 fields in all. The fields are rich text fields, and the title of these fields is set in the Settings Page. Not all fields will be displayed on the outputted PDF file; if there is no data in the field, the field will be hidden in the PDF file (i.e. it will not be an empty space but shall be completely missing).

In the PDF output, data from the left column is displayed on the first page along with the Runway Data and the Diagram Image. Data from the right column is displayed on the second page of the PDF file.

(C) Documents

The Documents Page contains two vertical sections Documents and Reports. The Documents section allows the user to import and manage non-runway PDF files that will be synchronized with JJ Mobile. These files are therefore not associated with any specific runway. An example would be a scanned area map.

The Reports section allows the user to select a pre-defined report to be opened with the computer's default PDF Reader.

(D) Settings

The Settings page is made up of two horizontal sections: Program Settings and Data Settings. Program Settings allow the user to change defaults like units of measure, Home Runway, Use of True or Magnetic Course, Diagram Expiration Schedule, etc. The Data Settings allow the user to change field labels and data locations (JJ Database or Third-party).

2.3 JJ Mobile Functions

The following are descriptions of the major functions that JJ Mobile will perform. The description of functions assumes that the layout of the program is as follows. A navigation bar shall be along the left edge of the screen. A status bar shall be positioned along the top of the screen, having the same width as the content area. The content area fills up the remaining screen space.

2.3.1 Content Area

The content viewing area is filled with the multipage PDF runway diagram.

When viewing the PDF diagram, the user shall swipe left and right to access the pages of the PDF. Upon reaching the end of the PDF document, another swipe in the direction of the

absent page will return the PDF to the first PDF page and visa versa. Standard iOS pinch-to-zoom functions shall be available for viewing the PDF.

2.3.2 Status Bar

The Status Bar along the top of the Content Viewing area gives the user the Active / Expired state of the runway diagram. This is a textual description that includes the date that the diagram becomes inactive. A diagram may become inactive while a pilot is on an extended trip and has not synchronized his/her device in a number of days. Therefore, the app must compare the date on record for the runway with the iOS system date to determine a runway's status. The background color of the status bar shall indicate the status of the runway.

A control is placed on the rightmost end of the status bar to adjust the display brightness of the iOS device.

2.3.3 Program Navigation

Program navigation shall be done from a static bar of 'buttons' or touch controls. These are arranged in the following order from top to bottom.

(A) Aircraft Type Button

A long touch of the Aircraft Type button will allow the user to select the aircraft type that will filter the runway diagrams available for viewing. To avoid inadvertent use, no response will be generated by a normal stimulus of this control.

Upon selection of the Aircraft Type, the label for the Aircraft Type value becomes the label for this button. The Aircraft Type button can be forced to an Aircraft Type when the JJ Mobile app is called from a third-party iOS app.

(B) Runway Search Button

The Runway Search button displays the runway selection list where a user can choose a runway. Upon choosing the runway, the runway diagram is displayed. The list of available runways is filtered by the value of the Aircraft Type that was selected.

When the JJ Mobile app is called from a third-party iOS app, the desired runway to display can be specified. The JJ Mobile app shall open the runway diagram through the logic of this button without displaying the runway selection list. In other words, the Runway Selection Buttons (described below) will not change when the third-party calling app requests a runway.

(C) Runway Selection Buttons

The runway selections buttons allow the user quick access to 3 different runway diagrams. These are much like a bookmark function in a web browser. When touched, the button's assigned runway diagram appears.

A long touch of a runway selection button shall open a selection window where the user can change the buttons assigned runway. The selection window would be the same one that was used in the previous Runway Search Button. Upon selection of a runway, the 3-4 character runway identifier becomes the label for the runway button.

(D) Annotate Button

The Annotate function in 'Diagram mode' allows the user to draw on top of the PDF file. Flattened PDF files are then submitted to JJ Desktop via email for review by the Diagram Manager. To avoid inadvertent use, a response will only be generated with a long touch of the button.

(E) Documents Button

The Documents button allows the user to quickly select from a set of synchronized PDF files not associated with the active Runway. To avoid inadvertent use, no response will be generated by a normal stimulus of this control.

(F) Program Return Button

A normal touch of the program return button hides the JJ Mobile application and returns the user to the last used application on the iOS device. This button resembles the iOS app's home icon.

(G) Synchronization Button

A long touch of the Synchronization Button initiates the device synchronization with the JJ Desktop repository. To avoid inadvertent use, no response will be generated by a normal stimulus of this control.

2.3.4 Program Settings

Program settings shall be accessed from the iOS Settings application. As stated in 2.1.9B, the user will be able to configure their synchronization 'server' settings from this screen.

2.4 User Characteristics

(A) Diagram Manager

The diagram manager is a designated individual whose is assigned the task of managing the runway diagram system. This individual is not a computer administrator or IT technician. He/she is capable of following an installation wizard but is completely unfamiliar with database administration.

(B) Site Administrator

The site administrator is an IT technician capable of database administration and network management. Not every site has a site administrator. The site administrator is quite computer savvy and can assist the Runway Manager with setup and setting changes. This individual is not available for assisting the Runway Manager on a regular basis.

(C) Pilot

The pilot is an individual who is otherwise engaged in safety critical tasks. He/she will devote minimal effort to operating an iOS device and will use the device only for a few seconds at a time.

(D) Software Developer

The software developer is an individual who is experienced with writing code. He/she may or may not be familiar with the code language used for the development of Jungle Jepps. This individual is expected to maintain the JJ code after the services of initial developer expire.

2.5 Constraints

(A) Programming Language

It is assumed that the developer of Jungle Jepps will use a programming language and IDE that are accessible to YAJASI after the developer's services expire. The programming language and IDE must be freely available but are not constrained to operation in a Windows OS only. In other words, free Apple tools can be used for development of the iOS application.

If free tools are available or do not meet the requirements, a solution should be researched by the developer that would require minimal cost. Yajasi would work toward approving a small expense of this nature.

(B) Source Code

The source code will be made available to YAJASI. This includes the JJ Desktop application, the JJ Mobile application, and the Installation Wizard.

Code Comments shall be made at regular intervals to explain programming logic. The purpose of commenting in this context is to communicate coding modification instructions to successive developers at YAJASI.

All code shall be neatly and consistently indented to clearly indicate flow and decision making logic.

(C) iOS Response Time

The JJ Mobile app is used during safety critical phases of flight; therefore, the application's stimulus-to-response time shall be no more than 700 milliseconds. Synchronization functions do not have a time constraint.

The JJ Mobile application must be extremely stable as it cannot 'crash' during use; therefore, when deciding between speed and stability, stability should be the primary concern.

2.6 Assumptions and Dependencies

As stated in 2.1.4, minimum system requirements exist for the JJ Software Suite. It is assumed that during development the individual software applications will be tested on the stated minimum environments. It is assumed that the JJ Suite will be further tested on the latest available release of the given operating system.

2.7 Apportioning of Requirements

The scaling of screen elements for use on an iPad mini or iPhone/iTouch device can be delayed until a future version of JJ Mobile. However, every effort should be made to design the product in a way that allows for this functionality to be added at a later date.

Annotating PDF files in JJ Mobile could be replaced with a comments submission function for submitting text to JJ Desktop for review by the Diagram Manager.

Other features that are requested by not required are stated within their respective subsections.

3. Specific Requirements – JJ Desktop Application

3 *Jungle Jepps Desktop Application*

3.1 User Interface

3.1.1 Program Installation

3.1.1.1 General Requirements

Program installation and setup shall be a simple process for the user. Much development and testing is expected to achieve this goal. Yajasi cannot overstate the importance of a reliable installation process.

In the case that the developer chooses to write JJ Desktop as a web application, only one installation process shall be required. Thus, it is expected that the user will not have to install XAMPP or the like in a separate process prior to installing the JJ Desktop program.

3.1.1.2 Use of Configuration Wizard

It is recommended (not required) that a configuration wizard be run at the first use of the JJ Desktop program. This wizard would basically present the program settings to the user one at a time. This would allow a more verbose explanation to be given for each setting as options are completed.

3.1.1.3 User Profile

A Diagram Manager should be able to complete the installation process independently. See the description of this user in section 2.4.

3.1.2 Program Security

3.1.2.1 Program Access

A single password shall be required to access the JJ Desktop. Its purpose is to restrict non-trained users should the program be installed on a “multi-user” workstation. This password shall be stored in the program settings (i.e. JJ Database) so that multiple instances of JJ Desktop (on separate computers) can all use the same password.

3.1.2.2 Database Specifics

Data in the database does not need to be encrypted. The database shall be accessible by other applications. This will allow Yajasi software developers to access the data through other applications.

3.1.3 Program Layout

The layout of the program is described in section 2.2.

3.2 System Interfaces

3.2.1 JJ File Repository

3.2.1.1 File Tree Structure

It is recommended that the file repository be structured in the following manner:

 //aircraft_type/runway_identifier/diagram.pdf

 //aircraft_type/runway_identifier/archive/*.pdf

 // aircraft_type/runway_identifier/photos/*.jpg

3.2.1.2 Archiving PDF files

When a PDF file is created, a copy of it shall immediately be placed in the archive subfolder. In this manner, the most current runway diagram is

placed in the archive folder, thus eliminating the need to create an archive at the next iteration of the diagram file.

3.2.1.3 File Naming Convention

It is strongly recommended that the following naming convention be used for both archived PDF files and photo files:

ZZZZ-RunwayName_20130521-01.*

ZZZZ is the 3-4 alphanumeric character unique identifier.

-RunwayName is the complete name of the runway in CamelCase with no spaces.

20130521 is the date the file was created in the YYYYMMDD format.

-01 is a sequential number for the iteration of that file, should more than one file with the same name be created on the same date.

3.2.1.4 Repository Portability

Moving the repository to a new location on a network file server should be a simple process. The user shall be able to copy/move the entire repository folder to a new location and then point the JJ Desktop application to the new location.

Should there be multiple installations of JJ Desktop on separate computers, the primary instance shall record the location of the repository and the secondary instances shall need no further configuration. Therefore, it is preferable that the path to the repository be stored in the JJ Database.

3.2.1.5 Hosting the Repository

In the case where multiple instances of JJ Desktop are installed (on separate computers), the repository shall be hosted in a shared folder location. This location may be on a network file server.

Every effort should be made to educate the user on how to configure folder sharing from the local machine should the user desire this option. If JJ Desktop is installed on a stand-alone computer, the repository shall be hosted on the local machine.

3.2.2 JJ Database

3.2.2.1 Data Storage Versatility

In some installations, the data storage will only use one single database where the application is installed on a single stand-alone Windows computer.

However, for other installations, data storage cannot be confined to one single database. To allow for integration with existing business systems, existing data must also be accessed from third-party databases.

3.2.2.2 JJ Database Hosting

In some installations, on a stand-alone Windows computer, the database shall be hosted on the local machine. In other installations, the database shall be hosted on a Windows/Linux network server or on a Windows computer acting as a network server.

3.2.2.3 Third-party Data Requirements

3.2.2.3.1 Scope

ALL data entry fields accessible through the JJ Desktop Application shall be allowed to be read from a third-party database. For example,

the runway elevation and latitude/longitude coordinates may be hosted in a database used for programming GPS devices.

Data in a third-party database shall be treated as read-only.

3.2.2.3.2 Connecting to Third-party Database

A connection to a third-party database shall be made using an ODBC conduit. Using this configuration, each computer using JJ Desktop will require the ODBC driver to be installed for the selected database.

Every effort should be made to simplify the connection process with the user. A routine that verifies the proper driver is installed on the local machine may be helpful.

3.2.2.3.3 Synchronizing Data with Third-party Database

Data shall be copied from the third-party database to the JJ Database, but NOT with a batch process. Runway Data shall only be copied to the JJ Database when the runway record is accessed in the JJ Desktop application.

3.2.2.3.4 Synchronizing Unique Record Identifiers

Data for JJ is organized by aircraft type, then by runway identifier. If a user chooses to use a third-party database, it is expected that these two data fields will be read from the third-party database.

In practice, the Diagram Manager will have the option to add a new aircraft type to the JJ program. When he/she initiates this action JJ Desktop will present the user with a list of the available options from the third-party database. The user would be restricted to this list. If no third-party database is used, the user will be able to manually type a new aircraft type.

A similar functionality would apply for creating new runways. If a third-party database is configured, the user shall be restricted to only create a new data set in JJ Desktop for the runways available in the third-party database. Conversely, if no JJ Database is configured, the user will have the option to manually type a new runway identifier to serve as the primary key for the data set.

3.2.2.3.5 Handling Differences in Field Data Types

The majority of fields in the JJ Database will be text fields. While it may appear that numeric values will be the only data for these fields, it is important that the fields be text. This will allow users to enter things like 'N/A' into a “numeric” field.

Therefore, when copying data from a third-party database, it is expected that numeric fields in the third-party database will be converted to text in the JJ Database. Date fields will remain date data types in both databases.

3.2.2.3.6 Data Entry Field Behavior

All fields (other than the Runway Identifier and Aircraft Type) shall be read only when a field has been configured to take data from a third-party database. If possible this data should be displayed as text only and should not appear to be a value in an editable textbox control.

3.2.2.4 Normalized Tables

It may go without saying that the structure of the JJ Database tables be normalized as this is generally the practice in the database administration industry.

3.3 System Features

3.3.1 *Aircraft Type Selection*

3.3.1.1 Span of Control

The Aircraft Type Selection control shall default to the last selected aircraft type for the installed instance of the program. In other words, a change to this field does not change all workstations using JJ Desktop.

3.3.1.2 Adding new Data

The control shall list the available aircraft types and have an option to add a new type. If this field is connected to a third-party database, the user will be presented with options from the third-party database but NO option to add a new type. If there is no connection to the third-party database, the user will be able to enter a new Aircraft Type.

3.3.1.3 Data Selection

When a user changes the Aircraft Type, the set of runways associated with that Aircraft Type change. Only the associated set will be accessible in the JJ Desktop tabs. Therefore, when the Aircraft Type is changed, the data set shall be refreshed and the first runway in the set shall be displayed.

3.4 Functional Requirements: Data Tab

3.4.1 *Tab Title*

The title of the tab should be '<Runway Identifier> DATA' where <Runway Identifier> is the active runway that was selected in the Data Tab.

3.4.2 *Disclaimer Text*

In an effort to remind users of the active Aircraft Type, a disclaimer shall be displayed at the top of this tab. The disclaimer should be “This diagram is for <Aircraft Type> aircraft only.”

3.4.3 *Preview/View Button*

If changes have been made to the JJ Database and they have not yet been propagated to the PDF file, the Preview label is displayed. In this scenario the response of the button is to create and open a temporary PDF that does NOT remain in the JJ File Repository for synchronization.

If all changes in the database have been propagated to the PDF file, then the View label is displayed. In this scenario, the published PDF file would be opened by the computer's default PDF viewer.

3.4.4 *Publish Button*

If changes have been made to the JJ Database and they have not yet been propagated to the PDF file, the response of the Publish button is to create the PDF that will be synchronized with JJ Mobile.

If no changes have been made, the Publish button will be hidden or unavailable to the user.

3.4.5 *Runway Diagram Image*

The runway diagram image shall be displayed (or previewed) at all times. To assist the user with their proof-reading, the image should be displayed in the

same size that it will be displayed in the PDF file. A button shall be provided above or below the image to “Select New Image File.”

3.4.6 Change Log

The change log shall be displayed in a tabular format with the following columns: Date, User, Change. The data shall be displayed in descending order by Date with the newest entry at the top of the list.

3.4.6.1 User Name

The user name is the active username in Windows. If no username is available, the name of the computer shall be used.

3.4.6.2 Log Table Refresh

The table of log entries shall be refreshed each time a new log entry is made. Therefore, updates to the log will be immediately visible to the user as new log entries are created.

3.4.6.3 User Activity Capture Sequence

A log entry shall be created the moment a user publishes changes to a PDF output. This means that log entries are made at the time of publishing the changes, and it requires that the developer compare the current published product with the new output.

3.4.6.3.1 Suggested Development

Yajasi suggests that to accomplish this type of logging, a temporary log is created of all potential final log entries. The temporary log can contain the “old” data and the “new” data. At the time of publishing, the “old & new” data can be compared and a determination can be made as to whether or not the temporary log entry should be moved to the permanent runway log.

3.4.6.4 Change Entries

The following examples indicate the nature of the change log entries. Note that the entry text is kept to a minimum. Note that the use of <FieldLabel> indicates that the active label of the field (as set in the Data Settings) is used for the log entry.

3.4.6.4.1 Log Entry Examples

“New Runway Diagram Image file <filename-nopath> selected.”

“<FieldLabel> text was added.” --(*This entry appears when a blank field was filled. This entry does NOT appear for new runway entries that have never been published.*)

“<FieldLabel> text was removed.”

“<FieldLabel> text was updated.”

“The <RunwayIdentifier> Runway Diagram was published as a PDF.”

“Mobile device <iPadName> received the <RunwayIdentifier> PDF.”

3.4.7 Home Runway / Secondary Runway

The Home Runway is determined on the settings page. The Secondary runway defaults to that selected on the settings page, but it can be changed on this tab.

3.4.7.1 Secondary Runway

The user shall be able to select from a list of all runway identifiers in the database irrespective of Aircraft Type.

3.4.8 Data Fields

3.4.8.1 Highlighting Fields

Some of the fields will at times contain data that needs to be highlight to the pilot. This data is usually a unique value that is different from the normal values. The background of the field in JJ Desktop and in the PDF should change to yellow when field highlighting is selected.

A checkbox control should be placed next to the data field on the JJ Desktop Data tab to allow the user to select highlighting for that field. A field is highlighted on a per-runway basis; therefore, highlighting a field for one runway will not highlight that field for all runways.

3.4.8.2 Selecting data from a List

Some fields use recurring data. These fields shall have an editable drop-down (or combo-box) list available to select from frequently used values. One of the options in the list shall be to edit the list whereby a dialog box appears for the user to edit the data list. For these controls, the field should be limited to the values in the selection list. The user shall be allowed to type directly into the field so that the value can be auto-completed based on the values in the selection list.

3.4.8.3 Field List

The following field list suggests parameters for the data fields that are entered on the Data tab. This is NOT an all-inclusive list of fields, but it lists the primary fields that a user would interact with. See following paragraphs for detailed explanations of fields.

3.4.8.3.1 The 'Dependency' column indicates the relationship of the data. 'Runway' indicates that the data can be used for any aircraft that operate at the runway. 'Aircraft' indicates that the data must be specific to each aircraft. For example, the RunwayName will be the same for the PC-6 and PC-12 aircraft; however the IASadjustment will be different values for the different aircraft.

Dependency	Name	Default Label	~ Size	Allow High-lighting	Select from a List
Runway	RunwayIdentifier	Runway	8	No	Yes
Runway	RunwayName	(none)	32	No	Yes
Runway	Longitude	Longitude	16	No	No
Runway	Latitude	Latitude	16	No	No
Runway	InspectionNA	N/A	Bit	No	No
Runway	InspectionDate	Completed	Date	No	Yes
Runway	InspectorName	Pilot	32	No	Yes
Runway	InspectionDue	Expiration	Date	No	No
Runway	Classification	Classification	8	No	Yes
Runway	Frequency1	VHF	8	No	Yes
Runway	Frequency2	HF	8	No	Yes
Runway	LanguageGreet	Language / Greeting	32	No	No

Dependency	Name	Default Label	~ Size	Allow High-lighting	Select from a List
Runway	Elevation	Elevation (<units>)	8	Yes	No
Runway	Length	Length (<units>)	8	Yes	No
Runway	WidthText	Width	12	Yes	No
Runway	TDZslope	TD Zone Slope	12	Yes	No
Aircraft	IASadjustment	Gnd Speed	12	Yes	No
Aircraft	PrecipitationOnScreen	Land with Precipitation	8	Yes	Yes
Runway	RunwayA	Runway	4	Yes	No
Aircraft	ATakeoffRestriction	Takeoff Weight	16	Yes	No
Aircraft	ATakeoffNote	(none)	32	Yes	No
Aircraft	ALandingRestriction	Landing Weight	16	Yes	No
Aircraft	ALandingNote	(none)	32	Yes	No
Runway	RunwayB	Runway	4	Yes	No
Aircraft	BTakeoffRestriction	Takeoff Weight	16	Yes	No
Aircraft	BTakeoffNote	(none)	32	Yes	No
Aircraft	BLandingRestriction	Landing Weight	16	Yes	No
Aircraft	BLandingNote	(none)	32	Yes	No

3.4.8.4 Specific Fields' Functionality

3.4.8.4.1 Runway Identifier / Name

The Runway Identifier / Name is the primary control for navigating to different runways in the database. When the user chooses a runway, the fields/images/log for the Data and Text tabs changes to the selected runway information.

One control shall list the available runways in a two column format including the identifier and name of the runway. The user shall have the ability to edit either value except when the field is connected to a third-party database. It is highly recommended that the runway name be available for editing directly in the control.

If this field is connected to a third-party database, the user will be presented with options from the third-party database but NO option to add a new runway.

If there is no connection to the third-party database, the control shall have an option to add a new runway. A new runway shall be added by entering a new runway identifier in a 2-step confirmation process. The user shall be prompted if the new runway identifier is not unique in the database. The user shall then be able to enter the runway name directly into the field on the data tab.

3.4.8.4.2 Longitude / Latitude

A form of data validation is required for these fields. The fields need to be in the correct format so they can be converted to decimal form for

use with the bearing and distance calculations.

The formulas for determining bearing and distance to a runway require that the coordinates be in decimal format. Thus, Yajasi expects there will most likely be a set of fields in converted decimal format in the JJ Database but hidden to the user.

3.4.8.4.3 InspectionNA

A true value indicates that the runway never becomes Inactive. A false value indicates that the runway will be Active until its expiration date.

3.4.8.4.4 InspectionDate

A calendar control shall be available to the user for selecting the date the runway inspection was completed. The user shall not be forced to use the calendar for entering the date.

3.4.8.4.5 InspectionDue

This field should be filled in automatically after the InspectionDate is entered. Its value should be according to the rules set in the Settings tab. See section 3.7 for details.

A calendar control shall be available to the user for selecting the date the runway inspection was completed. The user shall not be forced to use the calendar for entering the date.

3.4.8.4.6 Classification

Default values for this selection list are ' ', 'N', 'SPC', 'W'.

3.4.8.4.7 Frequency1

Default values for this selection list are '123.45'.

3.4.8.4.8 Frequency2

Default values for this selection list are '1', '2', '3', ... '10'.

3.4.8.4.9 Elevation and Length

Units (as specified in the settings tab) should be displayed immediately to the right of the data label.

3.4.8.4.10 IASadjustment

This field is also known as 'GPS=' on the JJ Mobile mock-up. Its label is incorrect on the JJ Mobile mock-up.

3.4.8.4.11 PrecipitationOnScreen

Default values for this selection list are 'Yes' and 'No'.

3.4.8.4.12 Runway field sets

Some runways can be used in both directions. Therefore, one runway constitutes 2 sets of takeoff and landing instructions. The RunwayA and RunwayB fields will represent the runway number.

Anytime RunwayA is changed, RunwayB should default to the 180 degree reciprocal of RunwayA. If RunwayA is 13, it is equivalent to 130 degrees where North is 000 or 360 degrees. The reciprocal is 310 degrees; therefore, RunwayB would be 31.

3.4.9 Page Sketch

The following image was created to illustrate the concept of the data page. It is NOT intended to be a mock-up of the final product. Please ignore the spelling errors and misrepresentations of standard form controls.

3.4.9.1 Sketch Layout

The layout of this sketch is slightly different that is described in the SRS.

The sketch is laid out to resemble the field arrangement on the PDF output.

The layout may need to be adjusted to meet all of the requirements.

3.4.9.2 Known Sketch Errors

The Publish button should not be displayed as a tab. Instead it is a button on the Data tab.

The Width field does not need to be divided into two parts.

The Touchdown Zone Slope does not need a runway label nor a Two way "See Profile" field.

The Overall Slope field is not needed.

The Strip Agency field is not needed.

3.5 Functional Requirements: Text Tab

3.5.1 Tab Title

The title of the tab should be '<Runway Identifier> TEXT' where <Runway Identifier> is the active runway that was selected in the Data Tab.

3.5.2 Disclaimer Text

In an effort to remind users of the active Aircraft Type, a disclaimer shall be displayed at the top of this tab. The disclaimer should be "This diagram is for <Aircraft Type> aircraft only."

3.5.3 Outputed Fields

The content required for each runway diagram will vary greatly. The stimulus to include a field in the PDF output will be that text is entered into the field. If the field is null or contains a trimmed empty string, the field will not be displayed on the PDF output.

As stated previously, a field whose value is empty will be completely missing from the PDF output. Its label and empty space shall not be displayed in the PDF file. A field with one or more spaces will be considered empty as the trimmed value will be an empty string.

3.5.4 *Page One Text*

3.5.4.1 Icon Selection (Development Request)

It is requested that the developer create functionality to select an image file to be used as an icon for the Page One text fields. An example of this usage can be seen in the JJ Mobile mock-ups. Development of this feature is highly encouraged by Yajasi, but it not required.

3.5.4.2 Field Format

Each of the 7 text fields should be rich text fields allowing users to **bold**, *italicize*, and/or underline their text. The font size or style should not be open for changes as it would disturb the final layout of the PDF.

3.5.4.3 PDF Output Placement

All fields in the Page One Text column shall appear on the first page of the PDF output file. The fields should appear in the order that they are displayed on the screen. Each runway will have varying amounts of text for each field. One runway may have 80% of it's text in field 2, while another runway may have evenly distributed text amount all 7 fields.

In the event that there is too much text to display in the allotted space on the output file, the bottommost field(s) will be truncated to 1 line of text with a parenthetical ellipsis (...) indicating the text is incomplete.

3.5.4.4 Default Field Labels

3.5.4.4.1 Note that these fields are aircraft specific. Each runway diagram for each aircraft will have different values in these fields for any given runway.

Field	Default Label
P1Text1	Committal Point
P1Text2	Go Around
P1Text3	Emergency Stop after Landing
P1Text4	Surface Description
P1Text5	Hazards & Additional Info
P1Text6	Aborted Takeoff
P1Text7	Departure Engine Failure Option(s)

3.5.5 *Page Two Text*

3.5.5.1 PDF Output Placement

All fields in the Page One Text column shall appear on the first page of the PDF output file. The fields should appear in the order that they are displayed on the screen. Each runway will have varying amounts of text for each field. The rules for handling the size of the data are same as those for the Page One Text fields.

3.5.5.2 Field Format

Each of the 7 text fields should be rich text fields allowing users to **bold**, *italicize*, and/or underline their text. The font size or style should not be open for changes as it would disturb the final layout of the PDF.

3.5.5.3 Default Field Labels

3.5.5.3.1 Note that these fields are aircraft specific. Each runway diagram for each aircraft will have different values in these fields for any given runway.

Field	Default Label
P2Text1	Language Group and Greeting
P2Text2	Weather Patterns
P2Text3	Explanation of Restrictions
P2Text4	Chief Pilot Comments
P2Text5	Minimum Number/Type of Wind Indicators
P2Text6	Runway Minimum Maintenance Standard
P2Text7	Pilot Authority for Runway Below Standard

3.5.6 *Page Sketch*

The following image was created to illustrate the concept of the text page. It is NOT intended to be a mock-up of the final product. Please ignore the spelling errors and misrepresentations of standard form controls.

3.5.6.1 Known Sketch Errors

Please note the previously stated change in the disclaimer text. The column titles should rather be 'Page One Text' and 'Page Two Text'

3.6 Functional Requirements: Documents Tab

3.6.1 *Documents Column*

The documents column shall list the documents currently being sync'd to all iOS devices. The documents should be listed in alphabetical order by file name.

3.6.1.1 Adding Documents

The user shall be given the functionality to add/import an PDF document. When browsing for files, only PDF files shall be displayed in the file selection window. No confirmation shall be given when importing a new

document.

The document shall be copied into the JJ File Repository, leaving the original file in its place. A newly added document shall be immediately available for synchronization with JJ Mobile.

3.6.1.2 Previewing Documents

Double-clicking on a document would open the document in the computers default PDF reader.

3.6.1.3 Removing Documents

Each file shall have a control next to the file name to remove the document from the list. The user shall be prompted with a confirmation message when deleting this document. Upon confirmation, the file shall be removed from the JJ File Repository and the file shall disappear from the documents column. A deleted file shall be removed from all JJ Mobile applications at the next synchronization event.

3.6.2 Reports Column

The reports column shall list the pre-defined reports. Double-clicking on the report title would create a PDF file and open it in the computer's default PDF reader program.

Note that these reports are specific to the selected Aircraft Type. Each report should be formatted in the same page size as the PDF document created for the JJ Mobile app.

The following is a list of the requested reports:

3.6.2.1 Active List

This report is an index to all active runways for the selected Aircraft Type. The index is single column and includes the Runway Name and Runway Identifier. The list is in alphabetical order by Runway Name.

3.6.2.2 Active Book

The Active Book is a compilation of all active and published runway diagrams as of today's date. It is ordered alphabetically by Runway Name. To simulate the Status Bar on the JJ Mobile application, a header should be added to each page of the file indicating the same information that would be displayed on the JJ Mobile Status Bar for the given runway. The header does not have to be color coded like JJ Mobile.

3.6.2.3 Inactive List

This report is a similar format to the Active List report except that it applies to all Inactive runways for the selected Aircraft Type.

3.6.2.4 Inactive Book

This report is a similar format to the Active Book report except that it applies to all Inactive runways for the selected Aircraft Type.

3.6.2.5 Runway Expiration List

The runway expiration list report lists all active runways for the selected Aircraft Type. Three fields are included: Expiration Date, Runway Name, and Runway Identifier. The list is ordered in descending order by date having the nearest expiration date at the top of the list.

3.6.3 KML Export (optional)

A low priority feature request is the KML Export functionality. This

functionality would allow a user to export a KML file of all Runways in the JJ Database. The file would include all runways regardless of Aircraft Type. The default information in the KML file would be the lat/long coordinates, the runway identifier, and icon type. The icon would indicate the active state of the runway diagram.

Additional information could be selected by the user to include more details in the KML file. The runway elevation, length, width, and magnetic orientation could be included so as to be drawn in Google Earth with a rectangle shape. Yajasi speculates that elevation may not be necessary should the shape be overlaid on the Google terrain model.

The export process for this file would simply be to save the file to a location selected by the user. Google Earth would not need to open automatically.

3.6.4 Page Sketch

The following image was created to illustrate the concept of the documents page. It is NOT intended to be a mock-up of the final product. Please ignore the spelling errors and misrepresentations of standard form controls.

3.6.4.1 Known Sketch Errors

The text indicating charts are specifically for a PC-6 Aircraft type is NOT applicable to this tab.

3.7 Functional Requirements: Settings Tab

3.7.1 Program Settings

The following settings are in no particular order. If possible, settings of similar subject should be grouped together.

3.7.1.1 Program Password

See section 3.1.2 for more information.

3.7.1.2 File Repository Location

See section 3.2.1 for more information.

3.7.1.3 Database Connection

Connection information required to connect to the JJ Database.

3.7.1.4 Disclaimer Text

At the bottom of each runway diagram is a disclaimer. This text should default to the following:

3.7.1.4.1 Page One Disclaimer

Use of this diagram is strictly prohibited for aviation operators other than Jungle Jepps mission users. This diagram MAY CONTAIN ERRORS.

3.7.1.4.2 Page Two Disclaimer

No diagram can substitute for a proper runway checkout. Use of this diagram is strictly prohibited for aviation operators other than Jungle Jepps mission users. This diagram MAY CONTAIN ERRORS. Report all safety concerns to the Chief Pilot or designated Safety Officer.

3.7.1.5 Units of Measure

The following items require a unit of measure: Altitude (default is ft – feet), Dimensions (default is m – meters), Weight (default is kg – kilograms), Distance (default is nm – nautical miles).

A further setting for distance is required because the algorithms for calculating distance between two points assume the result is in nm. Thus a conversion factor will need to be entered if the user changes the distance units to another value. For example, for km (kilometers) the conversion factor is 1.852 km/nm.

3.7.1.6 Use True/Magnetic Course

This setting allows the user to select whether or not the course heading will be adjusted for magnetic variation when displayed on the diagram.

3.7.1.7 Latitude/Longitude format

The user can select from at least two formats of coordinates: Decimal or DMS. Other formats may also be included.

3.7.1.8 Default Diagram Expiration Period

Diagrams that have an expiration date should default to a date as configured in this setting. A field for months shall allow the user to select the default number of months before expiration (defaults to 12). A second control should allow for selection of the following options which determine the actual day of expiration: Use Calendar Days, Last Day of Month, First Day of Month.

(Calendar days means a diagram created on March 25th 2013 will expire on the 25th of the selected month. If the day is greater than the month allows like the 30th of February, the calculation should result in the last day of the month.)

3.7.1.9 Latitude/Longitude format

The user can select from at least two formats of coordinates: Decimal or DMS. Other formats may also be included.

3.7.1.10 Home Runway

The user can select from a list of all runway identifiers in the database irrespective of Aircraft Type. The home runway is used to determine distance and course to the runway depicted on the diagram.

3.7.1.11 Default Secondary Runway

The user can select from a list of all runway identifiers in the database irrespective of Aircraft Type. The secondary runway is used to determine distance and course to the runway depicted on the diagram.

3.7.1.12 Diagram Manager's Email Address

The email address stored in this field is the one that will be used by JJ Mobile to send flattened PDF files back to the person working as the Diagram Manager.

3.7.2 Data Settings

3.7.2.1 Scope

The user shall be able to configure data retrieval from a third-party database. A table containing all available data fields (excluding settings, indexes, etc) in the JJ Database shall be presented for configuration.

3.7.2.2 Third-Party Connection

The connection information shall be entered once in JJ Desktop. This connection can then be re-used for each individual data field in the table.

3.7.2.3 JJ Field Labels

The label of each field in Jungle Jepps should be customizable. This field name is displayed on the JJ Desktop form and the PDF output file. The fields on this screen should be filled with the default field names.

3.7.2.4 Suggested Configuration Fields

Field Name – the label of the JJ Database field

Database – the third-party connection to use

Table – the third-party table name to retrieve

Field – the third-party field name to retrieve

Sample – the first non-null value in the table for the specified field. This is a read-only, non-editable field.

3.7.2.5 Active / Inactive

The field mapping is considered active when all of the required data has been entered and a sample value has been retrieved. A visual indication show be presented to the user indicating this state.

3.7.3 Page Sketch

The following image was created to illustrate the concept of the settings page. It is NOT intended to be a mock-up of the final product. Please ignore the spelling errors and misrepresentations of standard form controls.

3.7.3.1 Known Sketch Errors

The text indicating charts are specifically for a PC-6 Aircraft type is NOT applicable to this tab.

Publish / View FOA Data FOA Text Documents **Settings** AIRCRAFT TYPE ▼

This program creates charts specivially for a PC-6

Program Settings

Home Runway	WAJJ	▼
Altitude	Feet	▼
Length/Width	Meters	▼
Weight	Kilos	▼
Naviagation Strip 1	WAJJ	▼
Naviagation Strip 2	WAM	▼

Data Settings

Spreadsheet Format

3.8 PDF Output Layout

3.8.1 Application of SRS Mock-Up Image

The output layout of the PDF can be seen in the mock-ups for the JJ Mobile application. Every effort should be made to duplicate the layout and look of the mock-up. This includes but is not limited to font, background color, borders, alignment, and field arrangement.

4. Specific Requirements – JJ Mobile Application

4 *Jungle Jepps Mobile Application*

4.1 User Interfaces

4.1.1 *iOS JJ Settings*

Option in the iOS Settings app is labeled 'Jungle Jepps'.

Contains necessary controls to specify the connection to the master instance of JJ Desktop.

4.1.2 *iOS Home Screen Icon (onTouch)*

The JJ Application shall open to its default state.

4.2 System Features

4.2.1 *Application Default State*

4.2.1.1 Aircraft Type Control

Aircraft Type set to the value last chosen during a previous use. If no value was chosen, the value defaults to the first value in the list.

4.2.1.2 Runway Selection

Each Runway Selection control is set to the last value chosen during previous program use. If no value is chosen, the value defaults to the home base runway.

The topmost runway button shall be the default active selection.

4.2.1.3 Status Bar

The status bar shall display the appropriate data for the selected runway.

See below for data requirements.

4.2.1.4 Content Viewing Area

For the active runway, the PDF file shall be visible.

4.2.2 Screen Layout

4.2.2.1 Orientation

The application shall be laid out in portrait orientation. Rotation of the iOS device will allow the program to rotate in 180 degree increments so that it is always in portrait orientation.

4.2.2.2 Division of Screen

The application shall be divided into three areas. A navigation bar shall extend from the top of the screen to the bottom along the leftmost edge.

A status bar shall extend along the top of the screen between the navigation bar on the left and the screen edge on the right.

The remaining area of the screen shall be used for application content.

4.2.3 Pinch to Zoom

PDF files (displayed in the content area) shall have the iOS functionality of pinch-to-zoom. Upon initial viewing of the file, the application shall default to fitting the entire page or photo into the content area.

4.3 **Functional Requirements: Status Bar**

The Status Bar is located horizontally along the top edge of the screen. It contains the following controls.

4.3.1 *Status Text (Responds to Runway Selection Buttons)*

A textual description of the runway status is given. The background color of the entire status bar changes based on the runway status. The text is aligned to the left of the status bar but is indented.

4.3.1.1 Runway Status Text (when viewing the PDF)

Dates in the runway status text shall be formatted as DD-MMM-YY where the month is a 3 character text.

<i>Status Text</i>	<i>Background Color</i>
Active Until DD-MMM-YY	Green
Active (no expiration)	Green
Inactive Since DD-MMM-YY	Red

4.3.1.2 Runway Description (when viewing photos)

The background color of the status bar remains unchanged when viewing photos.

The text in the status bar identifies the runway being viewed. This shall be

in the format of ZZZZ – RunwayName where ZZZZ is the runway's 3 or 4 letter identifier.

4.3.2 *Aircraft Type (Responds to Aircraft Type Button*

The Aircraft Identifier text.

4.3.2.1 Text Format

This text is aligned to the right of the screen.

4.3.3 *Brightness Control (onTouch)*

The user is presented with a sliding control to adjust the screen brightness of the device. This button is located on the rightmost position of the status bar.

4.4 **Functional Requirements: Navigation Bar**

The Navigation Bar is located vertically along the left edge of the screen. It contains the following controls.

4.4.1 *Aircraft Type Button (onLongTouch)*

A selection list is displayed of the available Aircraft Types.

4.4.1.1 *Aircraft Type Value (onTouch)*

The selection list disappears.

The program enters its default state with the exception that all Runway Selection controls revert to the home base runway.

The selected Aircraft Identifier is identified in the Status Bar.

4.4.2 *Runway Search Button*

A selection list is displayed of the available runways. This selection list is based on the Aircraft Type selected previously.

4.4.2.1 List Format

Each list entry contains the Runway Name and the Runway Identifier separated by a dash. The list is in alphabetical order by Runway Name. The list shall be displayed in three or four columns with entries alphabetized horizontally.

Aboyi – ABY	Aiyura – AYU	Ambon – WAPP
Apalapsili – APA	Awimbon – AWI	Babo – BAB
Basir – BSR	Biak – WABB	Bias – BIA

4.4.2.2 *Runway Value (onTouch)*

The selection list disappears.

The associated PDF runway diagram file is displayed in the content area.

4.4.3 *Runway Selection Button (onTouch)*

The associated PDF runway diagram file is displayed in the content area. The Status Text in the Status Bar is updated.

4.4.3.1 Button Behavior

There are actually three (3) buttons. Each one has the same behavior except that only one button can be selected at any given moment.

4.4.3.2 Button Description

The button touched indicates it is the active selection through a change in outline weight/color, button color, or background color. This indication remains active even when other areas of the screen are touched.

The label of each button is the Runway Identifier text value oriented vertically (i.e. the beginning of the word is at the bottom).

4.4.4 Runway Selection Button (onLongTouch)

A selection list is displayed of the available runways in the same manner as the Runway Search Button list.

4.4.4.1 Runway Value (onTouch)

The selection list disappears.

The label of the button changes to the selected runway identifier.

The associated PDF runway diagram file is displayed in the content area.

4.4.5 Annotate Button (onLongTouch)

An annotation tools menu is displayed.

4.4.5.1 Annotation Tools

Industry standard annotation tools include but are not limited to:

highlighter, pencil, unfilled rectangle, unfilled oval, text box, etc.

Annotations made to the PDF document shall remain visible until synchronization where a flattened PDF file is created and emailed to the Diagram Manager for review.

4.4.6 Documents Button (onLongTouch)

A selection list is displayed of the available documents. The list is sorted in alphabetical order by title of the file name.

4.4.6.1 Document File (onTouch)

The document is displayed in the content viewing area. The Status Bar becomes hidden. All runway selection buttons remain enabled but indicate they are NOT selected. The Diagram/Photo and Annotate/Camera buttons become disabled.

4.4.7 Program Return Button (onTouch)

The user is returned to the last used application on the iOS device.

4.4.7.1 Button Description

The icon of the button is the home screen program icon of the application that will be activated upon touching this button.

4.4.8 Synchronization Button (onLongTouch)

The unattended synchronization process begins.

4.5 Other Requirements

4.5.1 Icons for Buttons

YAJASI will provide the icons for each button. The developer shall specify the format icon files.

4.6 Mock-ups of JJ Mobile

The following mock-ups show the desired look and layout of the JJ Mobile application. Yajasi understands that the final product will not look exactly like these mock-ups.

That being said, a good amount of time was spent designing these mockups to provide the clearest and most intuitive layout to the pilot. Details like the light background behind the runway buttons were intentional. A further detail was the dashed border around controls with a onLongTouch response.

4.6.1 Active Runway – PDF Page 1

The note about multiple runways is for YAJASI's reference and has no bearing on the developer. The highlighted label will not be highlighted on every diagram.

*Multipal runway option
see profile*

ACTIVE until (dd-mmm-yy)
PC-6

Class SP

VHF 122.5

VHF 122.5

Room for large names

Kiwi KIW

S 04:41.85 E 140:43.32 Ngolum/Yepmum

Elevation(ft)	Length(m)	Width(m)	TD Zone Slope	GPS=
3500	419	31/Ditch	2%	KIAS +8

Land with Precipitation?

NO

PC-6 Landing Weight

No Restrictions

Diagram Box
Width:430px Height:380px

PC-6 Takeoff Weight

Rwy 31

-100k / 2700GW
Reduced due to airstrip length

Rwy 13

-200k / 2600GW
Temp until further experience

GPS = KIAS +1 Helio +3 PC6

Commit Point Touchdown: Before the River at 5050 ft

Go Around: Right turn down valley.

If unable to stop after landing: Describe location/procedure for least damage/injury

Surface: Grass over packed gravel, smooth even surface.

Hazards & Additional Info: WIND CURFEW 9:00am. WAIVER Rwy for TDZ slope. If other than CALM winds, DO NOT LAND! CALM winds defined as Indicated by "dead" or slight movements of the WS. Sudden Very STRONG winds possible including tailwinds, updrafts, downdrafts and rolling action on medium to short final. Other wind indicators at KIW include; turbulence at Kiwi pass, flag at KP, smoke in the valley, and winds at KWR.

Aborted Takeoff: 50m into the takeoff roll. At 2/3 the Rwy, turn left into the embankment. DO NOT GO OFF THE END.

Departure Engine Failure Options: Description of pre-determined emergency landing options.

MC 174°/128 nm from WAJJMC 109°/112 nm from WAM










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4.6.2 Active Runway – PDF Page 2

Most runways will not have this amount of information. The following runway was chosen for its verbose description. In the case of less information, the vertical size of the fields would be smaller.

ACTIVE until (dd-mmm-yy) PC-6	
 PC-6        	<h2 style="text-align: center;">Kiwi (KIWI)</h2> <p style="text-align: center;">Weather Patterns</p> <p>Non Typical Eastern highland weather. WINDS funneled upvalley or down valley past airstrip. Winds come up and change QUICKLY!</p> <hr/> <p style="text-align: center;">Restrictions</p> <p>9:00 WIND CURFEW. With reliable CURRENT (while overhead) radio report of CALM winds, the wind time restriction may be waived. WAIVER AIRSTRIPE DUE TO TDZ SLOPE</p> <hr/> <p style="text-align: center;">Chief Pilot Notes</p> <p>DO NOT LAND with winds other than calm as defined by POH 600D. Windsock DOES NOT always indicate winds accurately. Also look for flag movement on Keypoint ridge, and other wind indicators. Agreement of Indicators required BEFORE committal point Airspeed 63(-0+5)kts, VSI 500-700, (Helio Power 10-12 inches) [PC6 7-9 PSI] 3 Landing Accidents and Multiple Landing scares over 40 years due to winds.</p> <hr/> <p style="text-align: center;">Minimum Number and Type of Wind Indicators</p> <p>One windsock at bottom of strip. Windsock is put up only when expecting a flight. Otherwise high winds that are common destroy the windsock in short order. Current Over head radio report from a reliable source may take the place of the windsock. Do not attempt landing in wind conditions. Beware of anything more than a calm wind condition. A light breeze will often be the indication of hazardous wind conditions. Wind can come up almost without prior windsock indications. Beware of dead windsock if there is turbulence in the valley. Wind at the government strip (KWR) and or wind at altitude indicating cloud movement.</p> <hr/> <p style="text-align: center;">Minimum Standard to which the airstrip is to be maintained</p> <p>Surface should be smooth and free of ruts. Grass Height should not obstruct the clear view of each side marker.</p> <hr/> <p style="text-align: center;">Authority of pilot if minimum conditions do not exist/abnormal conditions exist.</p> <p>The pilot should close the airstrip if any side markers are missing or not clearly visible. The Pilot should inform the chief pilot of that action. Other than landing past the wind curfew or with out a windsock with a reliable radio report no other authority is granted without specific verbal approval from the Chief pilot or his designee.</p> <hr/> <p>No chart can substitute for a proper checkout. This Chart is for YAJASI Internal use Only Not for Use by other Aviation Operators This Chart May Have Errors. Use of this Chart by any persons other than Yajasi personnel is Strictly Forbidden. Report safety concerns to the Yajasi Chief Pilot</p>

4.6.3 InActive Runway – Page 1

The main difference with an inactive runway is the background color indications. Notice that the status bar and the runway selection button have a different color. The Aircraft Type Selection button does not necessarily need to have a change in background color.

INACTIVE SINCE (dd-mmm-yy)
PC-6

Class
SP

VHF
122.5

VHF
122.5

S 04:41.85 E 140:43.32

Kiwi KIW

Ngalum/Yepmum

Elevation(ft)	Length(m)	Width(m)	TD Zone Slope	GPS=
3500	419	31/Ditch	see profile	KIAS +8

Land with Precipitation?

NO

PC-6 Landing Weight

No Restrictions

PC-6 Takeoff Weight

Rwy 31

-100k / 2700GW
Reduced due to airstrip length

Rwy 13

-200k / 2600GW
Temp until further experience

GPS = KIAS +1 Helio +3 PC6

Commit Point Touchdown: Before the River at 5050 ft

Go Around: Right turn down valley.

If unable to stop after landing: Describe location/procedure for least damage/injury

Surface: Grass over packed gravel, smooth even surface.

Hazards & Additional Info: WIND CURFEW 9:00am. WAIVER Rwy for TDZ slope. If other than CALM winds, DO NOT LAND! CALM winds defined as Indicated by "dead" or slight movements of the WS. Sudden Very STRONG winds possible including tailwinds, updrafts, downdrafts and rolling action on medium to short final. Other wind indicators at KIWI include; turbulence at Kiwi pass, flag at KP, smoke in the valley, and winds at KWR.

Aborted Takeoff: 50m into the takeoff roll. At 2/3 the Rwy, turn left into the embankment. DO NOT GO OFF THE END.











Departure Engine Failure Options: Description of pre-determined emergency landing options.

MC 174°/128 nm from WAJJMC 109°/112 nm from WAM

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Page 1 of 2

 PC-6        	INACTIVE SINCE (dd-mmm-yy)		PC-6 
	<h2>Kiwi (KIW)</h2>		
	Weather Patterns Non Typical Eastern highland weather. WINDS funneled upvalley or down valley past airstrip. Winds come up and change QUICKLY!		
	Restrictions 9:00 WIND CURFEW. With reliable CURRENT (while overhead) radio report of CALM winds, the wind time restriction may be waived. WAIVER AIRSTRIPE DUE TO TDZ SLOPE		
	Chief Pilot Notes DO NOT LAND with winds other than calm as defined by POH 600D. Windsack DOES NOT always indicate winds accurately. Also look for flag movement on Keypoint ridge. and other wind indicators. Agreement of Indicators required BEFORE committal point Airspeed 63(-0+5)kts, VSI 500-700, (Helio Power 10-12 inches) [PC6 7-9 PSI] 3 Landing Accidents and Multiple Landing scares over 40 years due to winds.		
	Minimum Number and Type of Wind Indicators One windsack at bottom of strip. Windsack is put up only when expecting a flight. Otherwise high winds that are common destroy the windsack in short order. Current Over head radio report from a reliable source may take the place of the windsack. Do not attempt landing in wind conditions. Beware of anything more than a calm wind condition. A light breeze will often be the indication of hazardous wind conditions. Wind can come up almost without prior windsack indications. Beware of dead windsack if there is turbulence in the valley. Wind at the government strip (KWR) and or wind at altitude indicating cloud movement.		
	Minimum Standard to which the airstrip is to be maintained Surface should be smooth and free of ruts. Grass Height should not obstruct the clear view of each side marker.		
Authority of pilot if minimum conditions do not exist/abnormal conditions exist. The pilot should close the airstrip if any side markers are missing or not clearly visible. The Pilot should inform the chief pilot of that action. Other than landing past the wind curfew or with out a windsack with a reliable radio report no other authority is granted without specific verbal approval from the Chief pilot or his designee.			
No chart can substitute for a proper checkout. This Chart is for YAJASI Internal use Only Not for Use by other Aviation Operators This Chart May Have Errors. Use of this Chart by any persons other than Yajasi personnel is Strictly Forbidden. Report safety concerns to the Yajasi Chief Pilot			

5. Change Management Process

Changes made by Yajasi will be updated in the SRS document. The SRS document will then be distributed via email to all involved parties.

SRS document change requests from the developer can be made via email to Yajasi. Yajasi will update the SRS document and redistributed it.

6. Document Approvals

Approvals of this document will be done through email.

7. Supporting Information

7.1 Sample Navigation Formulas

The follow formulae were take from <http://williams.best.vwh.net/avform.htm>. They can be used free of charge and are helpful for calculating the distance and course between the Home Runway and the Runway depicted on the Runway diagram.

For the examples below, the following information was used (same source).

Suppose point 1 is LAX: (33deg 57min N, 118deg 24min W)

Suppose point 2 is JFK: (40deg 38min N, 73deg 47min W)

Therefore, in radians:

LAX is $\text{lat1}=(33+57/60)*\pi/180=0.592539$, $\text{lon1}=(118+24/60)*\pi/180=2.066470$

JFK is $\text{lat2}=0.709186$, $\text{lon2}=1.287762$

7.1.1 Distance Between Two Points

The great circle distance d between two points with coordinates $\{\text{lat1}, \text{lon1}\}$ and $\{\text{lat2}, \text{lon2}\}$ is given by:

$$d=\text{acos}(\sin(\text{lat1})*\sin(\text{lat2})+\cos(\text{lat1})*\cos(\text{lat2})*\cos(\text{lon1}-\text{lon2}))$$

A mathematically equivalent formula, which is less subject to rounding error for short distances is:

$$d=2*\text{asin}(\text{sqrt}((\sin((\text{lat1}-\text{lat2})/2))^2 + \cos(\text{lat1})*\cos(\text{lat2})*(\sin((\text{lon1}-\text{lon2})/2))^2))$$

(A) Example 1 – LAX to JFK

$$\begin{aligned} d &= 2*\text{asin}(\text{sqrt}((\sin((\text{lat1}-\text{lat2})/2))^2 + \\ &\quad \cos(\text{lat1})*\cos(\text{lat2})*(\sin((\text{lon1}-\text{lon2})/2))^2)) \\ &= 2*\text{asin}(\text{sqrt}((\sin((0.592539-0.709186)/2))^2 + \\ &\quad \cos(0.592539)*\cos(0.709186)*(\sin((2.066470-1.287762)/2))^2)) \\ &= 2*\text{asin}(\text{sqrt}((-0.05829)^2 + 0.829525*0.758893*0.379591^2)) \\ &= 2*\text{asin}(0.306765) \\ &= 0.623585 \text{ radians} \\ &= 0.623585*180*\pi/60=2144\text{nm} \end{aligned}$$

(B) Example 2 – LAX to JFK

$$\begin{aligned} d &= \text{acos}(\sin(\text{lat1})*\sin(\text{lat2})+\cos(\text{lat1})*\cos(\text{lat2})*\cos(\text{lon1}-\text{lon2})) \\ &= \text{acos}(\sin(0.592539)*\sin(0.709186)+ \\ &\quad \cos(0.592539)*\cos(0.709186)*\cos(0.778708)) \\ &= \text{acos}(0.811790) \\ &= 0.623585 \text{ radians} \\ &= 0.623585*180*\pi/60=2144\text{nm} \end{aligned}$$

7.1.2 True Course Between Two Points

For starting points other than the poles:

```
IF sin(lon2-lon1)<0
  tc1=acos((sin(lat2)-sin(lat1)*cos(d))/(sin(d)*cos(lat1)))
ELSE
  tc1=2*pi-acos((sin(lat2)-sin(lat1)*cos(d))/(sin(d)*cos(lat1)))
ENDIF
```

An alternative formula, not requiring the pre-computation of d, the distance between the points, is:

```
tc1=mod(atan2(sin(lon1-lon2)*cos(lat2),
              cos(lat1)*sin(lat2)-sin(lat1)*cos(lat2)*cos(lon1-lon2)), 2*pi)
```

(A) Example – Initial True Course from LAX to JFK

$\sin(-0.778708) = -0.702 < 0$

therefore...

```
tc1 = acos((sin(lat2)-sin(lat1)*cos(d))/(sin(d)*cos(lat1)))
     = acos((sin(0.709186)-sin(0.592539)*cos(0.623585))/
           (sin(0.623585)*cos(0.592535)))
     = acos(0.408455)
     = 1.150035 radians
     = 66 degrees
```

7.1.3 Magnetic Course Between Two Points

Given True Course (TC) and Magnetic Variation (MV) where MV is a static value in decimal form either a positive or negative:

Magnetic Course = TC + MV