

SATS
Staff Deployment Simulation Software

User Guide

Contents

1	Preparation	3
2	Home Page	4
3	Import Data	5
4	Manage Cost Parameters.....	8
5	Manage Simulation Parameters	9
6	Manage Airline Requirements	10
7	View Result.....	12
8	View Past Result.....	14
9	Interpretation of Results	15

1

Preparation

1.1 System Requirements:

In order for the software to run smoothly, your computers need to meet these following requirements:

- Intel Pentium 4 – 2.4 GHz or higher.
- Minimum 2 GB of RAM (3 GB recommended for running scheduling/simulation more than 4 months).
- 1 GB free space on your HDD.
- 1024 x 768 or higher display resolution.
- Microsoft Access 2007/2010.

1.2 Change Date and Time Format:

Before running the scheduling, we need to make sure the date and time format of the system is set to ***“Singapore”***

We can set it by: Go to **Start → Control Panel → Region and Language → Formats**. In **Format** dropdown box, choose ***“English (Singapore)”***

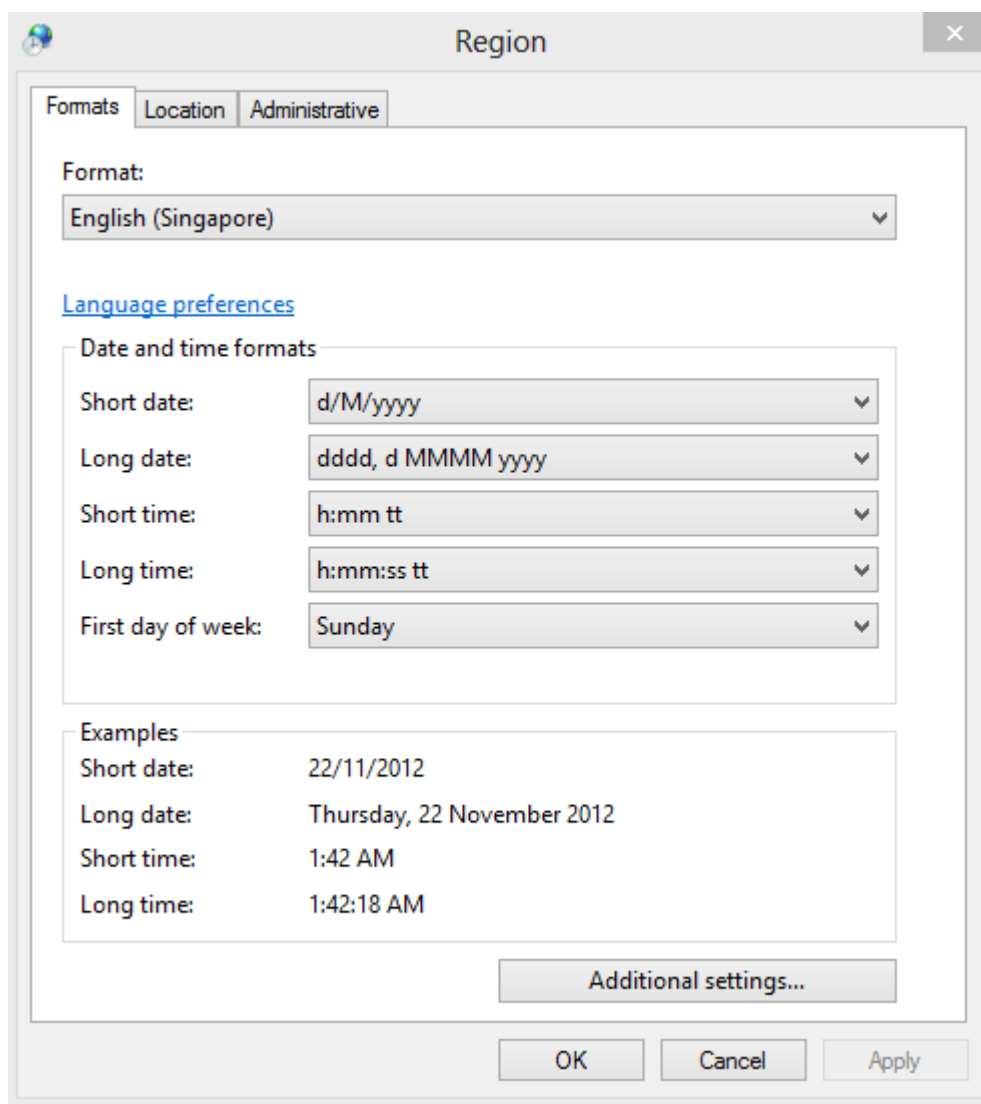


Figure 1: Region setting

2 Home Page

In the main folder of the application, click **“Start.bat”** to start the application. Please **do not** close the command prompt while running the application since it will force the application to close as well.

If the application is launched successfully, you will see the screen similarly to the image below

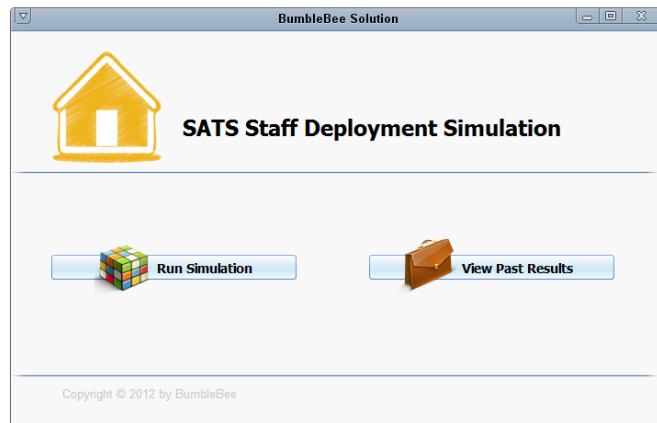


Figure 2: Home Page

In the **Home Page**, you can choose to:

- **“Run Simulation”**: To begin running simulation
- **“View Past Results”**: To view the results from previous simulations.

Notice: If you are not sure about anything, please simply move your mouse to the button/text. It will display the ToolTips to show you the functionality of that element.

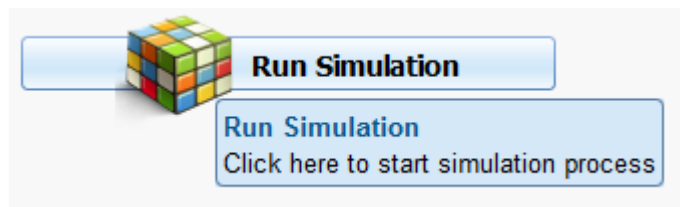


Figure 3: ToolTips example

We will focus on the **“Run Simulation”** first. The **“View Past Results”** will be discussed later in the manual.

Click on **“Run Simulation”** to begin. The application will direct you to the **“Import Data”** page

3

Import Data

3.1 Purpose:

This function is used to import data such as Flight Schedule (Arrival and Departure), Staff Training Record, Staff Roster and Airline Requirements which are generated by SATS System or designed by Airline Relation Manager into our application.

3.2 How to import data:

- First, we need to clean the data exported from SATS system. Please refer to section 3.3 for more details. Please save all of them as **.csv** or **.txt** file format
- Click on the **Magnifier** icon to browse to target files
- Please import all of the data needed including: Flight Arrival Schedule, Flight Departure Schedule, Staff Training, Staff Roster and Airline Requirements. You can choose to import all five of them or import one by one
- **Notice:** for **“Airline Requirements”**, you can edit or manually add the value by clicking on the **Pencil** icon. It will direct you to **“Manage Airline Requirements”** Page which we will discuss in Section 6.
- After browsing on of the files above, click **“Import”** to start importing data to our application. It will take roughly a minute to complete this process.
- If the **import is successful**, a **blue message** will be displayed below the progress bar. On the other hand, if the **import is unsuccessful**, a **red message** will be displayed with a prompt to ask you to check the **Log** file. The **Log** file will show you the error in the data so you can correct them and re-import the files again
- When the import is successful, click **Next** button located at the top right corner of the application to go to the next step **“Manage Cost Parameters”**.

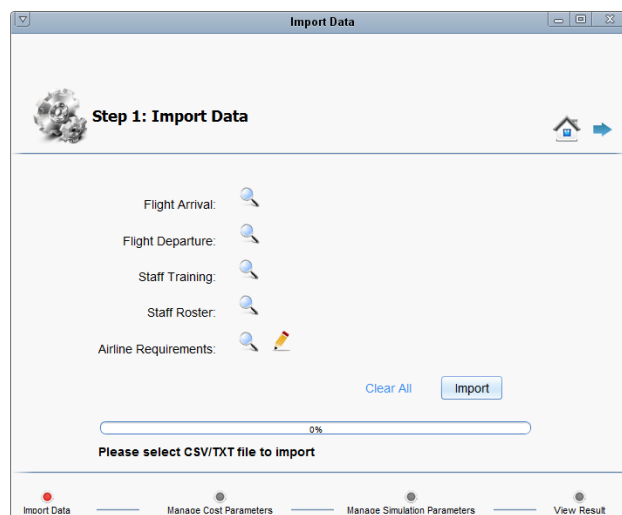


Figure 4: Import Data

- **Notice:** The **Breadcrumb** located at the bottom of the screen will show you your progress of simulation. The complete steps will be displayed in blue; the incomplete steps will be displayed in grey; your current step will be displayed in red.

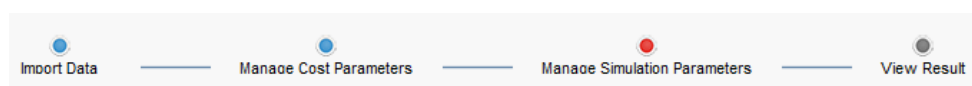


Figure 5: Breadcrumb navigation

3.3 Required format:

i. Flight Arrival and Flight Departure

- Remove rows with no data on either Gate1 column (in both arrival and departure schedule) or CTR column (in flight departure schedule).

ii. Roster

- Adhere to format used for normal shift and split shift.
- Exclude roster data meant for Group E, Group F, Group G, DM Group, SAMS Group, MBCC Group, EY Group, and MBS Group.

StaffNo	RosterID	RosterCyc	Mon	Tue	Wed	Thur	Fri	Sat	Sun
233292	CSA KE	1A	OFF	2100 700	2100 700	2100 630	2100 630	REST	2100 700
233286	CSA KE	2B	2100 630	2100 630	OFF	REST	2100 700	2100 700	2100 700
233296	CSA KE	3C	2100 700	OFF	2100 630	2100 630	REST	2100 700	2100 700
233287	CSA KE	4D	2100 700	2100 700	2100 630	OFF	2100 700	2100 630	REST
123456	CSA SPLIT SHIFT ROSTER (GROUP B)	3C	530	530	530	OFF	REST	530	530
	CSA SPLIT SHIFT ROSTER (GROUP B)		830	830	830			830	830
	CSA SPLIT SHIFT ROSTER (GROUP B)		1500	1530	1530			1500	1500
	CSA SPLIT SHIFT ROSTER (GROUP B)		2100	2100	2100			2100	2100
	CSA SPLIT SHIFT ROSTER (GROUP B)	4D	530	530	530	530	530	OFF	REST
	CSA SPLIT SHIFT ROSTER (GROUP B)		830	830	830	830	830		
	CSA SPLIT SHIFT ROSTER (GROUP B)		1500	1500	1500	1530	1530		
	CSA SPLIT SHIFT ROSTER (GROUP B)		2100	2100	2100	2100	2100		
226019	CSA SPLIT SHIFT ROSTER (GROUP B-IT)	1A	OFF	500	500	500	500	REST	500
226777	CSA SPLIT SHIFT ROSTER (GROUP B-IT)			900	900	900	900		900
				1400	1400	1400	1400		1400
				1900	1900	1900	1800		1900
	CSA SPLIT SHIFT ROSTER (GROUP B-IT)	2B	400	400	OFF	400	400	400	REST
			900	900		800	800	830	
			1500	1500		1400	1400	1400	
			1900	1900		1900	1900	1800	

iii. Airline Requirements

- Ensure all unique flights in flight arrival and flight schedule departure are included in the airline requirement data.
- Method to declare All Day Counter Open.
Ensure that the counter opening hour, number of wide aircraft, and number of narrow aircraft are all 0.

Gate Departure

Airline_Code	Size	CSO_At_Gate	CSA_At_Gate	Gate_Opening_Hours
BI	Narrow	1	2	1
BI	Wide	1	3	1
MH	Narrow	1	2	1
PR	Narrow	1	2	1
PR	Wide	2	3	1

Counter Departure

Airline_Code	Number_of_Narrowed_Aircrafts	Number_of_Wide_Aircrafts	CSO_At_Counter	CSA_At_Counter	Counter_Opening_Hours
BI	0	1	1	5	3
BI	1	0	1	4	3
MH	1	0	2	5	2.5
MH	2	0	2	7	2.5
MH	3	0	2	7	2.5
PR	0	1	1	5	3
PR	1	0	1	5	3
PR	1	1	1	5	3
PR	2	0	1	5	3

Gate Arrival

Airline_Code	Size	CSO_At_Gate	CSA_At_Gate
BI	Narrow	1	2
BI	Wide	1	3
MH	Narrow	1	2
PR	Narrow	1	2
PR	Wide	1	3

iv. Staff Training

This file contains information of all staff trained systems.

For Travelsky, add another airline code: HU.

For Able, add another airline code: NQ.

4

Manage Cost Parameters

4.1 Purpose:

This function is for user to pre-define costs such as **CSO/CSA Salary**, **Overtime Rate**, **Recall Rate** for Rest/Off Day and **MAC Cost**. These costs will be used for simulation in the latter steps.

4.2 How to Manage Cost Parameters:

- Key in the value accordingly for each field in the page to define the costs for simulation. You will need to key in for the first time you run the application.
- For the second time onward, the input field are pre-computed according to last recorded simulation.
- If you want to change any value, simply edit it accordingly.
- Click **Next** to go to “**Manage Simulation Parameters**” Page

The screenshot shows a window titled "Manage Cost Parameters". Inside, there's a sub-header "Step 2: Manage Cost Parameters" with a dice icon and navigation arrows. Below this, there are several input fields with labels and units:

Parameter	Value	Unit
CSO Salary	2.0	dollar/hr
CSA Salary	1.0	dollar/hr
Overtime Rate	1.0	
Recall Rate - Rest Day	1.0	
Recall Rate - Off Day	1.0	
MAC Cost - Breakfast	1.0	dollar/hr
MAC Cost - Lunch	5.0	dollar/hr
MAC Cost - Dinner	1.0	dollar/hr
MAC Cost - Supper	1.0	dollar/hr

At the bottom, there's a progress bar with four steps: "Import Data", "Manage Cost Parameters" (which is the current step and has a red dot), "Manage Simulation Parameters", and "View Result".

Figure 6: Manage Cost Parameters

5

Manage Simulation Parameters

5.1 Purpose:

Manage Simulation Parameters is used to define the variables for simulation such as Simulation Periods, Simulation Time (number of times you want the application to simulate. The more times it run, the more accurate the result will be). It also allow user to key-in the uncertainties such as Daily MC Rate, Ad Hoc Leave, Resign Rate or New Staff Rate

Figure 7: Manage Simulation Parameters

5.2 How to Manage Simulation Parameters:

- Key in the **Simulation Period** and **Number of Simulations**. They are required fields so please do not leave them blank. Due to memory concern, we will limit the **Number of Simulations** at **100 times**
- If you want the application to take into consideration uncertainties such as **MC Rate**, **Resign Rate**, **Ad Hoc Leave** and **New Staff Rate**, please key in the **Mean** and **Standard Deviation** for each variable accordingly.
- Click **Next** to start the simulation
- A message box will appear and ask you to wait for the result
- The simulation will take a fair amount of time based on the simulation period and simulation times

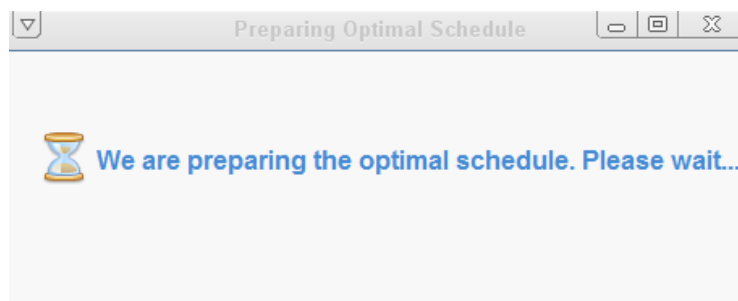


Figure 8: Simulation Message Box

6

Manage Airline Requirements

6.1 Purpose:

This function is used to edit or manually add a new requirement from a specific airline. Please notice that Airline Requirements can be imported from “**Import Data**” function

6.2 How to Manage Airline Requirements:

- Switch to **Gate Departure, Gate Arrival and Counter Departure** Tab to add or edit value accordingly.
- To edit: Double click on any field in the table. Edit the value and then click **Save**
- To add: Fill in the fields on top such as **CSO at Gate, CSA at Gate** and click **Save**
- When you are done, simply close the window to return to the application

The screenshot shows the 'Manage Airline Requirements' window with the 'Gate Departure' tab selected. The window has a title bar with standard OS controls. Below the title bar is a header area with the text 'Manage Airline Requirements' and a small airplane icon. The main area contains a tabbed interface with three tabs: 'Gate Departure' (active), 'Gate Arrival', and 'Counter Departure'. Below the tabs are input fields for 'Airlines', 'Aircraft Size', 'CSO at Gate', 'CSA at Gate', and 'Gate Opening Hrs to Departure'. The 'Airlines' and 'Aircraft Size' fields are dropdown menus, while the others are text boxes. There is a 'Save' button to the right of the input fields. Below the input fields is a table with the following columns: 'Airline Code', 'Aircraft Size', 'CSO at Gate', 'CSA at Gate', and 'Gate Opening Mi...'. The table has several empty rows. At the bottom right of the table are 'Delete Row' and 'Save' buttons. The footer of the window contains the text 'Copyright © 2012 by BumbleBee'.

Figure 9: Gate Departure Tab

The screenshot shows the 'Manage Airline Requirements' window with the 'Gate Arrival' tab selected. The layout is similar to Figure 9, but the 'Gate Arrival' tab is active. The input fields for 'Airlines', 'Aircraft Size', 'CSO at Gate', and 'CSA at Gate' are present, but the 'Gate Opening Hrs to Departure' field is not visible. The table below has columns for 'Airline Code', 'Aircraft Size', 'CSO at Gate', and 'CSA at Gate'. The 'Save' button is located to the right of the input fields, and 'Delete Row' and 'Save' buttons are at the bottom right of the table. The footer text 'Copyright © 2012 by BumbleBee' is also present.

Figure 10: Gate Arrival Tab

Manage Airline Requirements

Manage Airline Requirements

Gate Departure

Gate Arrival

Counter Departure

Airlines

No. of Narrow Aircraft

No. of Wide Aircraft

CSO at Counter

CSA at Counter

Opening Hour to Departure

For

hrs

mins

☐ All Day Check

Save

Airline Code	Narrowed-bodied ...	Wide-bodied Aircr...	CSO at Counter	CSA at Counter	Counter Opening ...

Delete Row

Save

Copyright © 2012 by BumbleBee

Figure 11: Counter Departure Tab

7

View Result

7.1 Purpose

This function displays the results from the simulation by: Pie Chart, Details Report. It can also show the Staff Schedule, Location List and Sensitive Cost Schedule

7.2 Result in Pie Chart (Result Cost Breakdown)

The Pie Chart shows the cost breakdown from overtime, recall. It also shows the staff utilization rate and flight demand coverage of the current schedule.

7.3 Result in Gantt Chart (Staff Schedule)

- Click on the Staff Schedule to go the Staff Schedule Page.
- Select Staff Number and Week
- Click View Staff Schedule
- The Gantt chart shows the schedule for that particular staff.

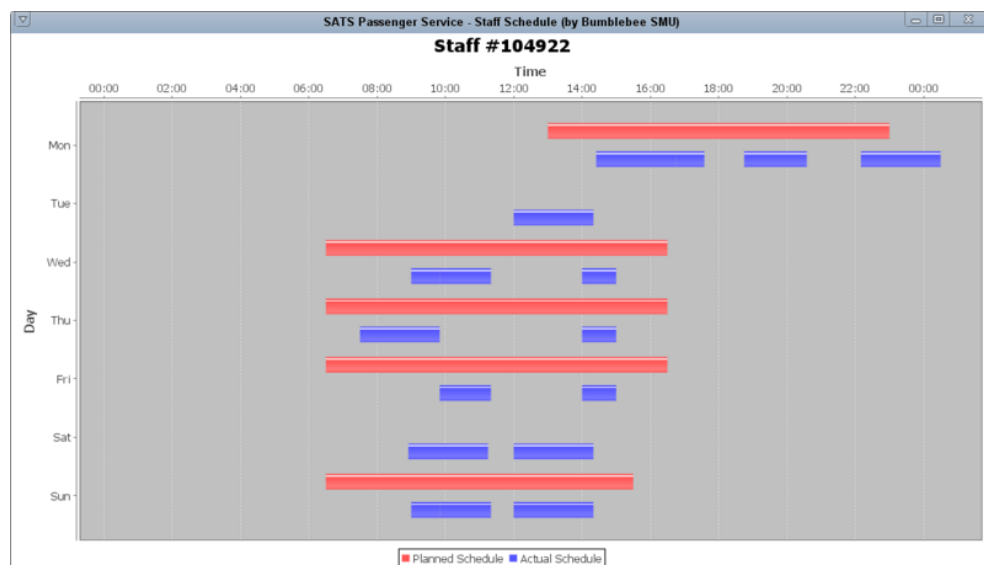


Figure 12: Staff Schedule Chart

7.4 View Details Report

Click View Detail Report to see the results from the simulation in details. The report will be exported in PDF Format

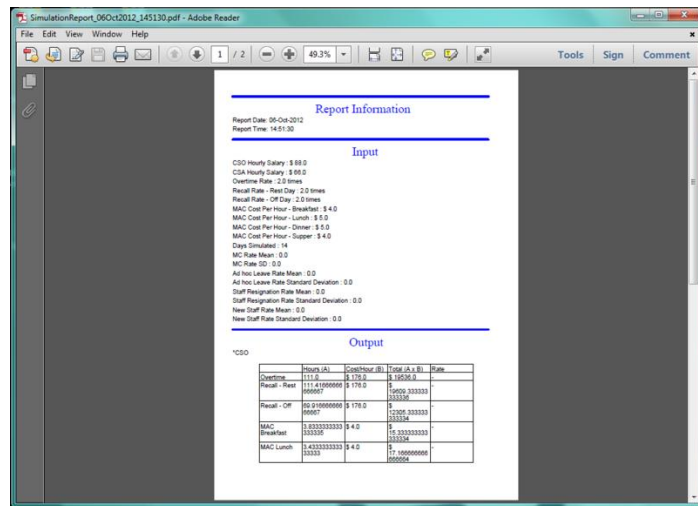


Figure 13: Details Report

7.5 Location List

To see and edit Location List, click on **View Location List**

- View it by Click on Next button
- Edit values by changing the text field

7.6 Cost Sensitive Schedule

Click **Get Cost Sensitive Schedule** to get the report by CSV Format.

The report generation will take several minutes to load

8

View Past Result

8.1 Purpose

This function shows the results from previous simulations. User can export them to Detail Report in PDF to compare different scenario

8.2 How to View Past Result

- Go back to **Home Page** by clicking on “**Home**” button
- Click “**View Past Result**”
- Select **From Date** and **To Date** to narrow your search result
- Click **Filter**
- Select a record that you want to view
- Click **View in PDF** to view the a particular record
- Click **Delete** to delete that record from our database

Result ID	Report Date & Time
25	2012-10-18 18:36:17.0
26	2012-10-18 18:38:35.0
27	2012-10-23 01:00:44.0
28	2012-10-23 01:03:24.0

Figure 14: View Past Result

9

Interpretation of Results

Important Notices:

- Please notice that our “optimal schedule” is based on the imported roster. As a result, the flight demand coverage and staff utilization rate will depend largely on the roster.
- The Staff Schedule we provide might be different from the actual schedule since our algorithm only focuses on optimizing the result.