Software Requirements Specification (SRS)

Software Requirements Specification for Alaska Airlines

Version 1.0

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For CEN 3073 - Requirements Engineering and Analysis

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1. Introduction

1.1 Purpose

A new scheduling software is being developed for Alaska Airlines in order to improve the safety, cost, and efficiency of scheduling pilots and flight attendants. By creating a software where pilots fly more of the same routes, they will become more familiar with flying to and from specific airports which will increase their knowledge of these airports. As a result, this will improve safety metrics at Alaska Airlines which is one of the main goals of the airline. Algorithms will also be developed so that the schedule can be flown by as few pilots as possible which will improve efficiency as well as cut costs. Routes will also be optimized so that less fuel and turn around time is required.

1.2 Scope

Product Name

Alaska Airlines Crew Schedule Access

Overview

On the backend, the software will optimize trip efficiency, safety, and cost. On the front end, the software will allow pilots and flight attendants to view their schedule, bid for their schedule, trade trips, post trips, pick up open time, and see details about trips they are on.

Goals

A new scheduling software is being developed that will create bid sheets specific to each pilot while also allowing them to have a say in their schedule. These personalized bid sheets will adapt over time to the tendencies of bids placed by the individual pilot. While not only benefiting the pilot, it will also improve the safety and efficiency of the airline by having specific pilots only fly to certain high risk airports to increase their familiarity with these high risk airports. In turn, this will reduce the number of safety incidents occurring primarily at these specific airports. By creating bid sheets specific to each individual pilot, costs of each schedule can be reduced while increasing the

efficiency of the schedule. Additional benefits of the new software include easier to understand bid sheets, a more user focused interface, and an anonymous incident reporting link.

- How the software will help achieve business goals:
    - The software will reduce the number of accidents by allowing pilots to become more familiar and accustomed to flying in and out of specific airports.
    - Number for employee injuries will decline through the use of this software because employees would be more familiar with the airports that are flying in and out.
    - Alaska Airlines would continue to operate safely by measuring the changes in safety data after the role out of the new software to ensure the safety levels are either improving or staying the same.
    - Safety metrics will me improved as a result of the new software allowing data to be taken on the differences of pilots flying in and out of a wide variety or airports compared to pilots only flying in and out of a handful of airports.
    - Reporting of incidents will be easier through the new scheduling portal by allowing employees to have a fast and easy way to anonymously report incidents they witnessed.
- Objectives of the software:
    - Reduce the number of unstable approaches by 50% based on safety data through having pilots fly to the same airports more often so that Alaska Airlines becomes a safer airline within 6 months of launching the new scheduling software.
    - Reduce the number of ground proximity warnings by 25% based on safety data through having pilots fly to the same airports more often so that Alaska Airlines becomes a safer airline within 6 months of launching the new scheduling software.
    - Reduce the number of long landings by 40% based on safety data through having pilots fly to the same airports more often so that Alaska Airlines becomes a safer airline within 6 months of launching the new scheduling software.
    - The number of help desk tickets from the scheduling software should be reduced by 50% after a year of releasing the new software by adding more descriptions of what to do while using the software and by providing tutorials on how to use the software so that employees can manipulate their schedule with more ease.
    - Pilot and flight attendant scheduling efficiency will increase by using 10% fewer employees to fly the same routes within one year of using the new scheduling.
    - Total costs of paying pilots will be reduced by 5% by allocating them in a more efficient way through reducing excessive layover and wait times.

Out of Scope

The solution will not redo specific routes to make them more efficient. It will also not reformat the bid sheets only the general layout of the scheduling portal. New functionality of the platform will also not be added. App for the scheduling portal will not be developed in this release.

1.3 Product Overview

1.3.1 Product Perspective

A context diagram is a level 0 data flow diagram. It provides an abstraction view to the system. The system is depicted as one process that has relationships to outside entities. To show the system a bubble is used with the name of the software that is going to be developed inside of it. The input and output of the system is shown with labeled arrows incoming and outgoing. The data flows from the software to the environment and back.

To create a new diagram, I used SmartDraw as my software. On SmartDraw I selected the data flow diagram template. I started by putting the software to be developed which is the scheduling portal in a circle. I then added the two external entities that interact with the software which were scheduling agents and employees. Finally, I added arrows in the direction information was flowing to and from the scheduling portal and external entities. I put a description of the activity occurs on each arrow.
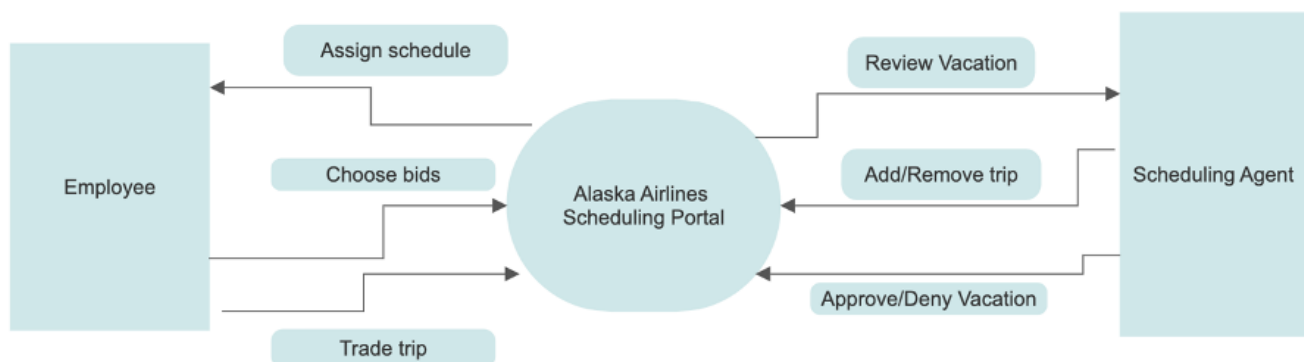
Constraints:

🔒 **AA-49** Bid sheets generated by the scheduling software shall comply with FAA regulations.

🔒 **AA-50** Development of the scheduling portal shall follow Alaska Airlines design and coding standards.

🔒 **AA-51** Scheduling software shall be compatible with the current version of the software.

🔒 **AA-52** Only secure web browsers can be used to login to the scheduling portal.

🔒 **AA-53** System shall support the number of pilots and flight attendants at Alaska Airlines.

🔒 **AA-63** The system must follow all laws in the United States and Mexico.

🔒 **AA-64** The system must follow all guidelines and regulations from the FAA and Pilot/Flight Attendant Unions.

🔒 **AA-65** Access to the system will only be granted to pilots, flight attendants, scheduling agents, and maintance.

🔒 **AA-66** Alaska Airlines conventions must be followed in the design of the portal.

🔒 **AA-67** Alaska Airlines scheduling portal must fit display requirements of tablet and computers.

1.3.2 Product Functions

- Pilots can login to scheduling portal with employee number and password
- Flight attendants can login to scheduling portal with employee number and password
- Pilots can trade a trip with another pilot
- Flight attendants can trade a trip with another flight attendant
- Pilots can pick up a trip posted by another pilot
- Flight attendants can pick up a trip posted by another flight attendant
- Pilots can post a trip they don't want
- Flight attendants can post a trip they don't want
- Pilots can pick up a trip that is not assigned to anyone
- Flight attendants can pick up a trip that is not assigned to anyone
- Pilots can view their individual bid sheets
- Pilots can bid based on their bid sheets
- Flight attendants can view their bases bid sheets
- Flight attendants can bid based on their bid sheets
- Employees can submit an anonymous safety concern on incident
- Scheduling agents can post bid sheets
- Scheduling agents can upload employee schedules
- Scheduling agents can approve vacation time
- Pilots can view their schedule
- Flight attendants can view their schedule
- Bid sheets will be generated based on safety and efficiency algorithms

1.3.3 User Characteristics

- Pilots -
    - High school or college graduate
    - Employee of Alaska Airlines
    - Experienced in using scheduling software
    - Technical expertise may vary
- Flight Attendants -
    - High school or college graduate
    - Employee of Alaska Airlines
    - Experienced in using scheduling software
    - Technical expertise may vary
- Scheduling team -
    - College graduate
    - Employee of Alaska Airlines
    - Expert in using scheduling software
    - High technical expertise

1.3.4 Limitations

Key	Summary	Description	Labels
AA-28	9 digit employee ID must be entered as username	Adds security to system.	limitation
AA-29	Password must be 10 digits with at least 1 number and 1 symbol	Adds security to access system.	limitation
AA-30	Employee must change password to login to portal every 6 months	Reduces security risks.	limitation
AA-31	Portal must be able to run on all devices	Employees do not all have work computers so it must be compatible with personal devices.	limitation
AA-32	Browser must be secure to open the portal	Reduces security risks.	limitation
AA-33	Code must be written according to Alaska Airlines programming standards	Programmer must adhere to standards.	limitation
AA-34	Portal will automatically log out after 10 min of not being used	Reduces security risks.	limitation
AA-35	Portal may not go down for maintenance for more than 2 hours at a time	Employees need to access their schedule at all time of day.	limitation
AA-36	Schedules must be able to be downloaded as a pdf	Employees may want a paper copy of their schedule.	limitation
AA-37	System must be integrated by given date	Programmers need to meet deadlines	limitation
AA-38	Portal must be simple to use for employees with little IT knowledge	Some pilots and new hired have little knowledge of using technology or scheduling software.	limitation

1.4 Definitions

Alaska Air Group - Owns Alaska Airlines and Horizon Air

Safety Operation Performance Metric - Quarterly goals for pilots and flight attendants to meet regarding safety.

In flight - Group that is in charge of operations that occur during flights

Safety metrics - Data on how safety is being upheld

Cost Analysis - Documents that detail the budget and how much each project will cost

Airport City Codes - Identifies each airport in a unique way

2. References

Jon Sites - Director of Flight Safety at Alaska Airlines

Safety Manual at Alaska Airlines - may be obtained from Alaksa Airlines

Error Report - may be obtained from Safety Group at Alaska Airlines

Procedures Document - may be obtained from Alaska Airlines

Cost Analysis Document - may be obtained from Alaska Airlines

Alaska Safety Management Sytems Manual - may be obtained from Safety Group at Alaska Airlines

Alaska Pilot Scheduling Manual - may be obtained from Alaska Airlines

ALPA Pilot Contract with Alaska Airlines - may be obtained from Alaska Airlines or ALPA union

Alaska Flight Planning and Scheduling Manual - may be obtained from Alaska Airlines scheduling department

Alaska Flight Operations Manual - may be obtained from Alaska Airlines flight operations department

FAR 119 Federal Flight Limitations Document - may be obtained from Alaska Airlines or the FAA

Operational Performance Leadership Safety Goals - may be obtained from Alaska Airlines

3. Specific Requirements

Requirements:

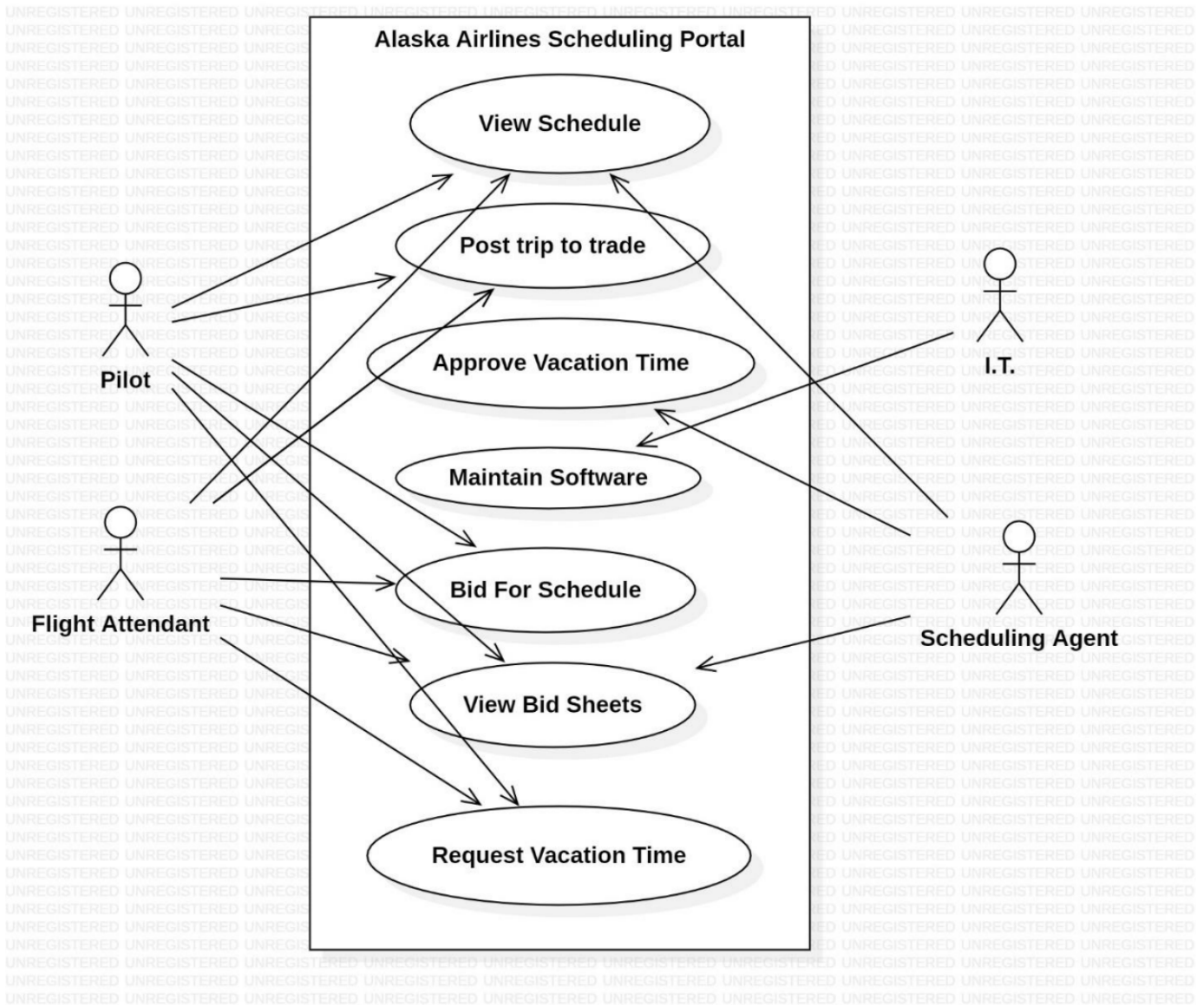| Key	Summary	Description	T	Linked Issues	P	Labels
AA-62	The previous version of the scheduling software shall be shut down upon rollout of the new version.	The previous version of the scheduling software needs to be taken down when the new one rolls out so that pilots don't get confused. Source: Director of Safety	📄		⌄	non-functional
AA-61	The scheduling software shall be installed on all company computers upon rollout.	Scheduling software will be installed onto all company computers for easy access. Source: Director of Safety	📄		⌃	
AA-60	The scheduling software shall implement data from previous scheduling portal into the new scheduling portal.	Since the necessary data about employees and trips already exists is will be transferred. Source: Director of Safety	📄		⌄	functional
AA-59	The scheduling software shall not go down for maintenance for more than one hour per day.	Pilots and flight attendants must be able to access the portal at all times of the day and from different time zones so the portal may only do down for 1 hour a day. Source: Director of Safety	📄		=	
AA-58	The scheduling software shall be approved by the safety department, scheduling department, and pilot union.	Before rollout of the software it must be approved. Source: Director of Safety	📄		⌃⌃	functional
AA-57	The scheduling software shall be compatible with windows, apple, and android devices.		📄		⌃	
AA-56	The scheduling software shall provide interactive user training after each employees first log in	Giving employees user training after their first time logging into the new scheduling portal will allow them to get familiar with new functionality. Source: Director of Safety	📄		⌄	
AA-55	The scheduling software shall include a database that holds pilot and trip information		📄		⌃	non-functional
AA-54	The scheduling software shall not exceed the budget determined by Alaska Airlines	The cost of developing and implementing the software cannot go above the cost allocated for the project. Source: Director of Safety	📄		⌃⌃	functional
AA-48	The scheduling software shall allow pilots to pick up a trip from a trip listed on the open time page of the scheduling portal..	Source: User	📄	AA-23	=	functional
AA-47	The scheduling software shall provide an option to download a pdf of bid sheets.		📄		⌄⌄	non-functional
AA-46	Pilots shall view bid sheets, using Alaska Airlines scheduling portal, from the bid subpage.	Pilots need to view their personalized bid sheets before bidding for their schedule. Source: User	📄		⌃⌃	functional
AA-45	The scheduling software shall provide a filtration system on the trip trade board.	When a pilot or flight attendant is looking for a trip to pick up they will be able to filter the available trips by length, location, and pay. Source: Scheduling department	📄		⌄⌄	functional
AA-44	The scheduling software shall allow pilots to post a trip they have been assigned to	Source: User	📄	AA-17	=	functional

	the trading board on the schedule portal.						
AA-43	The scheduling software shall require an employee ID and unique password to log into the scheduling portal.	Source: User		📄	AA-16	⌃	non-functional
AA-42	The software shall provide scheduling agents a means to approve or deny an employee time off request.	Scheduling agents must be able to approve or deny any requests a pilot or flight attendant makes for time off. Source: Scheduling department		📄		⌄	functional
AA-41	The scheduling software shall send all employee time-off requests to scheduling agents.	When a pilot or flight attendant requests time off, the request must be sent to a scheduling agent so they can approve or deny the request. Source: Scheduling department		📄		=	functional
AA-40	The scheduling software shall allow pilots to request a set of days off, using the scheduling portals time off page.	Source: User		📄	AA-19	⌄	functional
AA-39	Scheduling agents shall be able to remove a trip, using Alaska Airlines scheduling software, from an individual pilot's schedule.	Source: Scheduling department		📄	AA-12	⌃	functional

19 issues

Use Case Diagram:

Alaska Airlines Scheduling Portal

- View Schedule
- Post trip to trade
- Approve Vacation Time
- Maintain Software
- Bid For Schedule
- View Bid Sheets
- Request Vacation Time

Actors: Pilot, Flight Attendant, I.T., Scheduling Agent

Use Cases:

Key	Summary	T	P
AA-27	As a scheduling agent, I want to be able to add data to a blank trip so it can be assigned to someone	🔖	⌃⌃
AA-26	As a flight attendant, I want to be able to post my trip so that another flight attendant can pick it up	🔖	=
AA-25	As a pilot, I want to be able to post my trip so that another pilot can pick it up	🔖	⌄
AA-24	As a flight attendant, I want to be able to pick up a trip from another flight attendant so that I can work more hours	🔖	⌄
AA-23	As a pilot, I want to be able to pick up a trip from another pilot so that I can work more hours	🔖	⌄
AA-22	As a flight attendant, I want to trade a trip with another flight attendant so that I can have flexibility in my schedule	🔖	⌄
AA-21	As a flight attendant, I want to request to have a trip added to my schedule so that I can pick which trip I want	🔖	=
AA-20	As a flight attendant, I want to request vacation time so that I will have set dates off of work	🔖	⌄
AA-19	As a pilot, I want to request vacation time so that I will have set dates off of work	🔖	⌄
AA-18	As a scheduling agent, I want to be able to log in to the scheduling software so that I can add, remove, or edit a trip	🔖	⌃⌃
AA-17	As a pilot, I want to be able to trade a trip with another pilot so that I can have flexibility in my schedule	🔖	⌄
AA-16	As a flight attendant, I want to log in to the schedule portal so that I can see my schedule	🔖	⌃

AA-15	As a pilot, I want to log in to the schedule portal so that I can see my schedule		
AA-14	As a scheduling agent, I want to create a new trip so that it can be assigned to an employee		
AA-13	As a scheduling agent, I want to be able to asign a trip to an employee so that I can create their schedule		
AA-12	As a scheduling agent, I want to remove a trip from an employee so that I can edit their schedule		
AA-11	As a pilot, I want to request to have a trip added to my schedule so that I can pick which trip I want.		
AA-2	Document business rules		

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4. Verification

Key	Summary	Verification Approach
AA-62	The previous version of the scheduling software shall be shut down upon rollout of the new version.	Inspection
AA-61	The scheduling software shall be installed on all company computers upon rollout.	Analysis
AA-60	The scheduling software shall implement data from previous scheduling portal into the new scheduling portal.	Inspection
AA-59	The scheduling software shall not go down for maintenance for more than one hour per day.	Inspection
AA-58	The scheduling software shall be approved by the safety department, scheduling department, and pilot union.	Analysis
AA-57	The scheduling software shall be compatible with windows, apple, and android devices.	Inspection
AA-56	The scheduling software shall provide interactive user training after each employees first log in	Demonstration
AA-55	The scheduling software shall include a database that holds pilot and trip information	Inspection
AA-54	The scheduling software shall not exceed the budget determined by Alaska Airlines	Analysis
AA-48	The scheduling software shall allow pilots to pick up a trip from a trip listed on the open time page of the scheduling portal..	Demonstration
AA-47	The scheduling software shall provide an option to download a pdf of bid sheets.	Test
AA-46	Pilots shall view bid sheets, using Alaska Airlines scheduling portal, from the bid subpage.	Inspection
AA-45	The scheduling software shall provide a filtration system on the trip trade board.	Analysis
AA-44	The scheduling software shall allow pilots to post a trip they have been assigned to the trading board on the schedule portal.	Demonstration
AA-43	The scheduling software shall require an employee ID and unique password to log into the scheduling portal.	Test
AA-42	The software shall provide scheduling agents a means to approve or deny an employee time off request.	Test
AA-41	The scheduling software shall send all employee time-off requests to scheduling agents.	Demonstration
AA-40	The scheduling software shall allow pilots to request a set of days off, using the scheduling portals time off page.	Demonstration
AA-39	Scheduling agents shall be able to remove a trip, using Alaska Airlines scheduling software, from an individual pilot's schedule.	Test

19 issues

5. Appendices

5.1 Assumptions and Dependencies

- Having pilots fly to the same airports more frequently will be safer
- Safety issues are occurring due to pilots having a lack of experience flying to certain airports

- There are enough pilots to only allow pilots based in certain cities to fly to specific airports
- There is money in the budget to support the new software to be developed
- IT department is capable of developing the new software
- The new software can be integrated into the current system when finished
- Pilots will adapt to the new way the scheduling system works
- Tutorials will be needed for employees to understand how the new software works

5.2 Acronyms and Abbreviations

Airport City Codes must be understood

Trip credit - pay for the trip to the pilot

Block time - flight time