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|  | **JKU - JOHANNES KEPLER UNIVERSITÄT LINZ | JKU LINZ**  **ISSE - Institute of Software Systems Engineering** |  |

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| **Course:** UE Software Engineering | **Course ID:** 343.309 | **Semester:** 2021W |
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## Milestone 1 Report – Team 2

### 1. Overall Architecture



The airport management system is based on the four subsystems like they are displayed in the above package diagram. Every subsystem directly communicates with all other subsystems since the control system management as a central part is not available in this case. This specifically means that Airside and Landside management provide their vehicles’ route information and consume them from the respective other part instead of having the control system management between them. We can see that every subsystem provides and consumes information from every other subsystem which makes it quite interconnected.

### 2. System



Financial Management is responsible for gathering information about the flights from the airlines, calculating the ticket prices, booking facilities for airlines, assigning employees to the respective Managements and managing maintenance of vehicles, fuel, material and equipment.

Airside Management is responsible for …

Landside Management is responsible for …

Terminal Management is responsible for checking in passengers, handling all baggage related tasks, performing security checks and also displaying flight information publicly for all passengers.

**Report costs**

Step 1: Landside management gathers all costs from refueling, maintenance and facility usage

Step 2: Airside management gathers all costs for using the runway

Step 3: Financial management requests a cost report from Landside management

Step 4: Financial management requests a cost report from Airside management

Step 5: Airside and Landside management send cost report

Step 6: Financial Management sends out bills to airlines

Step 7: Financial Management monitors payment of the bills

**Coordinate routes**

Step 1: Airside management requests fuel truck, stair truck, etc. from Landside Management

Step 2: Landside Management requests parking location of aircraft

Step 3: Airside Management provides parking location and arrival/departure time

Step 4: Landside Management calculates needed resources

Step 5: Landside Management plans best route for vehicles

Step 6: Landside Management assigns driver

Step 7: Landside Management executes requested service

**Manage employees**

Step 1: Landside-, Airside and Terminal Management report desired amount of employees to Financial Management

Step 2: Financial Management searches for suitable employees according to knowledge and abilities

Step 3: Financial Management assigns employees to Landside, Airside and Terminal Management

Step 4: Landside, Airside and Terminal Management report working hours of employees to Financial Management

Step 5: Landside, Airside and Terminal Management report absences to Financial Management

Step 6: Financial Management pays salaries to employees

Step 7: Financial Management regulates hours of labor according to working hours

**Manage landside employees**

Step 1: Landside Management requests security clothing for its employees from Financial Management

Step 2: Financial Management buys requested clothing from an external vendor

Step 3: Landside Mangement requests driving licence courses for the drivers for being able to drive the vehicles

Step 4: Financial Management books driving instructor and coordinates appointments

Step 5: Financial Management supervises attendance of employees at appointments

Step 6: Financial Management pays for course and requests driving licence for Landside Management employees

**Manage terminal employees**

Step 1: Terminal Management requests adequate clothing for employees from Financial Management

Step 2: Financial Management buys requested clothing from an external vendor

Step 3: Terminal Management requests computers with access to flight information and passenger data in order to do work

Step 4: Terminal Management requests security utils (meta detector, scanner, ...) from Financial Management

Step 5: Terminal Management requests big screens for display flight information from Financial Management

Step 6: Financial Management provides requested utils and buys the from an external vendor if needed

**Manage airside employees**

Step 1: Landside Management requests security clothing for its employees from Financial Management

Step 2: Financial Management buys requested clothing from an external vendor

Step 3: Airside Management requests courses for air traffic controllers, tower personnel, etc. from Financial Management in order to ensure operability

Step 4: Financial Management books instructors and coordinates appointments

Step 5: Financial Management supervises attendance of employees at appointments

Step 6: Financial Management pays for course and requests driving licence for Airside Management employees

**Provide gate and transport information**

Step 1: Terminal management requests passenger/cargo transport from Landside Management

Step 2: Landside Management requests gate and transport information from Terminal Management

Step 3: Terminal management assigns gate

Step 4: Terminal management forwards baggage to transportation units

Step 5: Terminal management and Airside management coordinate flight details to ensure that baggage gets delivered correctly and on time

Step 6: Landside Management transports baggage and passengers to the airplane

**Provide flight information**

Step 1: Airside Management requests flight information from Terminal management (scheduled departure/arrival)

Step 2: Terminal Management adjusts departure/landing time according to check-in status of passengers

Step 3: Airside Management provides actual departure/landing time (possible delays)

Step 4: Terminal Management displays possibly changed flight information to passengers

Step 5: Terminal Management coordinates baggage and passenger transportation according to air craft status

**Update ticket information / pricing**

Step 1: Terminal Management reports check-in status of flights to Financial Management

Step 2: Terminal Management reports payments (too heavy baggage, better seat category, ...) to Financial Management

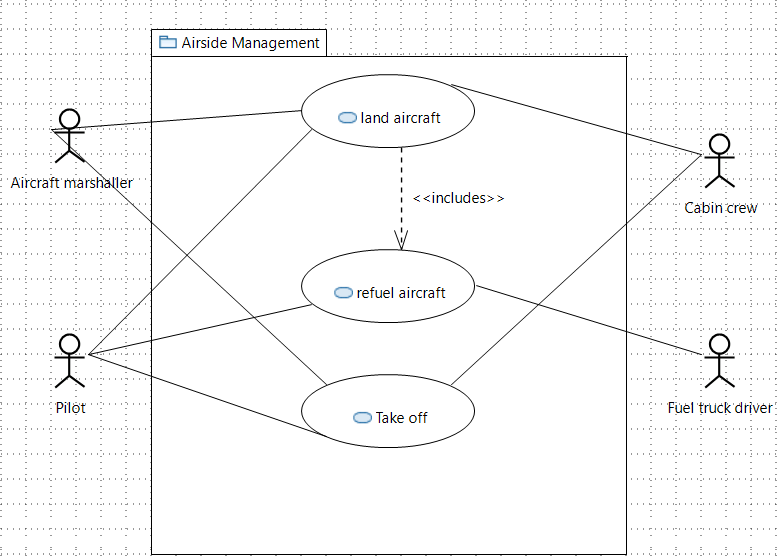
Step 3: Financial Management updates ticket prices, departure times and flight states

Step 4: Terminal Management displays updated data on flight information system

Step 5: Financial Management executes payments depending on the payment method (excluding cash since that is payed immediately)

#### 2.1 Sub-system 1 / Airside management - [Jonas **Reichhardt**]

The airside management handles aircraft related information and actions. For example, aircraft landing and takeoff.



The aircraft marshaller is ground personnel which guides pilots from starting/landing strip to parking spot and vice versa, in our case he also gives landing/starting permission.

On the aircraft the cabin crew manages customer request, safety briefing and it acts as a communication relay between pilot and passengers.

Regardless of the situation pilots are involved in every action in the airside management. They land the aircraft, notify the landside management to get the aircraft refueled and takeoff when all passengers and cargo is loaded.

The fuel truck driver is part of the landside management but is necessary to get aircrafts refueled and ready to takeoff.

**Land aircraft**

Step 1: Pilot requests landing clearance from the aircraft marshaller

Step 2: Pilot notifies cabin crew that the aircraft will land soon

Step 3: Cabin crew informs the passengers that they should put on their seatbelts

Step 4: Aircraft marshaller gives clearance and provides the landing strip

Step 5: Pilot performs landing

Step 6: Aircraft marshaller provides a gate number and the parking spot after the passengers left.

Step 7: Aircraft marshaller signals instructions to the pilot to ease parking.

Step 8: Pilot acknowlegdes the information provided

Step 9: Cabin crew departs the passengers row-wise

**Refuel aircraft**

Step 1: Pilot requests fuel truck from landside management and provides location information

Step 2: Fuel truck driver gets information

Step 3: Fuel truck driver reports to pilot that the truck will refuel the aircraft

Step 4: Fuel truck moves to aircraft

Step 5: Fuel truck refills aircraft

**Take off**

#### Step 1: Pilot goes through all checklists

#### Step 2: Pilot requests start permission from aircraft marshaller

#### Step 3: Aircraft marshaller gives permission together with starting strip

#### Step 4: Pilot acknowlegdes the information provided

#### Step 5: Pilot informs cabin crew that the aircraft has started the take off procedure

#### Step 6: Cabin crew informs passengers that they should put on their seatbelts

#### Step 7: Pilot moves the aircraft to the designated starting strip

#### Step 8: Pilot performs take-off

#### 2.2 Sub-system 2/Sub-system name - [Stefan Haslhofer]

#### 2.3 Sub-system 3/Terminal management - [Simon Primetzhofer]



A passenger is a natural person which enters the airport in order to travel to another destination. Passengers may have some baggage with them – depending on the size, it must be handed over at the check-in. Furthermore, a passenger must enter the security check in any case and when arriving, already have a valid visa to enter the respective country.

Check-in employees are sitting at the check-in counter and have two tasks: Checking in a passenger for the booked flight and if a passenger has baggage, they must tag and forward it to the landside management.

Security employees are responsible for inspecting the hand baggage and the passengers themselves. They remove forbidden items and are also allowed to examine a passenger in detail. They have the permission to deny entrance to the gate area when security concerns are present.

Border police officers are monitoring arriving passengers and confirm their admission. They must have knowledge about which nationalities need a visa and which can enter without further checks.

The flight information system is a digital system which allows passenger to gather all necessary flight information at any time. There are big screens all over the airport and also small screens directly at the gates which provide more detailed information.

**Check-in flight**

Step 1: Passenger approaches check-in counter

Step 2: Check-in employee asks for passport

Step 3: Passenger hands over passport

Step 4: Check-in employee checks identity

Step 5: Check-in employee prints out flight tickets

Step 6: If the passenger has some baggage, he/she hands it over to the check-in employee

Step 7: If Step 6 was executed, the check-in employee tags the baggage and forwards it

Step 8: Check-in employee gives back the passport including the flight tickets

Step 9: Passenger leaves counter

**Hand over baggage**

Step 1: Passenger hands over baggage

Step 2: Check-in employee weighs every baggage item

Step 3: If the baggage is too heavy, passenger pays an additional fee

**Tag baggage and forward**

Step 1: Check-in employee prints out one tag per baggage item

Step 2: Check-in employee puts tag on every baggage item

Step 3: Check-in employee forwards all baggage items via the conveyor to the transportation location

**Enter security check**

Step 1: Passenger enters security area with flight ticket

Step 2: Passenger throws all forbidden items into a bin

Step 3: Passenger puts all remaining personal items into a box

Step 4: Security employee scans personal items

Step 5: Passenger goes through metal detector

Step 6: If the passenger fails the metal detector test, an individual security check is initiated

Step 7: If forbidden items are detected, an individual security check is initiated

Step 8: Passenger takes back personal items

Step 9: Passenger leaves security area

**Start individual security check**

Step 1: Security employee removes forbidden items from the passenger's personal belongings if present

Step 2: Security employee performs an individual scan on the passengers' body

Step 3: Security employee asks relevant questions to resolve the situation

Step 4: If the situation is resolved, the passenger passes the security check; if not, the passenger is escorted away

Step 5: Passenger leaves individual security check

**Check passport**

Step 1: Passenger approaches border police

Step 2: Passenger hands over passport

Step 3: Border police checks nationality and possible warrants, fees, etc.

Step 4: If passenger is not an EU or EWR citizen, border police checks for a valid visa

Step 5: Border police gives back the passport

Step 6: Passenger leaves border police check

**Confirm visa**

Step 1: Border police inspects passport for visa

Step 2: Border police checks if visa is valid

Step 3: Border police confirms identity of passenger

Step 4: If passenger passes visa check, he/she is allowed to go on

Step 5: If check is not passed, border police denies further travelling

Step 6: If security concerns are raised, the passenger gets arrested

**Gather flight information**

Step 1: Passenger spots flight information display

Step 2: Passenger looks for his/her own flight in the list of all upcoming flights

Step 3: Flight information provides flight number, departure/landing gate and time

Step 4: Passenger notes down important information

Step 5: Passenger leaves information area

#### 2.5 Sub-system 5/Financial Management - [Kaan Baylan]

The Airline is a business which operates regular services for carrying passengers or cargo by plane. This business will book a facility of the airside to park their aircrafts and will give the financial management info about their designated flight.

The Financial Management Employee is a person who works for the Financial Management department in our Airside. These employees will be receiving the desired bookings of the airside and reserve the facilities. Moreover, this department has got the task to assign employees to the other managements.

Furthermore, the employees are to be expected to manage the information of the tickets for the flight when the flight information gets changed. (Date, Time, and Gate)  
Another important task is to manage the different maintenances.

**Book flight:**

Step 1: Airline contacts FME

Step 2: Airline gives info about which facilities they want to book

Step 3: FME checks if facilities are free to book

Step 4: FME gives Airline a contract about the booking

Step 5: Airline accepts and signs contract

Step 6: Airline pays the discussed amount

Step 7: FME registers the facilities as booked

**Give flightinfo:**

Step 1: Airline gets info about flight

Step 2: Airline gives info to FME

**Change flightinfo:**Step 1: Airline gets info about flight

Step 2: Airline gives info to FME

**Update ticketinfo:**

Step 1: FME gets info about tickets

Step 2: FME changes prices and date of tickets

**Assign Employees:**

Step 1: FM looks into the other Managements

Step 2: FM calculates which Employees will be needed in which Management

Step 3: FM assigns Employees to the Managements

**Manage Maintenances:**

Step 1: Some other management needs maintenance

Step 2: Other management tells what the maintenance is (vehicle, fuel, material or equipment)

Step 3 (look into destinated use-case)

**Manage vehicles:**

Step 1: FME gets info about vehicle

Step 2: FME pays repair or buys new vehicles

**Manage fuel:**

Step 1: FME gets info about fuel

Step 2: FME buys new fuel

**Manage material:**

Step 1: FME gets info about needed material

Step 2: FME pays for new material

**Manage equipment:**

Step 1: FME gets info about needed/broken equipment

Step 2: FME pays for repairment or new equipment

### 3. Design Decisions

**Overall architecture package diagram:**

We decided to connect every subsystem with the other ones since we have no central unit like the control system management. Therefore, Airside and Landside Management have to communicate directly with each other.

**System level use case diagram:**  
Managing employees is split into one overall use-case which contains generic tasks of employee management and the subsystem specific use-cases (manage landside/terminal/airside employee) contain steps which are only needed for the respective subsystem.

**General style of use-cases:**

We decided to structure conditions and exceptions with <<extend>> since this was the best way to display such flows. Note that the condition which is formulated in the yellow box must be satisfied in order to enter the extending use-case.

### 4. Change Log

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| **Deliverable** | **Changes** |
| D1 | Formed team and choose subsystems |
| D2 | Added overall architecture (one version per team member) |
| D3 | Combined and refined overall architecture using a package diagram  Added use-case diagrams for overall system and subsystems |
| D4 | Added detailed use-case specification for every use-case |
| Report and Presentation | Refined use-case specifications to be more detailed |