

## Diagram Documentation

**Deliverable Information** - (*Custom diagram*)

custom Deliverable Information

To continue viewing the SCALES Framework web report, click on the image below



Start viewing the  
SCALES Framework  
Web Report

## E.02.30-SCALES-D1.2-SCALES Initial Web Tool Framework

| Document information |  |
|----------------------|--|
| Project title        | Resilience potential and early warnings for Air Traffic Management in case of system degradation through Enterprise Architecture |
| Project N°           | E.02.30  |
| Project Manager      | SINTEF   |
| Deliverable          | SCALES Initial web tool framework  |
| Deliverable ID       | D1.2   |
| Edition              | 00.01.00   |
| Task contributors    |  |
| <b>SINTEF, DBL</b>   |  |

**Abstract**

This document contains the initial version of the combination of Enterprise Architecture and Resilience Engineering principles as a web tool for SCALES project (E.02.30), SESAR WPE funded project. The central goal of SCALES is to link Resilience Engineering and Enterprise Architecture principles into a framework (the "SCALES Framework") that enables a context driven analysis of resilience and identification of resilience related indicators.

This document provides a link to the initial SCALES web report. The report is preliminary version of the SCALES framework web tool. Guidelines are included in the web report itself. Detailed guidelines for use of the web tool are part of D1.1 SCALES Specifications and Guidelines.

Appendix includes tool review (appendix I).

Figure: 1

**Introduction** - (*Custom diagram*)

## custom Introduction

### Introduction

#### Scope of project

SCALES is a SESAR WP-E project which started in Autumn 2013 and it will end in Spring 2016. The central goal of SCALES is to link Resilience Engineering and Enterprise Architecture principles into a framework (the "SCALES Framework") that enables a context driven analysis of resilience.

#### The SCALES Framework

Enterprise architecture offers the opportunity to model system of systems and to consider the system from different viewpoints (functional, communication, information and process view). For each viewpoint SCALES will identify appropriate resilience related indicators. These will be measured and monitored during system in operation, providing information about system ability to adapt to perturbations and maintain its functionality in specific cases.

The current scope of the framework is go-around situations and with an emphasis on ATM.

#### How to navigate in the SCALES Framework

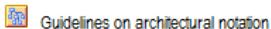
The SCALES Framework is composed of four essential viewpoints:

- The Functional Viewpoint: Shows relevant roles and actors and their functions / responsibilities related to the target system.  
 [Overview of Roles](#)  
 [Functional View Overview](#)
- The Process Viewpoint: Shows processes and interactions among roles and actors.  
 [Process View Overview](#)
- The Information Viewpoint: Details the information elements being exchanged in the Process Viewpoint.  
 [Information View Overview](#)
- The Resilience Viewpoint: Consists of resilience indicators and resilience patterns extracted from the analysis of the other viewpoints.  
 [Resilience View Overview](#)

The viewpoints can also be accessed through the menu on the left-hand side.

#### Guidelines on the use of viewpoints and architectural notation

Guidelines on how to understand the architectural notation used in the SCALES Framework can be found here:



#### Relation to European ATM Architecture (EATMA)

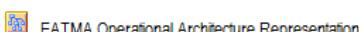
The SCALES Framework aims to harmonize with the European ATM Architecture (EATMA). EATMA is a navigable web architecture and is decomposed into viewpoints similar to the SCALES Framework.

The purpose of EATMA is to:

- Optimise research and development during the SESAR Development Phase, and to
- Optimise the deployment of the developed concepts and tools to ensure that they improve ATM performance against the targets set by the European Commission

In order to cope with this complexity with having an architecture acting as both a planning and coordination instrument and global repository of knowledge from SESAR projects the EATMA is structured into layers maintaining the different responsibility areas. Most relevant for SCALES is the operational architecture and in SCALES we will try to align our architectural components according to EATMA in order to provide useful input with respect to resilience that is consistent with other work within SESAR.

A representation of the operational architecture in EATMA is included here:



#### Link to Diagram's Report

All diagrams can be downloaded as PDF from the following link:

#### Terms and abbreviations

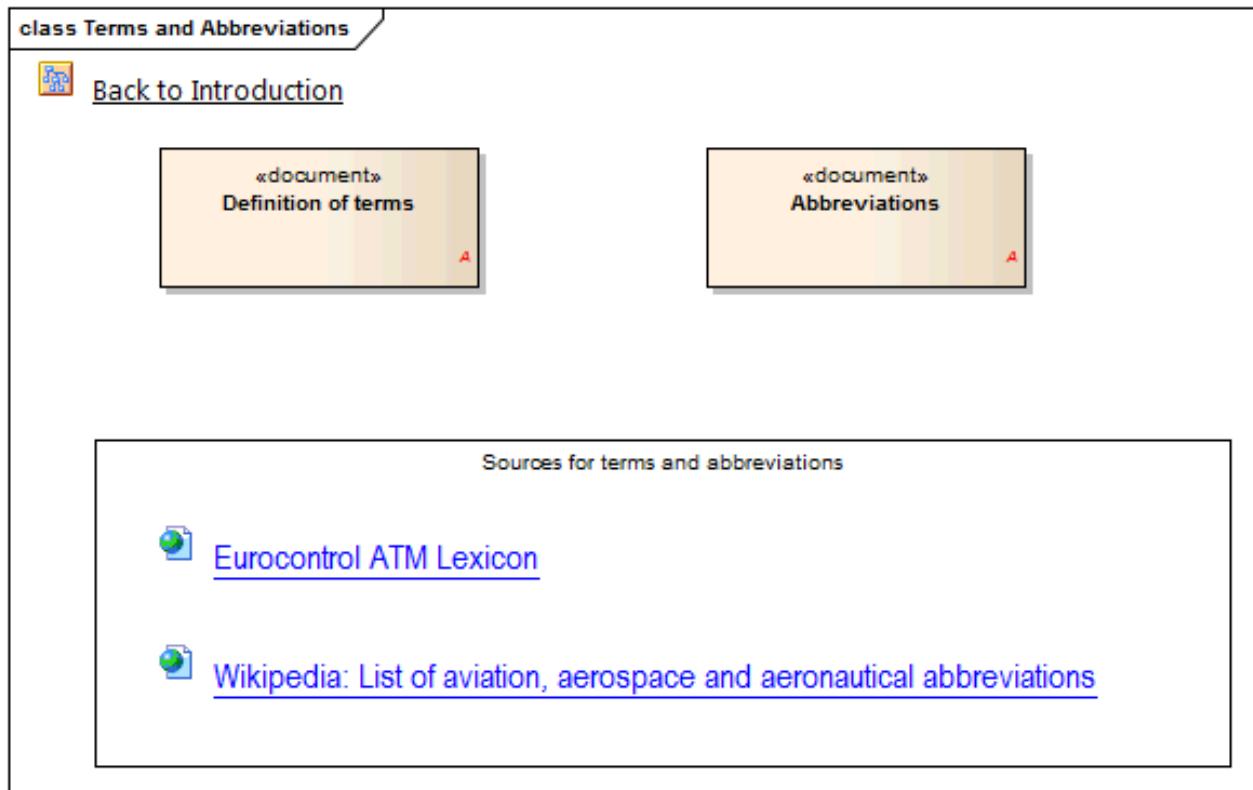
Terms and abbreviations used in the SCALES Framework can be found here:



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*Figure: 2***Terms and Abbreviations - (Class diagram)***Figure: 3***Guidelines - (Custom diagram)**

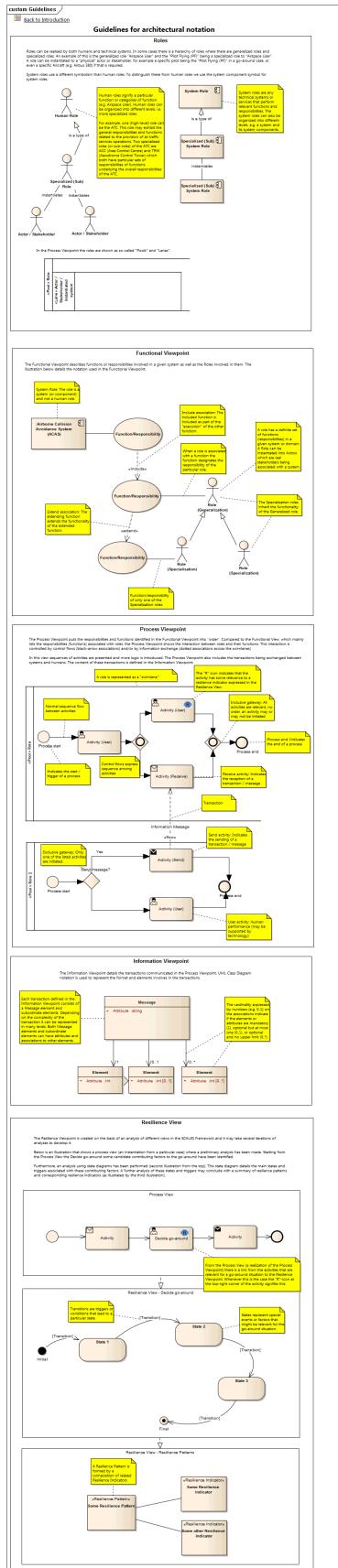


Figure: 4

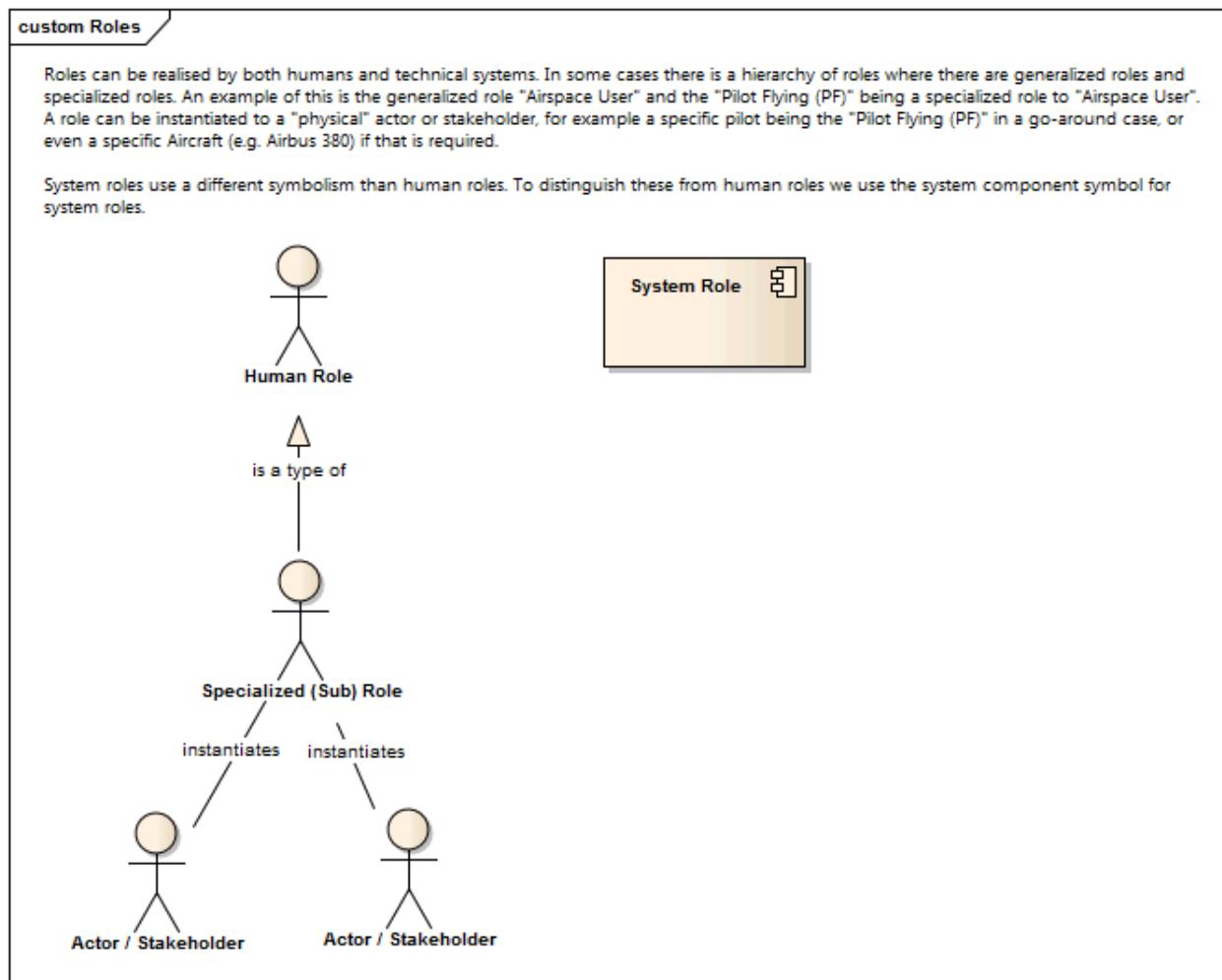
**Roles - (Custom diagram)**

Figure: 5

**Information Viewpoint - (Class diagram)**

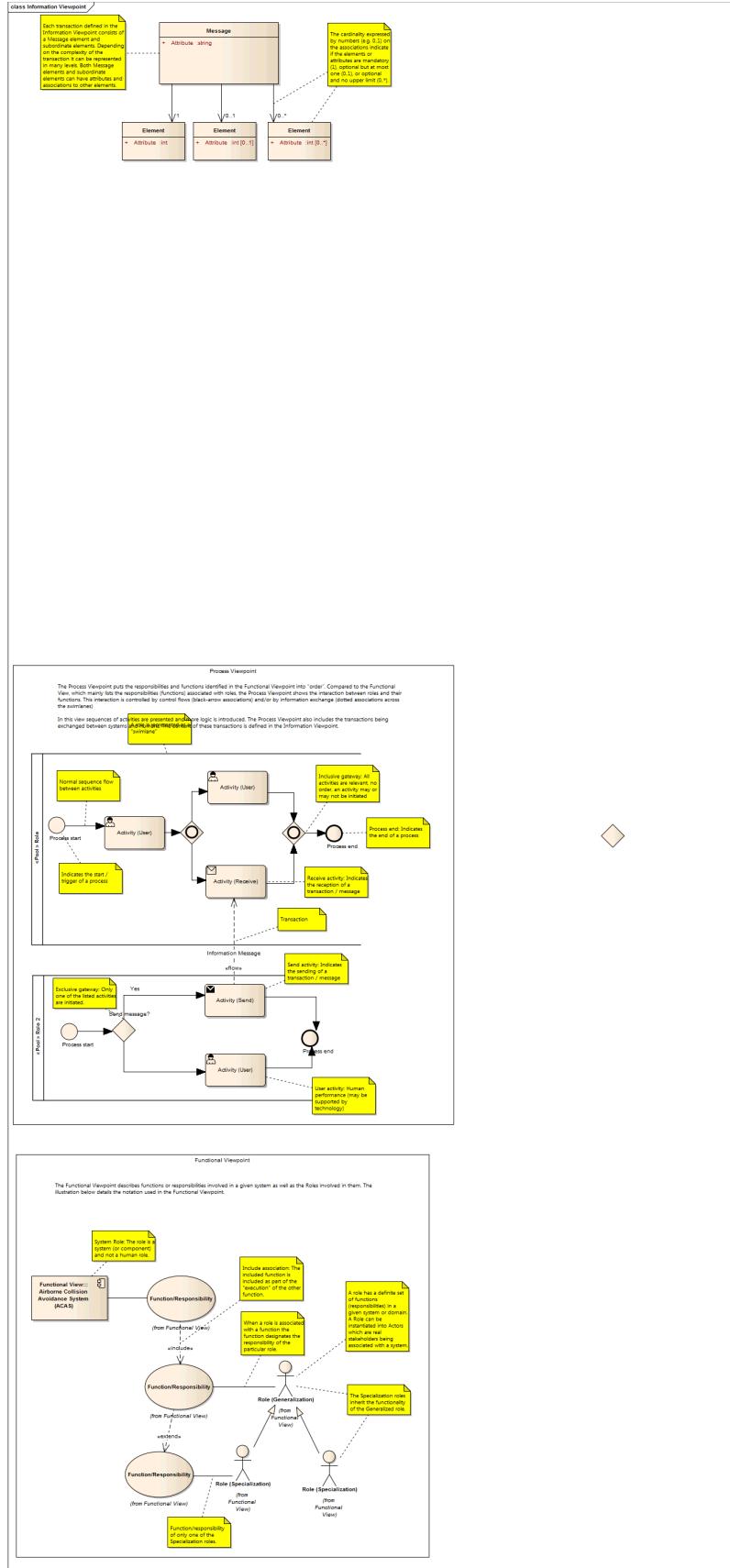


Figure: 6

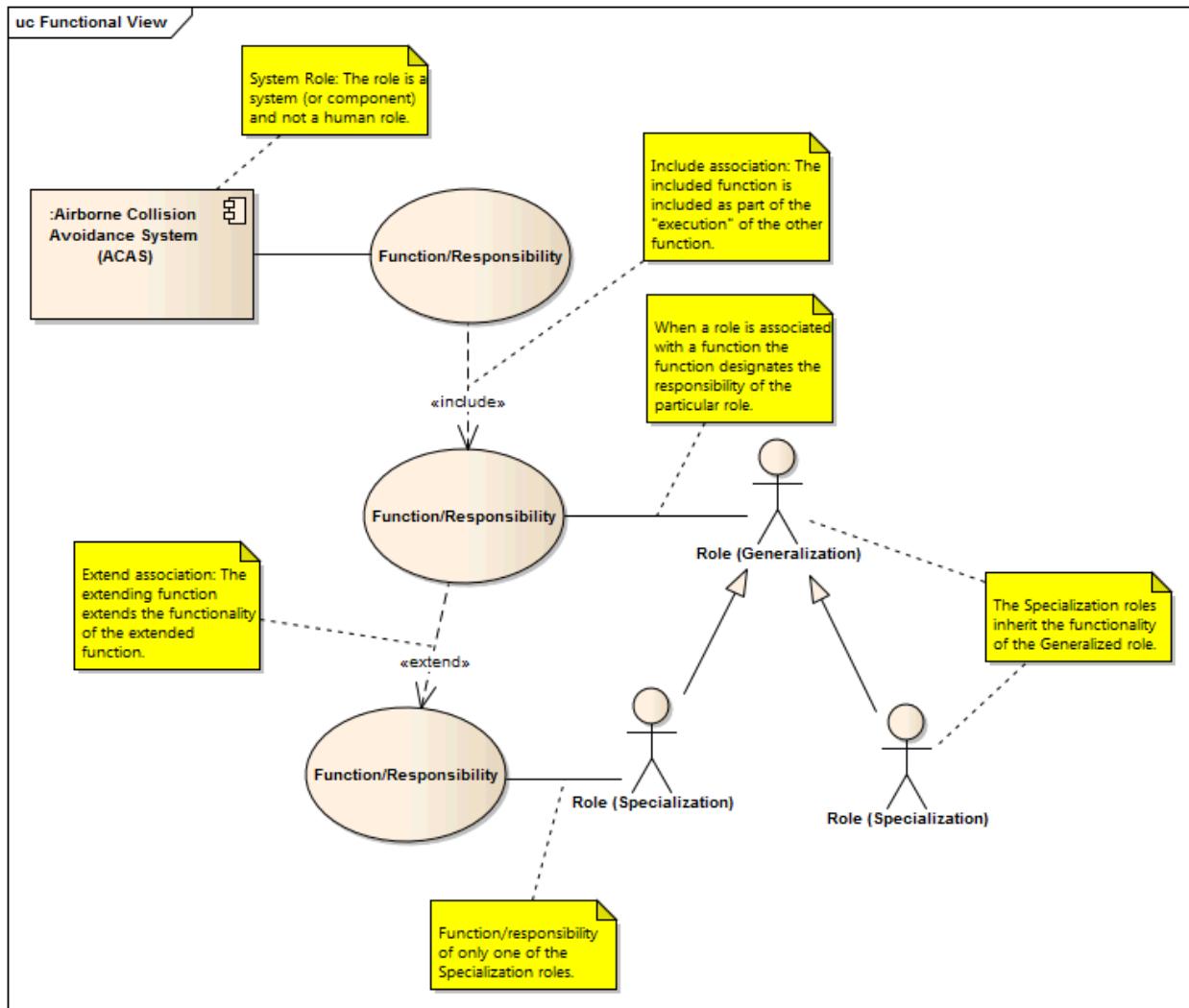
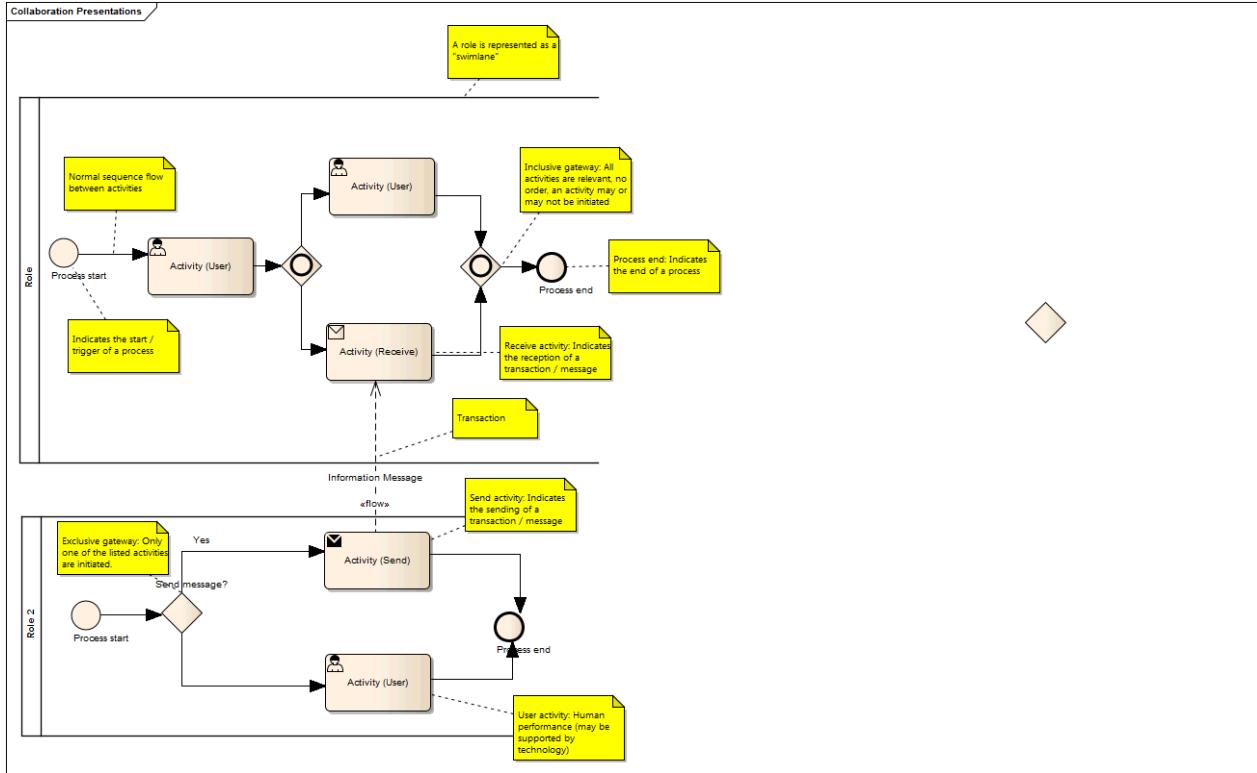
Functional View - (Use Case diagram)

Figure: 7

Presentations - (Collaboration diagram)



**Resilience Viewpoint - (StateMachine diagram)**

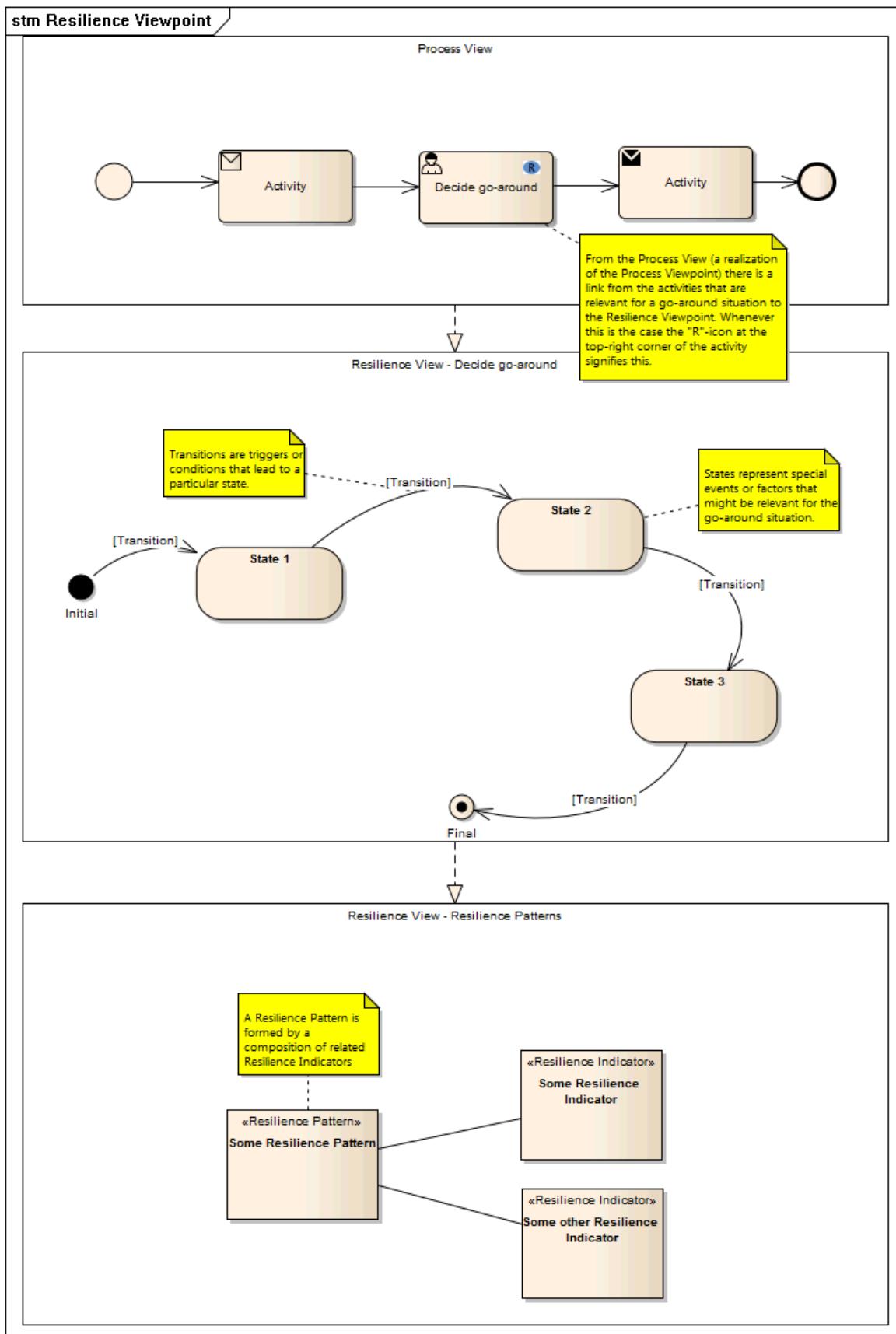


Figure: 9

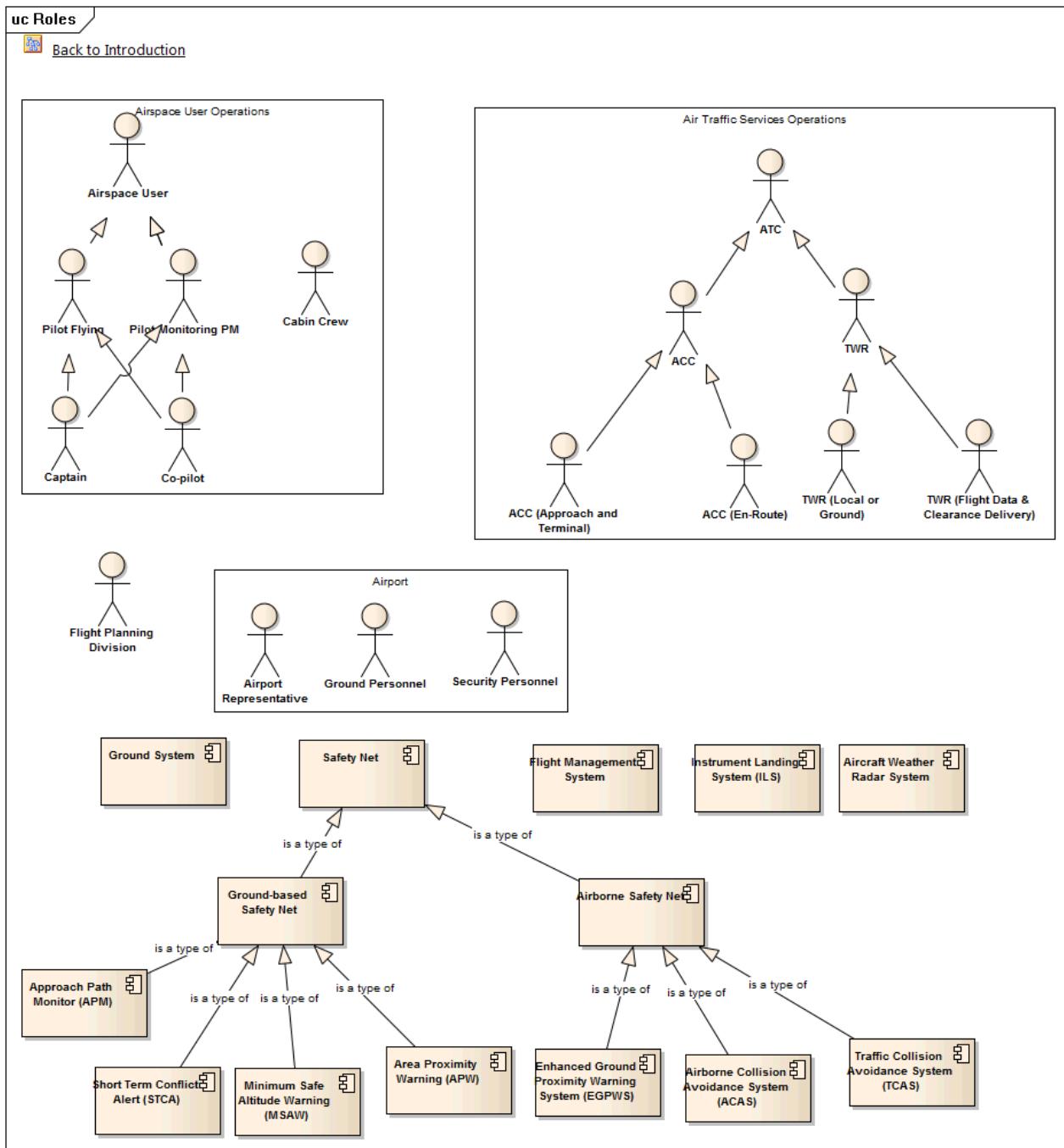
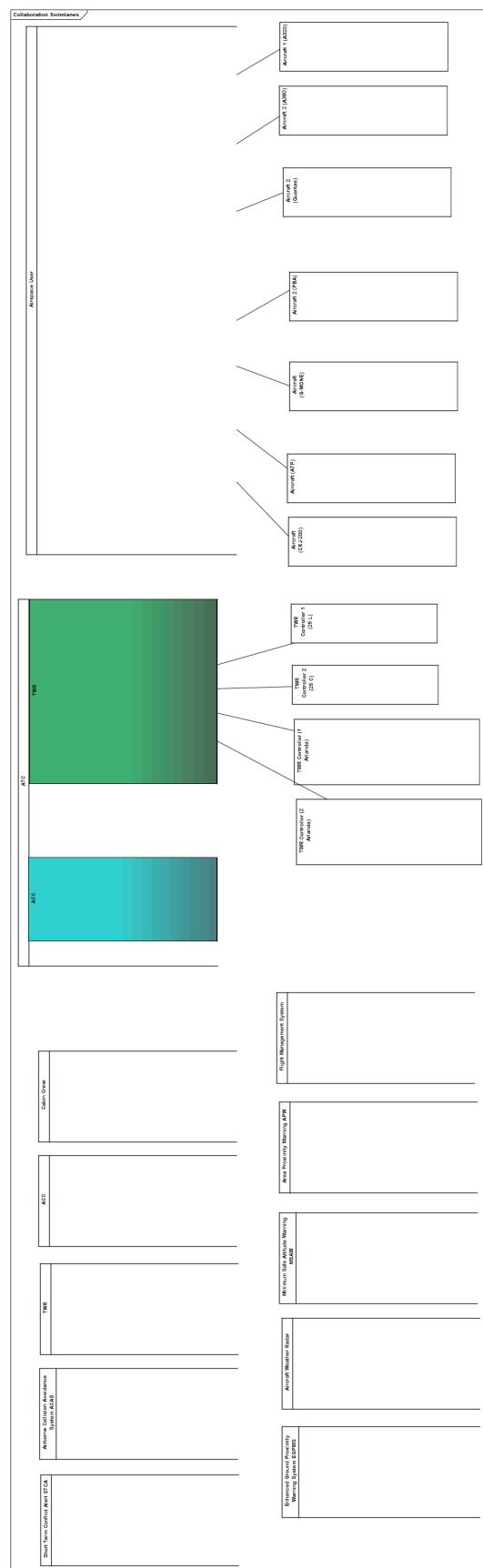
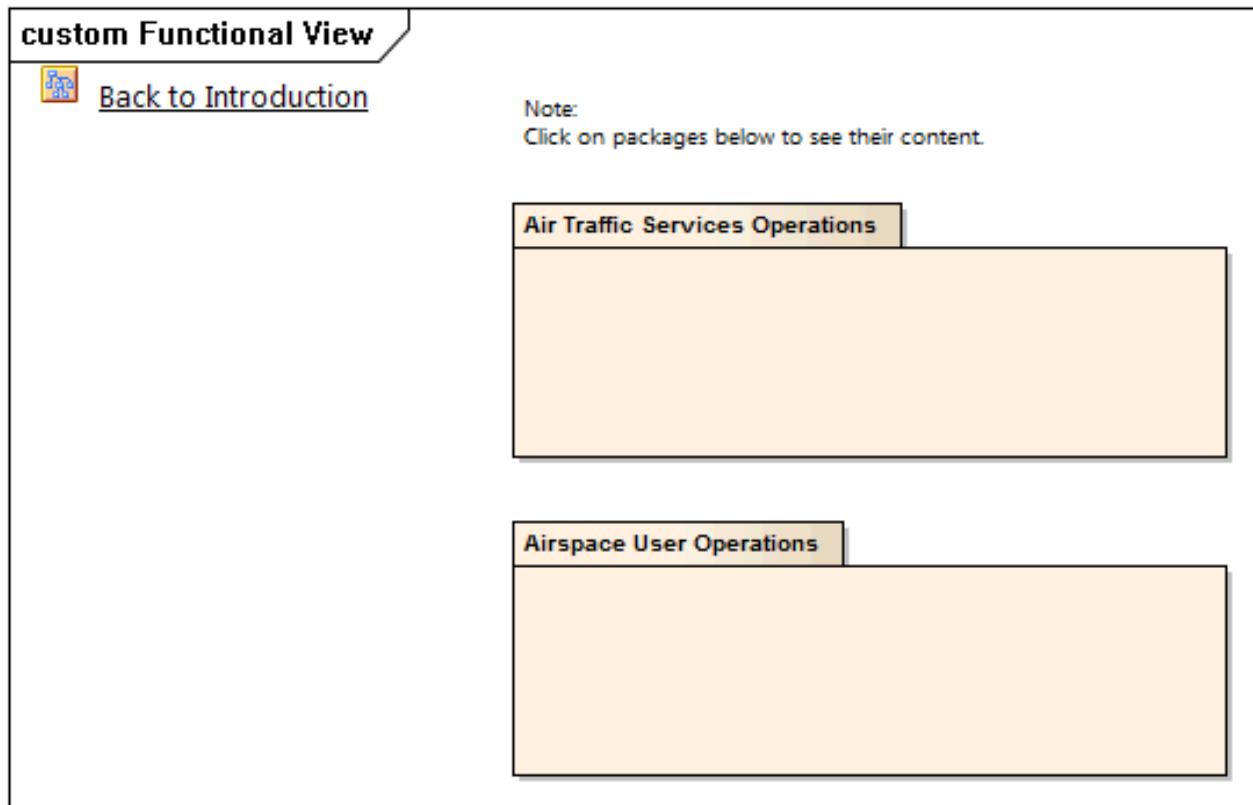
**Roles - (Use Case diagram)**

Figure: 10

**Swimlanes** - (*Collaboration diagram*)



*Figure: 11***Functional View - (Custom diagram)***Figure: 12***ATC Functions - (Use Case diagram)**

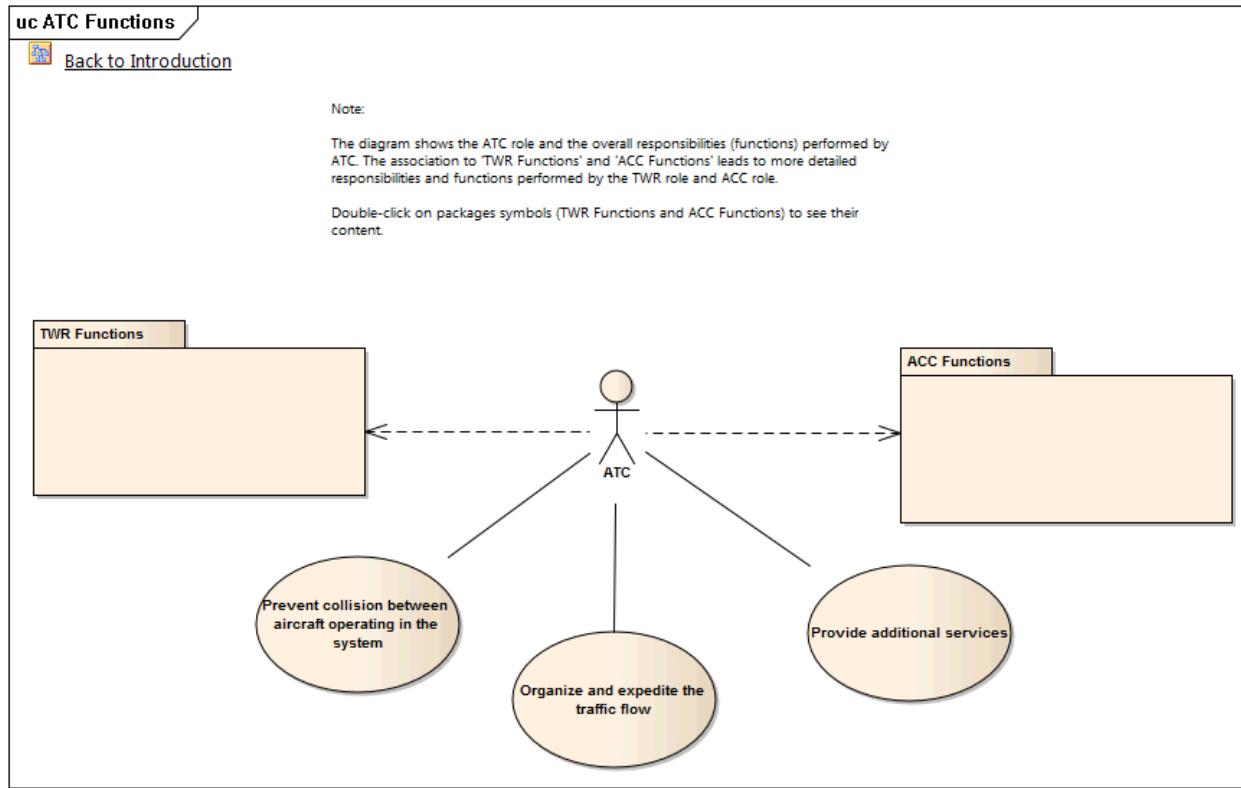


Figure: 13

### ACC Functions - (Use Case diagram)

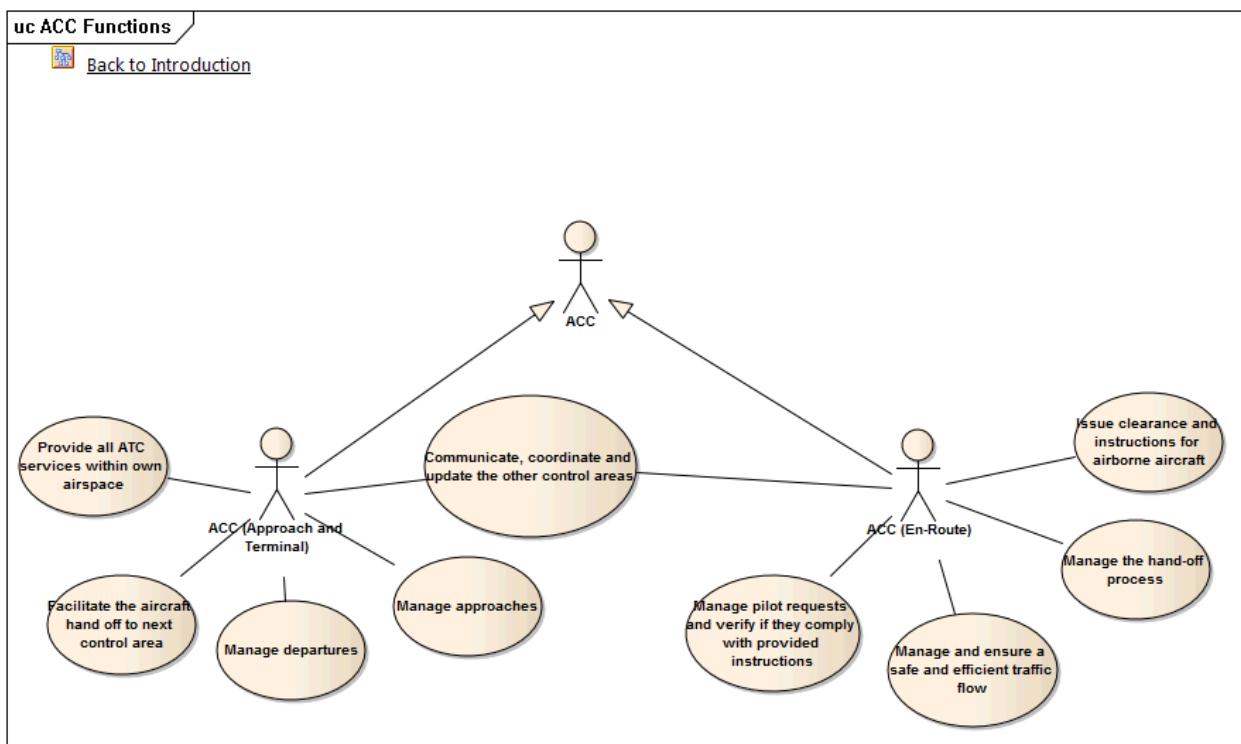


Figure: 14

**TWR Functions - (Use Case diagram)**

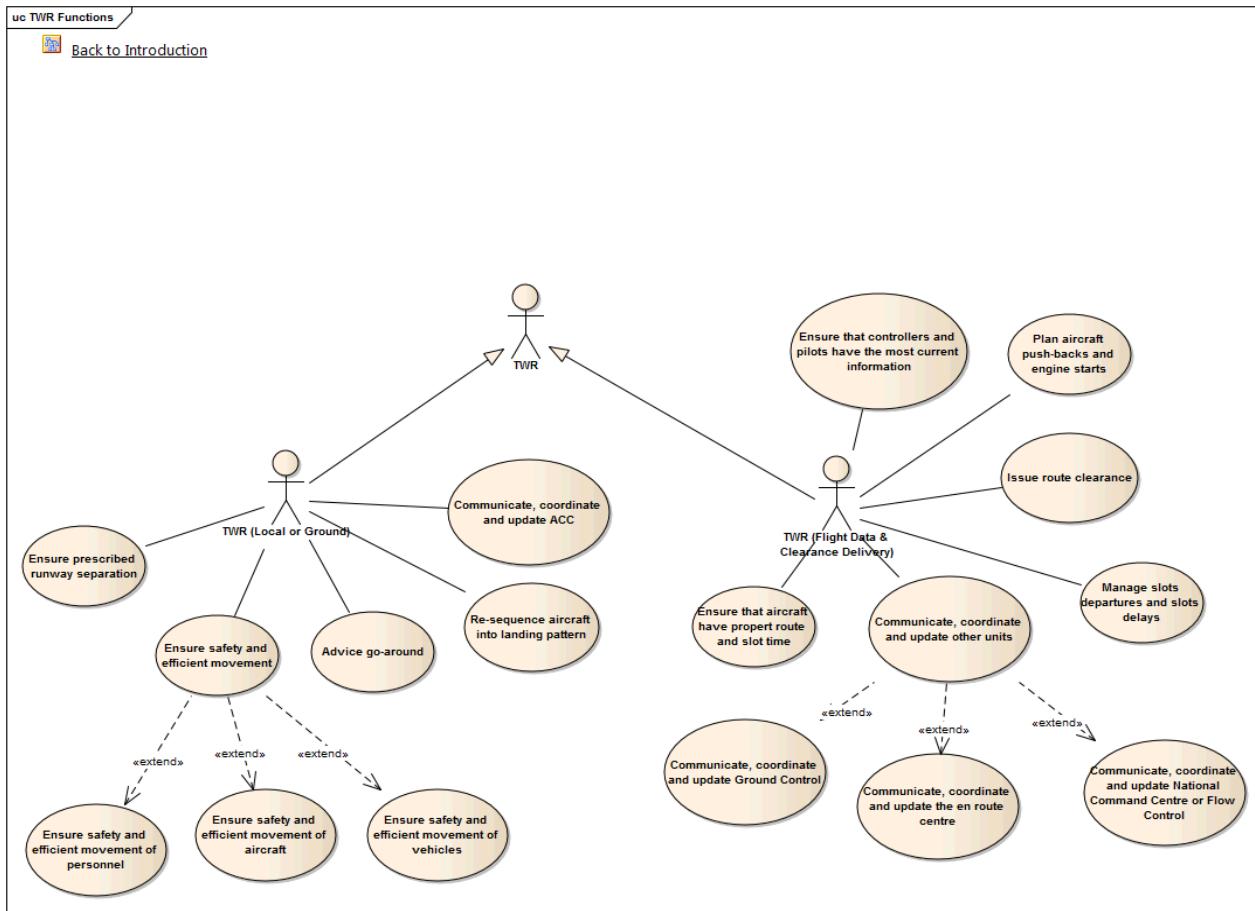


Figure: 15

### Airspace User Operations - (Use Case diagram)

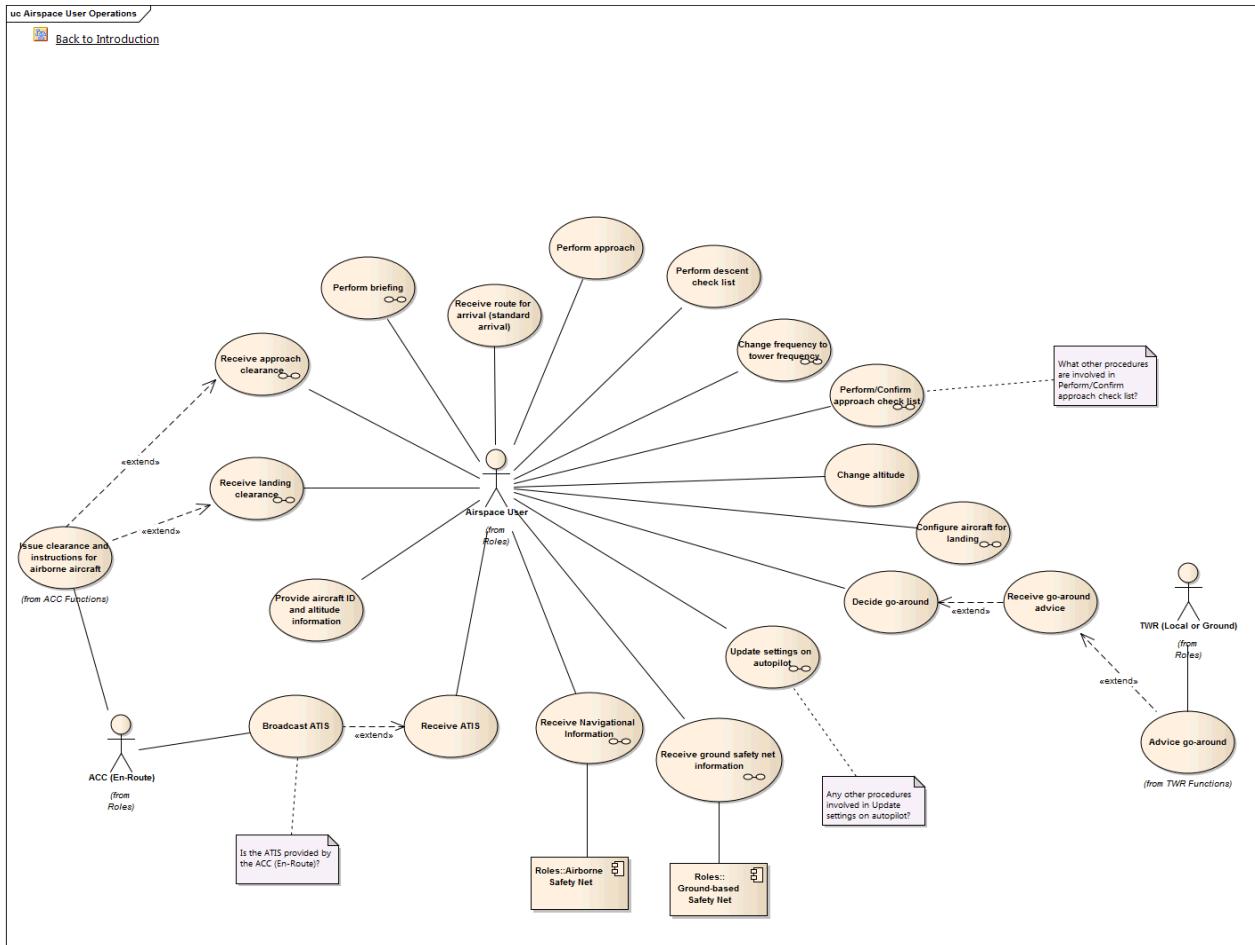


Figure: 16

### Change frequency to tower frequency - (Use Case diagram)

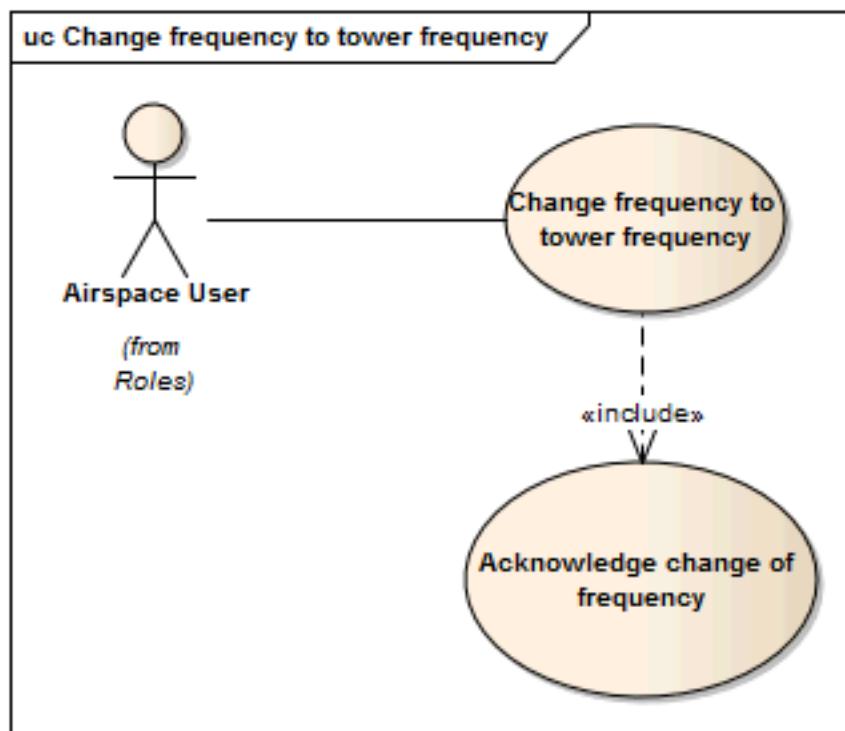


Figure: 17

Configure aircraft for landing - (Use Case diagram)

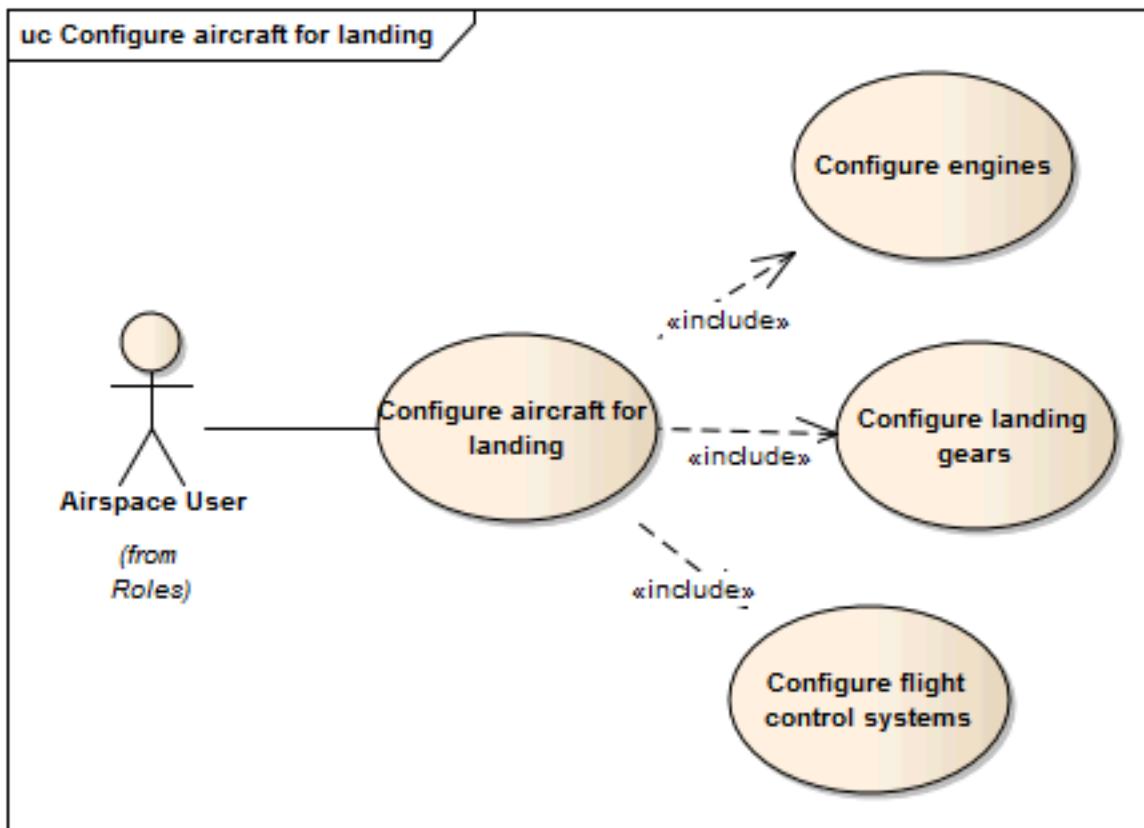


Figure: 18

Perform briefing - (Use Case diagram)

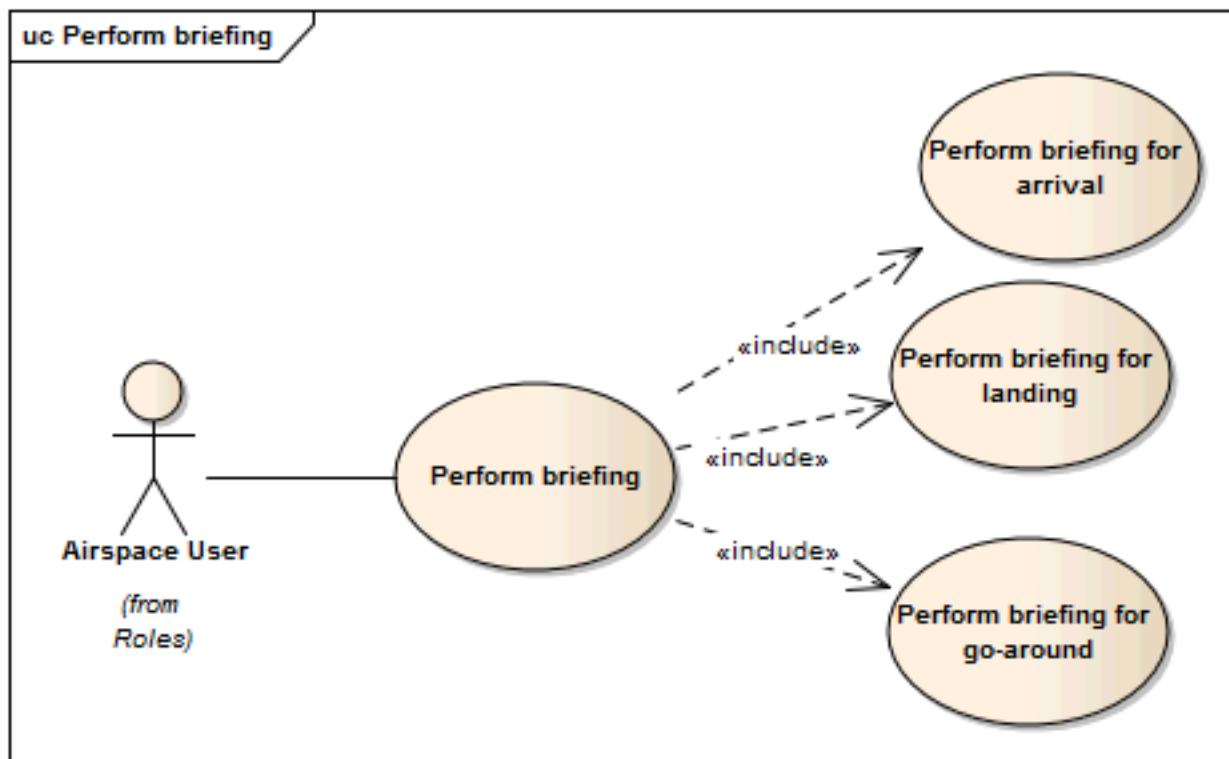


Figure: 19

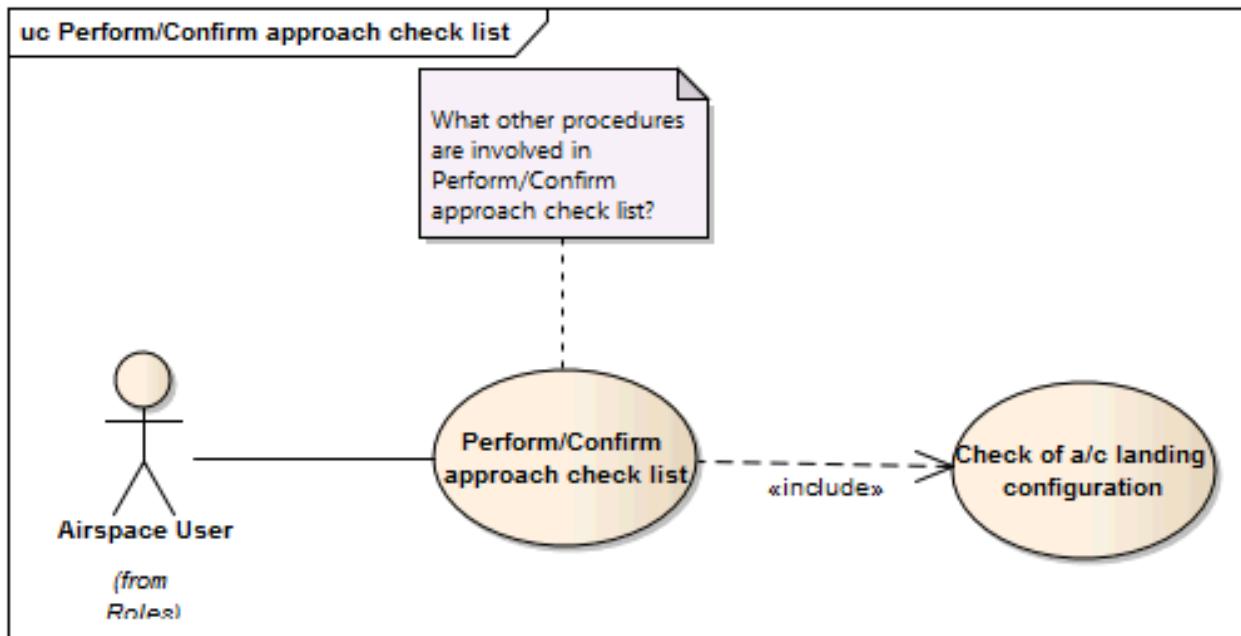
**Perform/Confirm approach check list - (Use Case diagram)**

Figure: 20

**Receive Navigational Information - (Use Case diagram)**

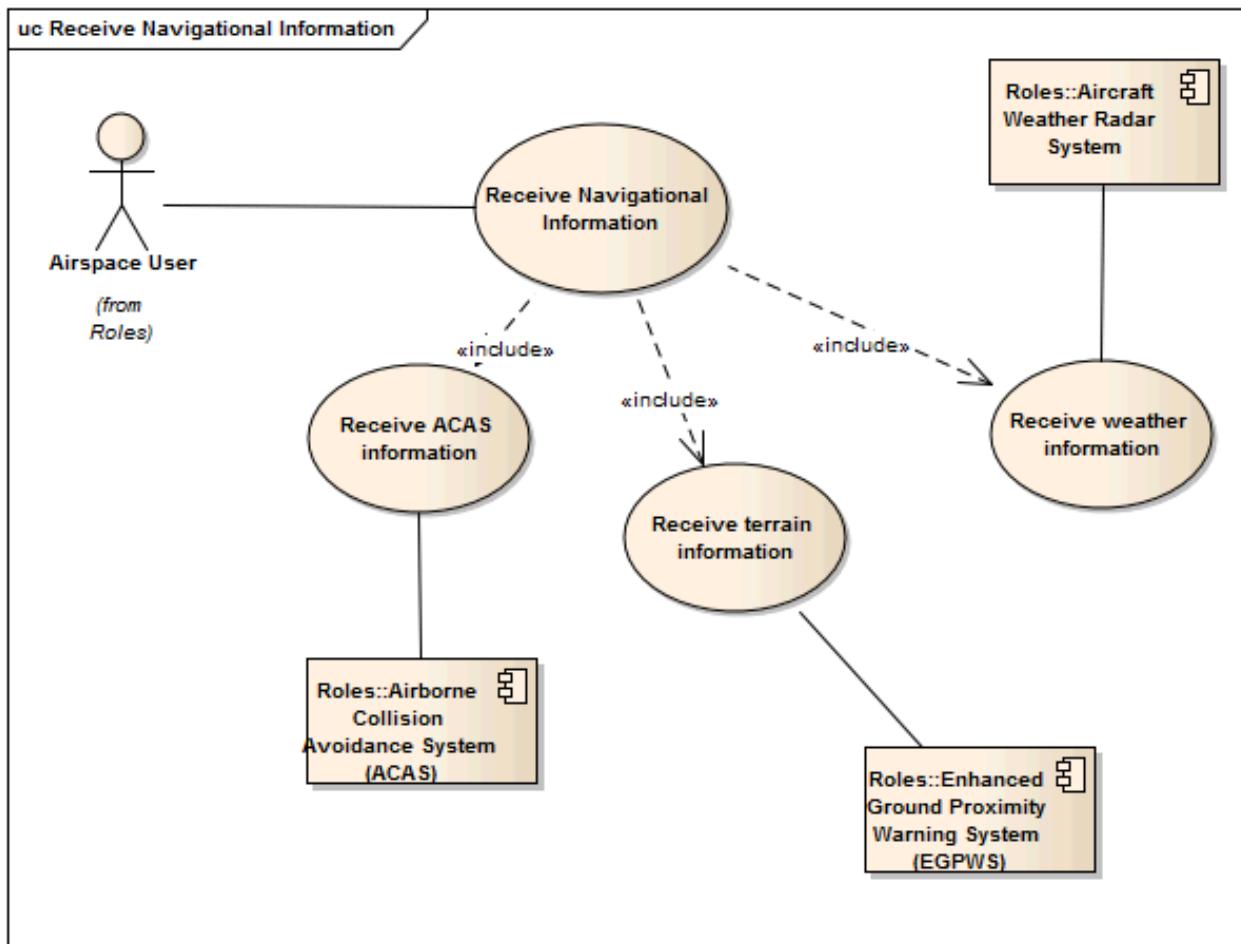


Figure: 21

Receive approach clearance - (Use Case diagram)

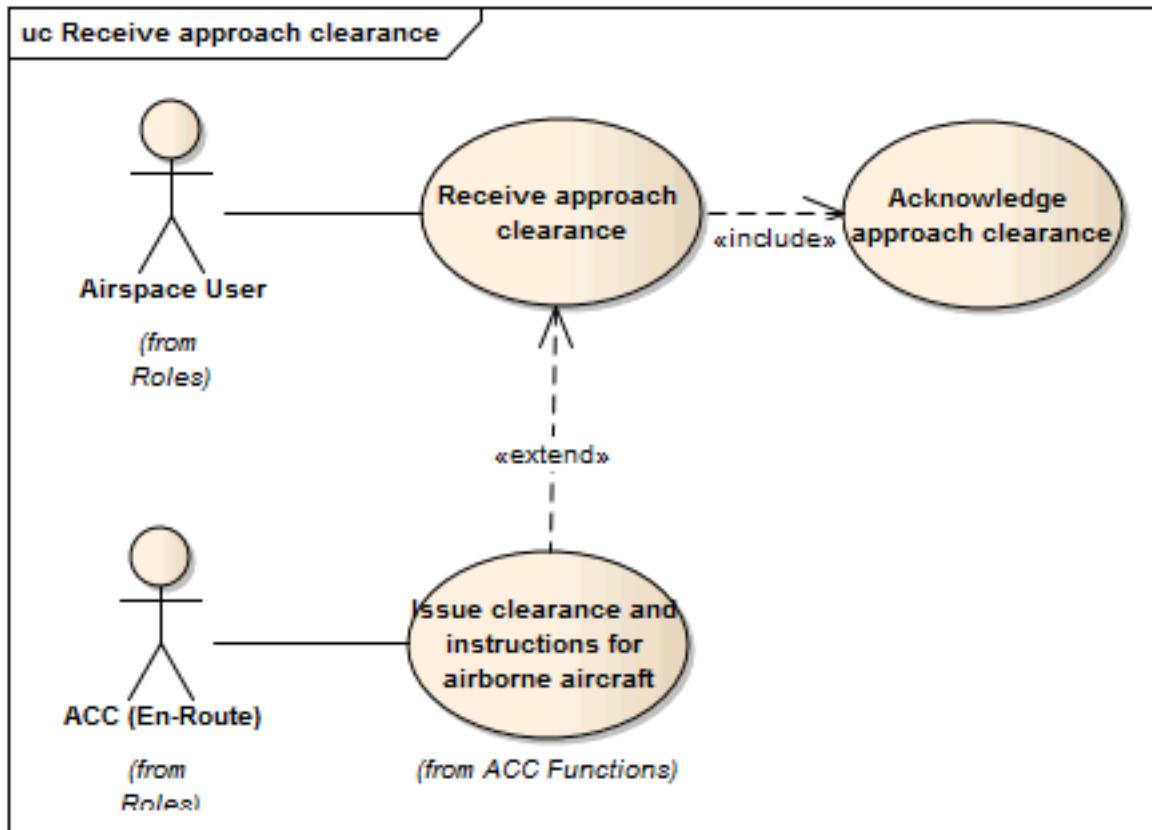


Figure: 22

### Receive ground safety net information - (Use Case diagram)

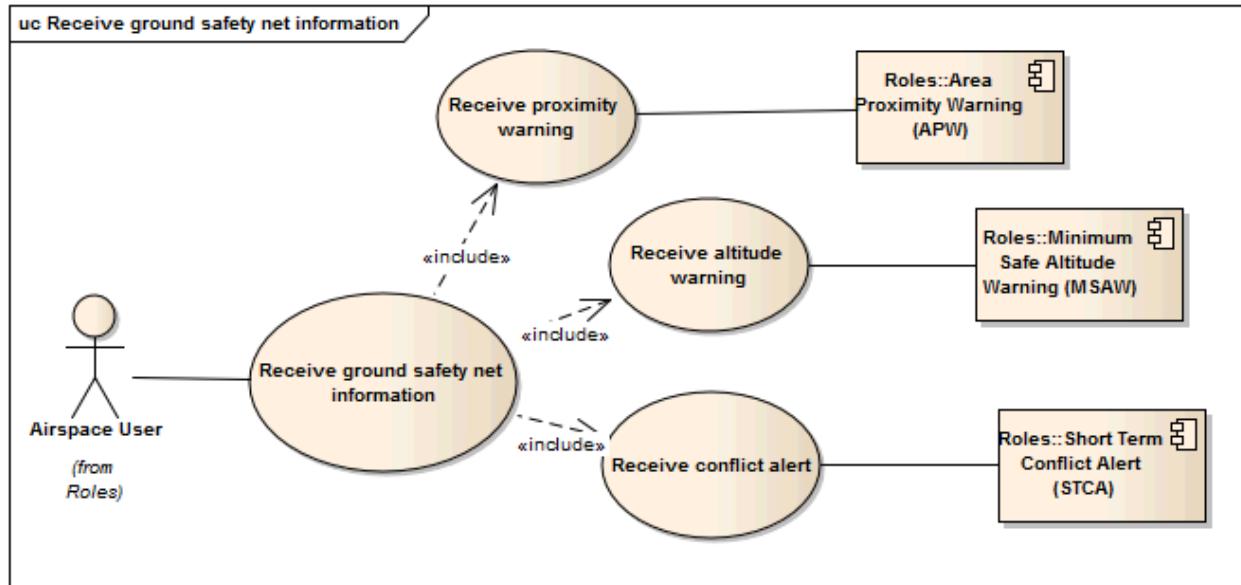


Figure: 23

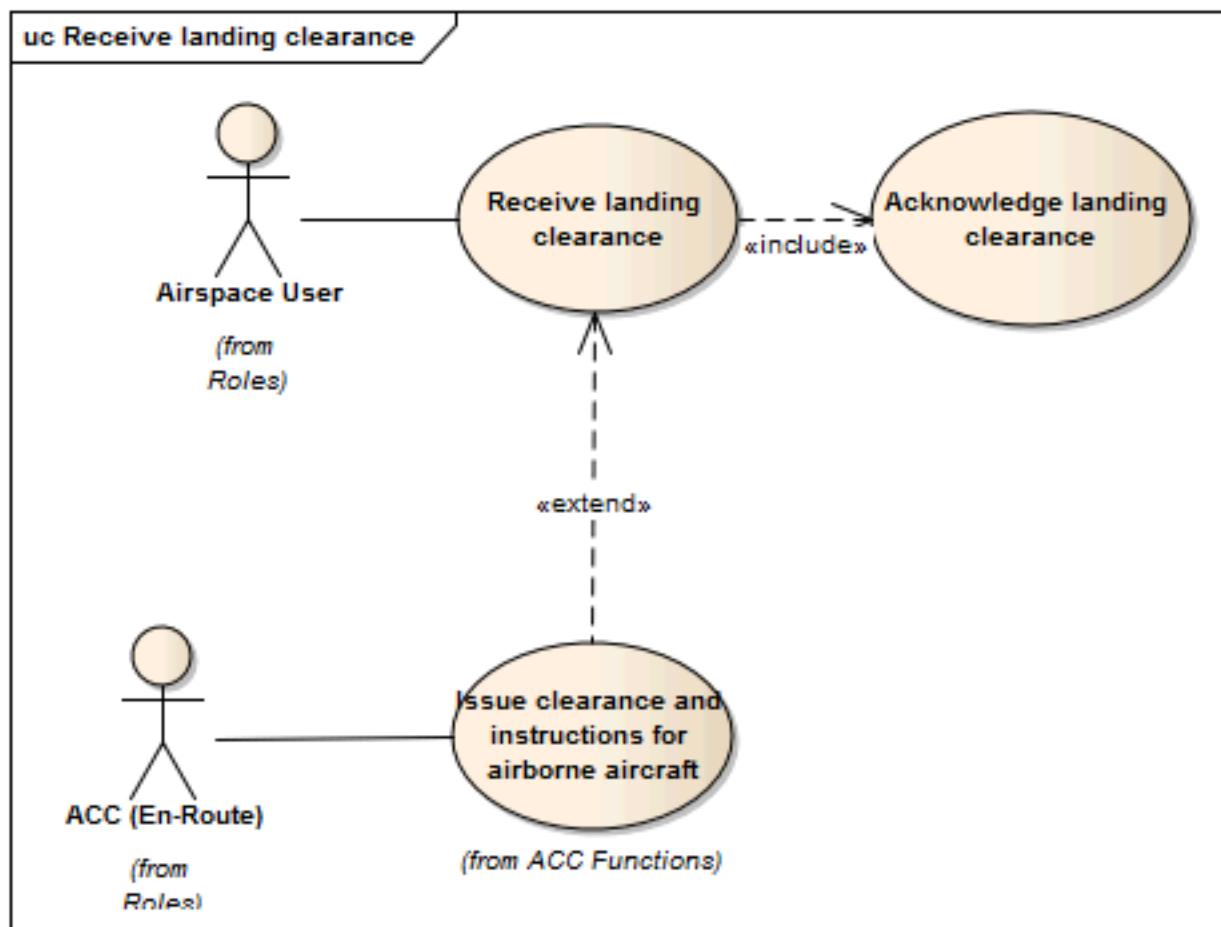
Receive landing clearance - (Use Case diagram)

Figure: 24

Update settings on autopilot - (Use Case diagram)

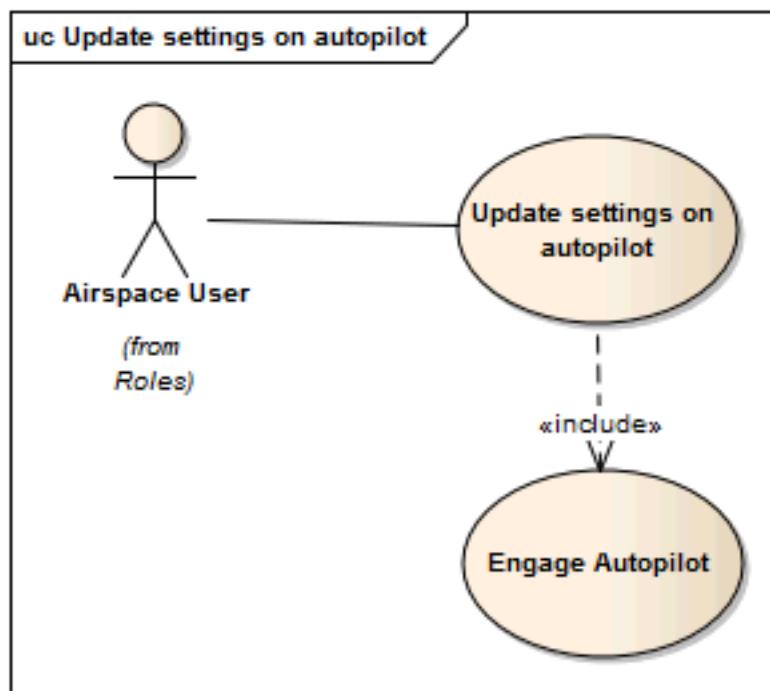


Figure: 25

Process View - (Custom diagram)

**custom Process View**

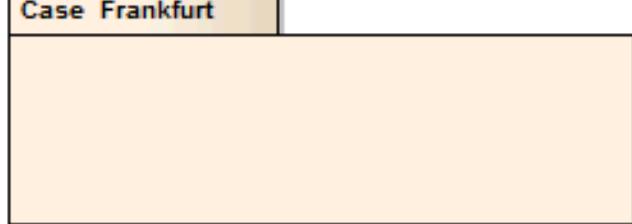
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Note:  
Click on packages below to see their content.

**Case Arlanda**



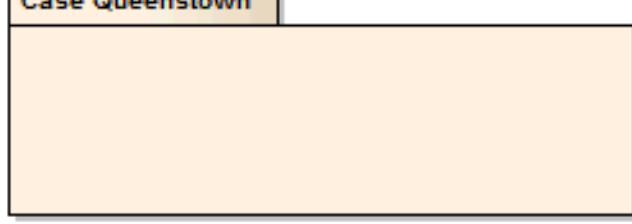
**Case Frankfurt**



**Case Gibraltar**



**Case Queenstown**



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Figure: 26

**Case - Arlanda** - (Business Process diagram)

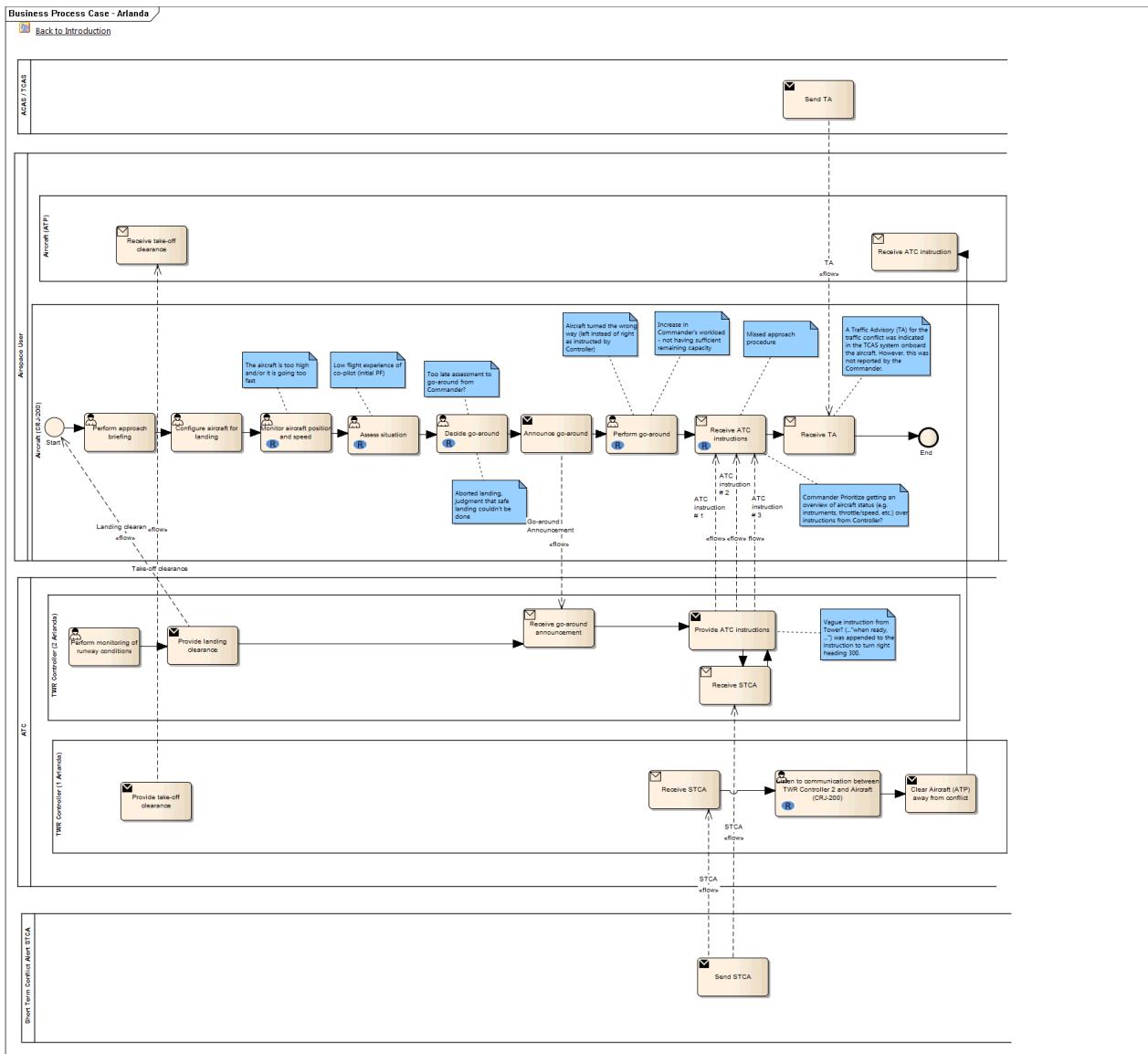


Figure: 27

### Case - Frankfurt - (Collaboration diagram)

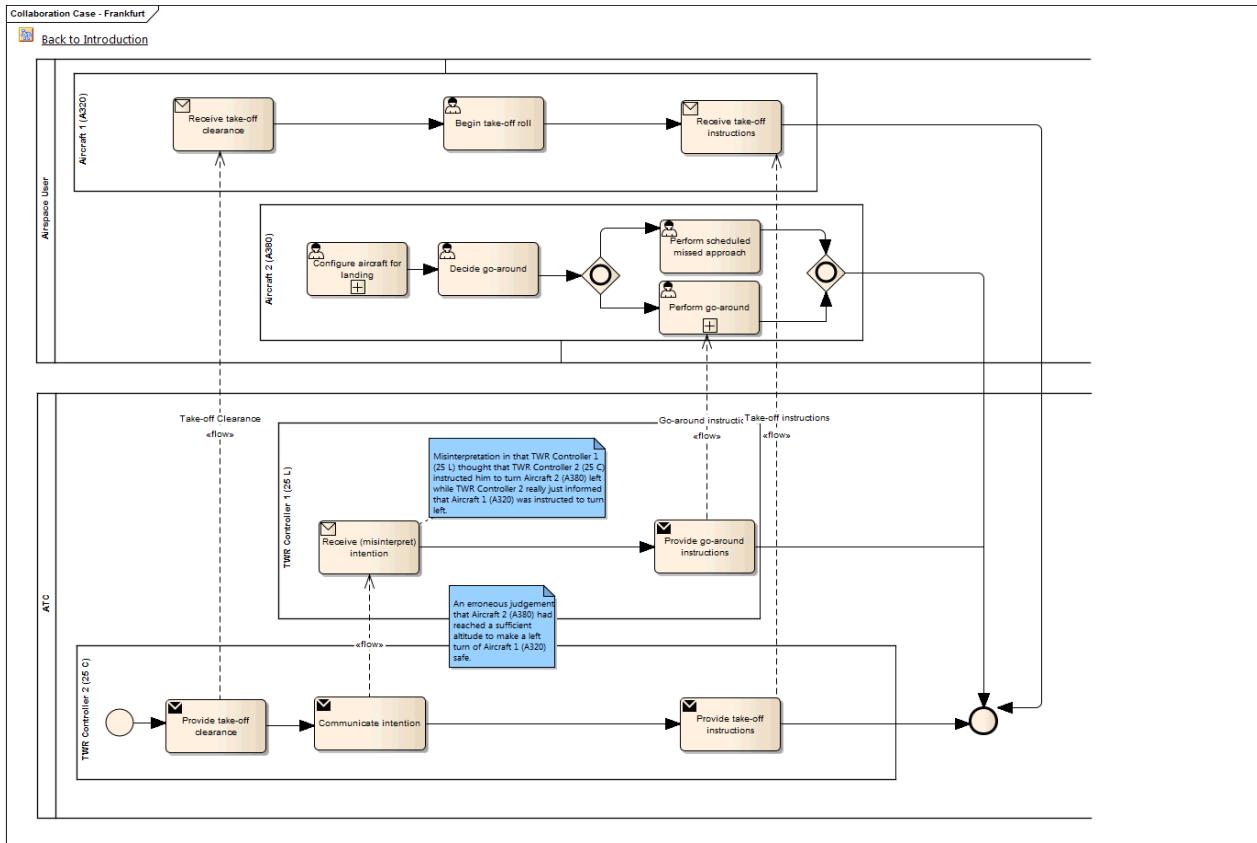


Figure: 28

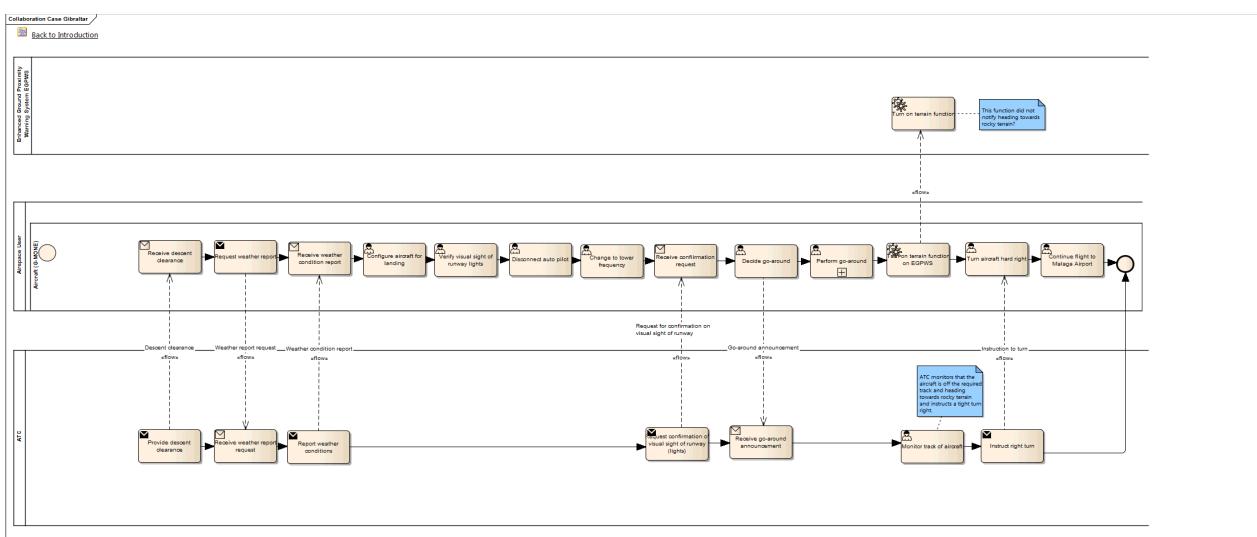
**Case Gibraltar - (Collaboration diagram)**

Figure: 29

### Case Queenstown - (Collaboration diagram)

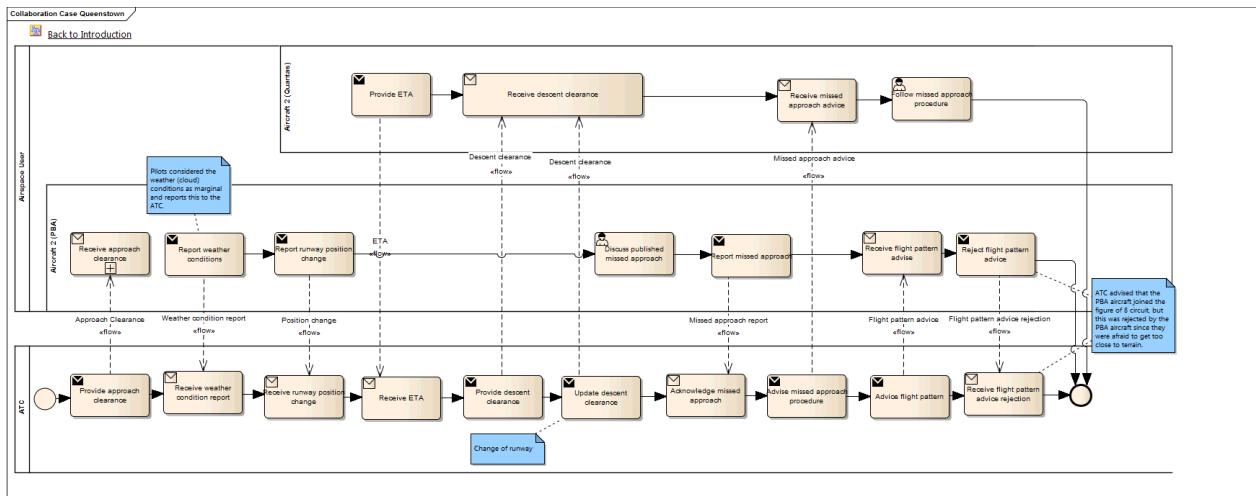


Figure: 30

### Approach - (Business Process diagram)

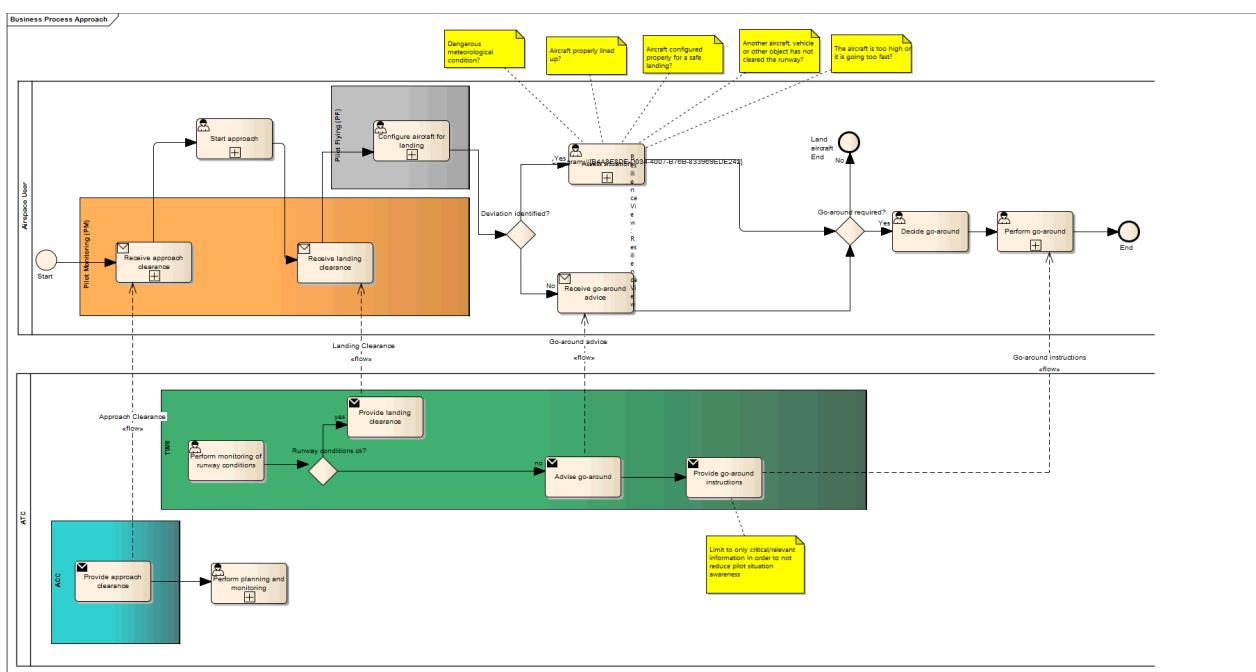
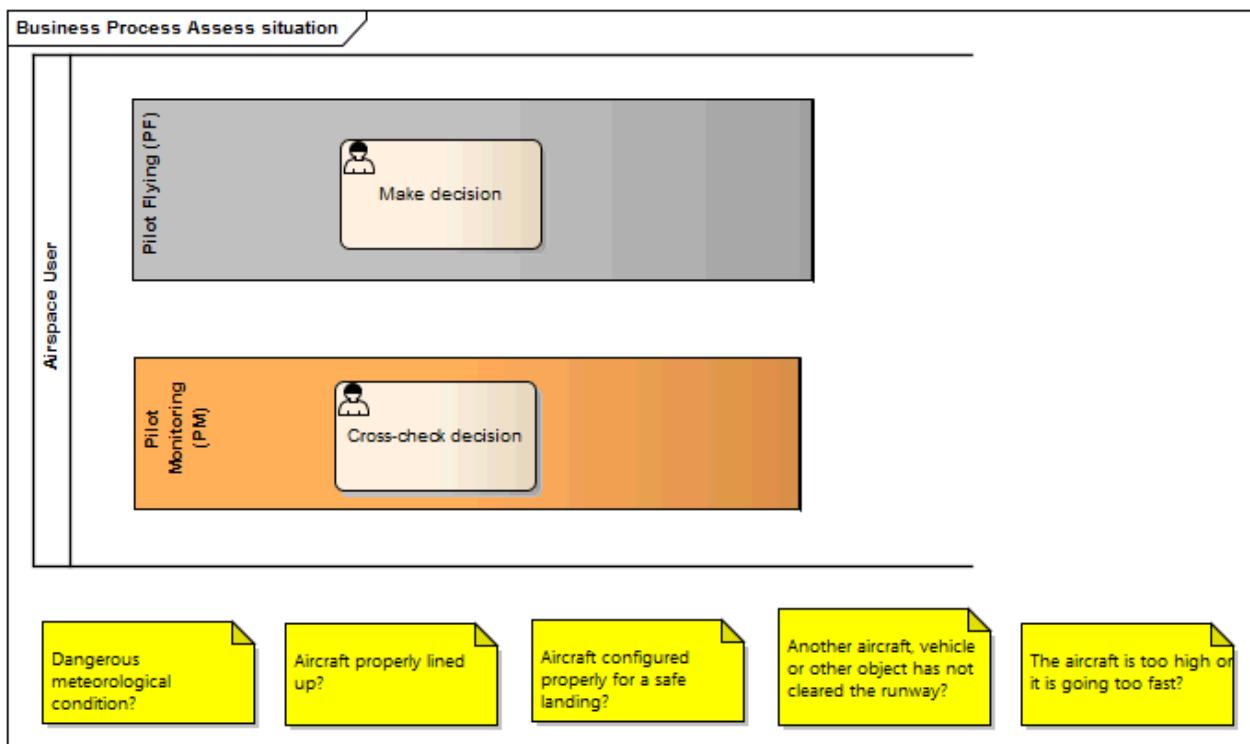


Figure: 31

**Assess situation - (Business Process diagram)***Figure: 32***Configure aircraft for landing - (Business Process diagram)**

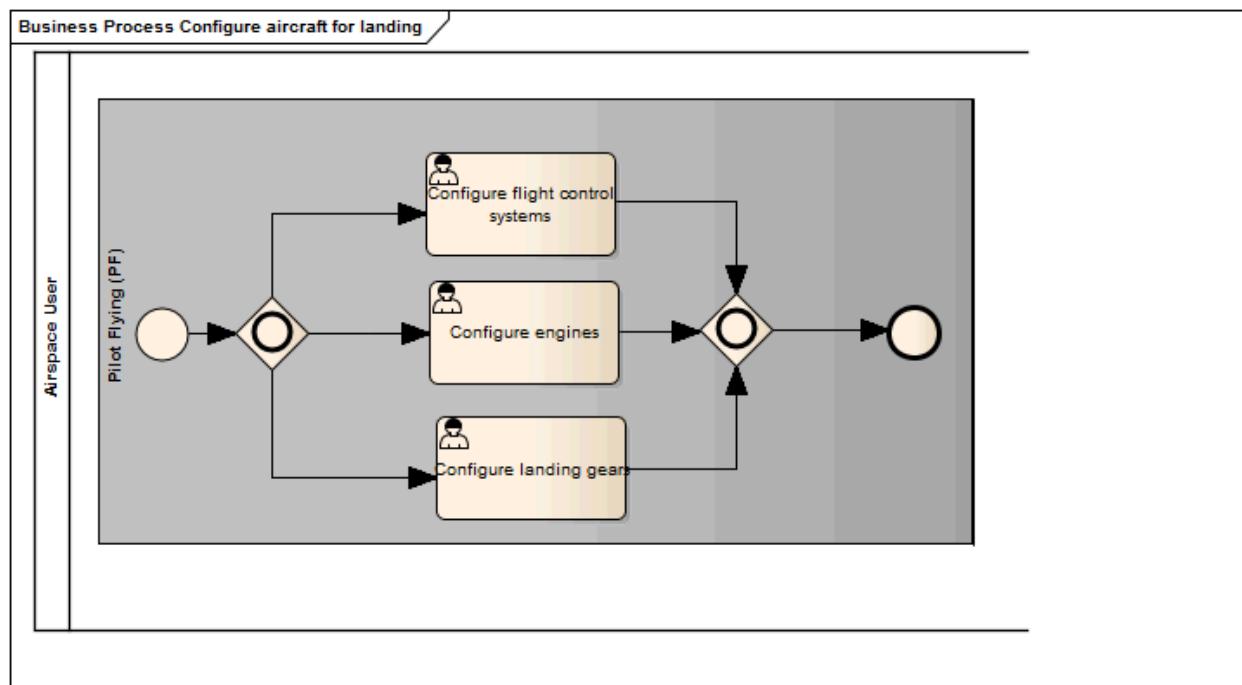


Figure: 33

**Perform go-around - (Business Process diagram)**

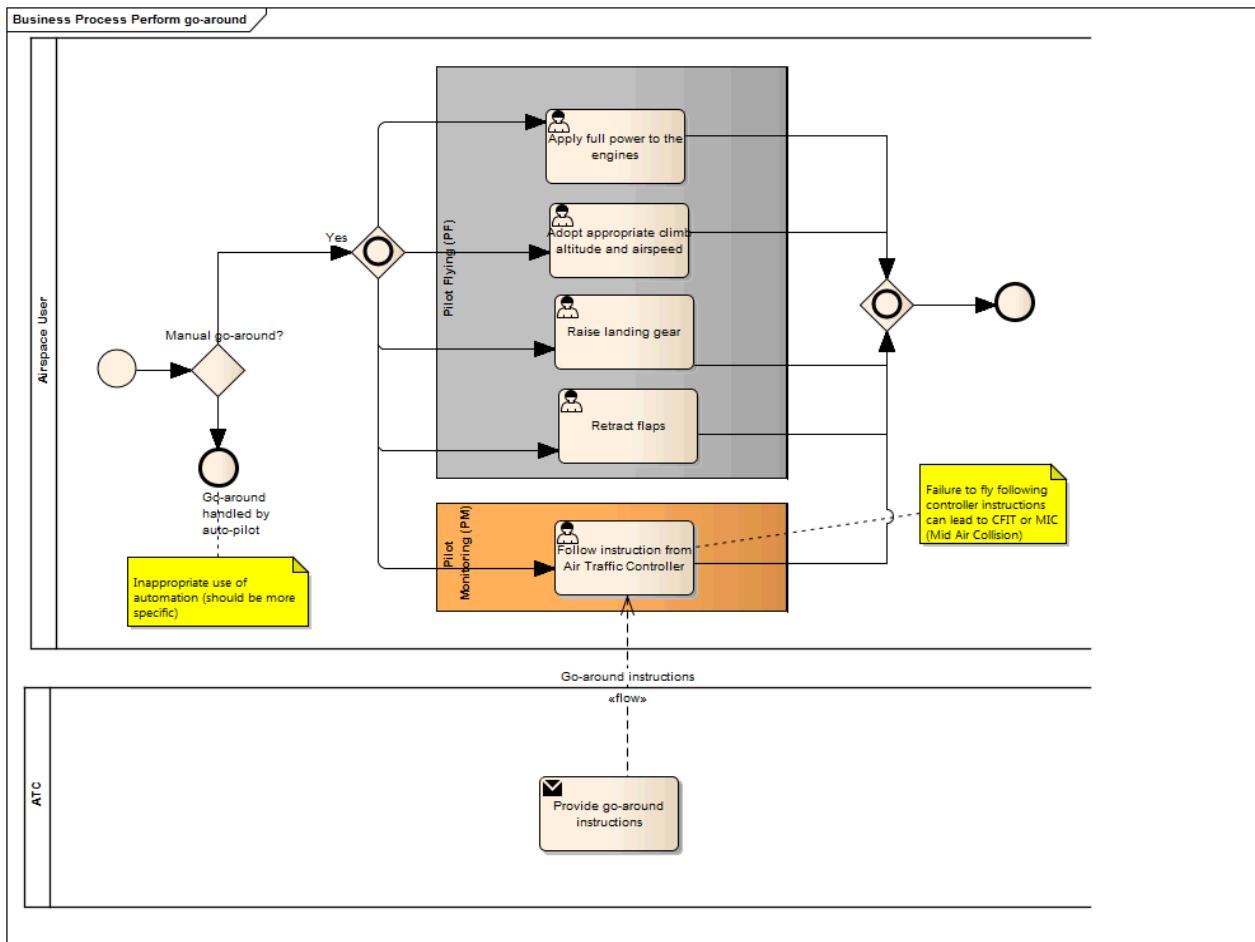


Figure: 34

### Perform planning and monitoring - (Business Process diagram)

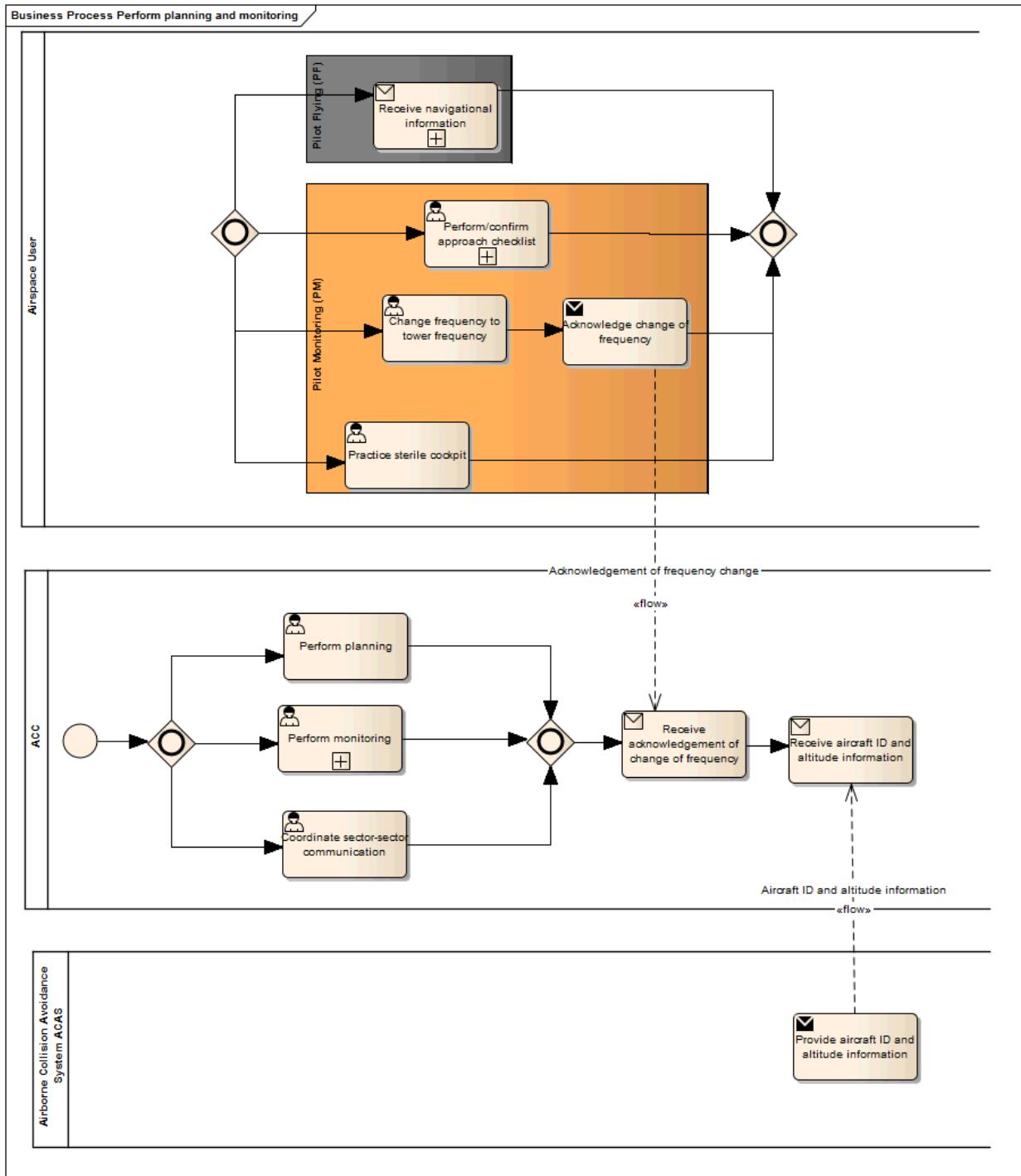


Figure: 35

### Perform monitoring - (Business Process diagram)

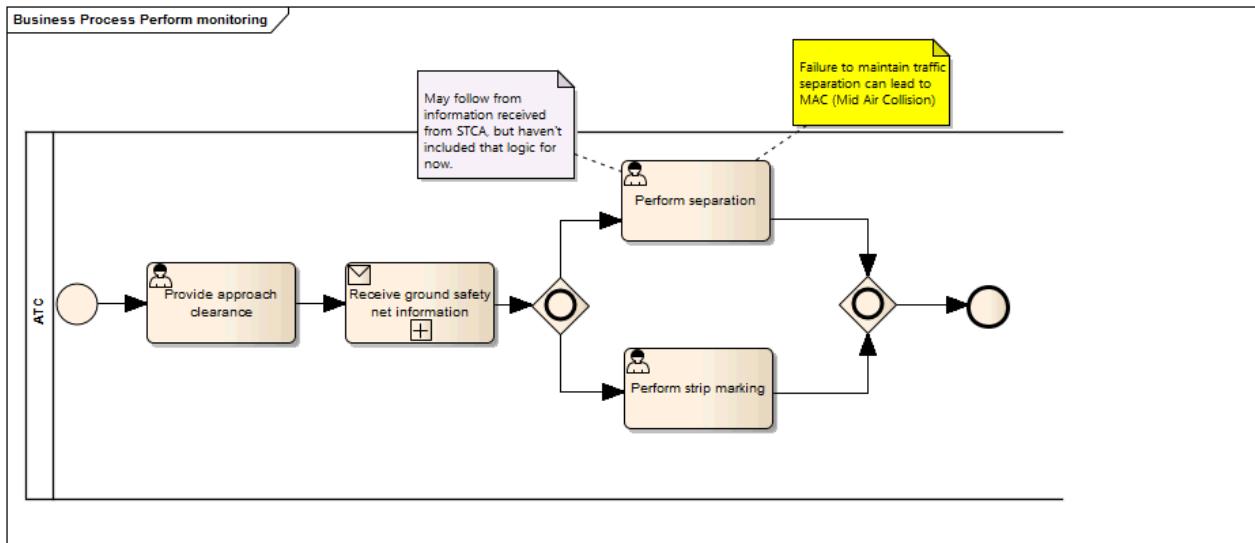


Figure: 36

**Receive ground safety net information - (Business Process diagram)**

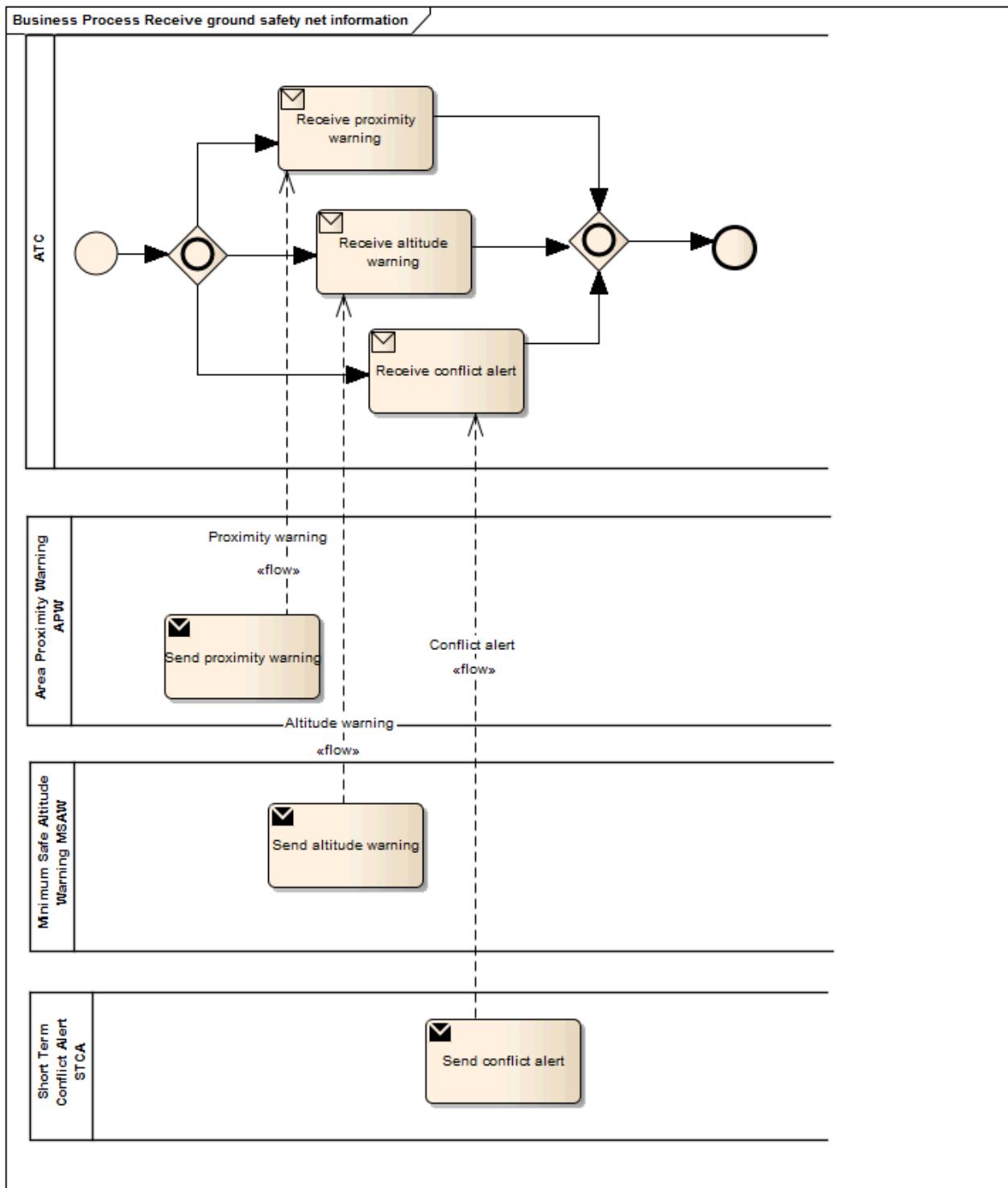


Figure: 37

Receive approach clearance - (Business Process diagram)

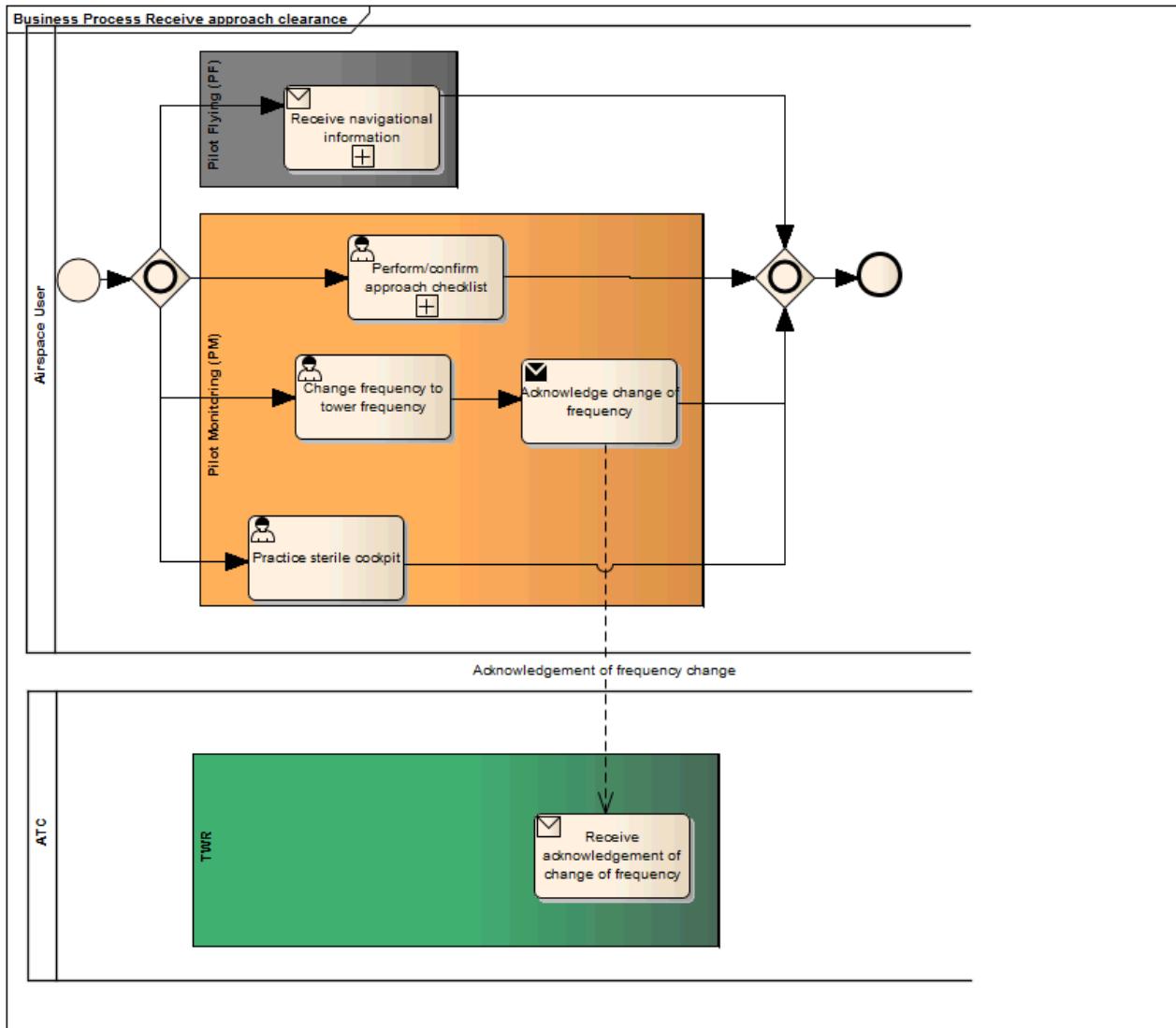


Figure: 38

#### Perform/confirm approach checklist - (Business Process diagram)

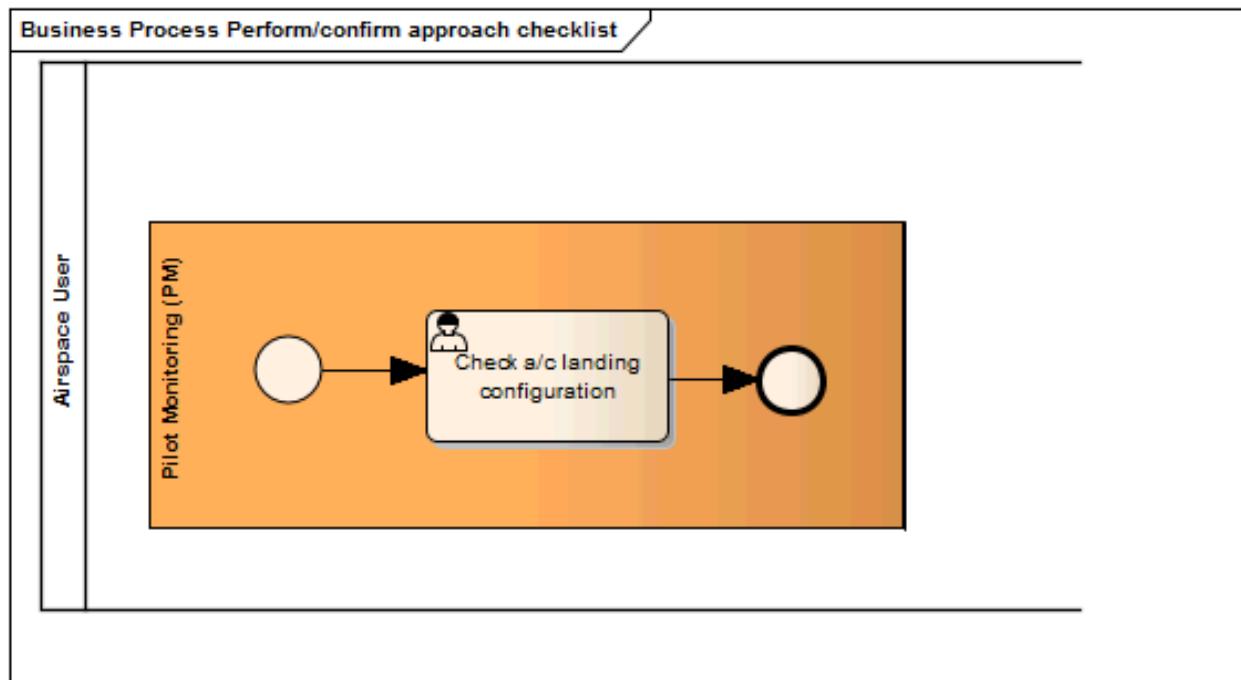


Figure: 39

Receive navigational information - (Business Process diagram)

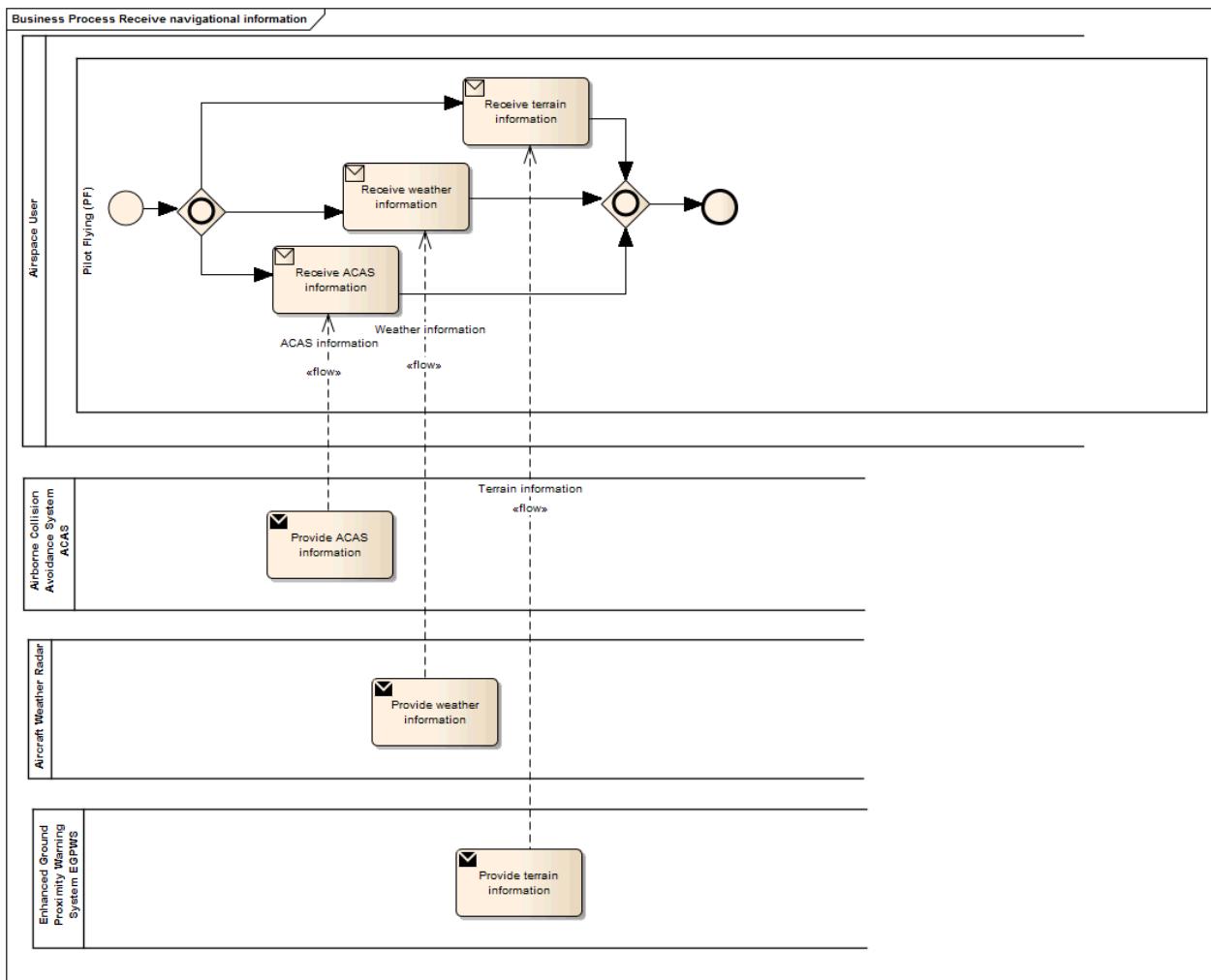


Figure: 40

### Receive approach clearance - (Business Process diagram)

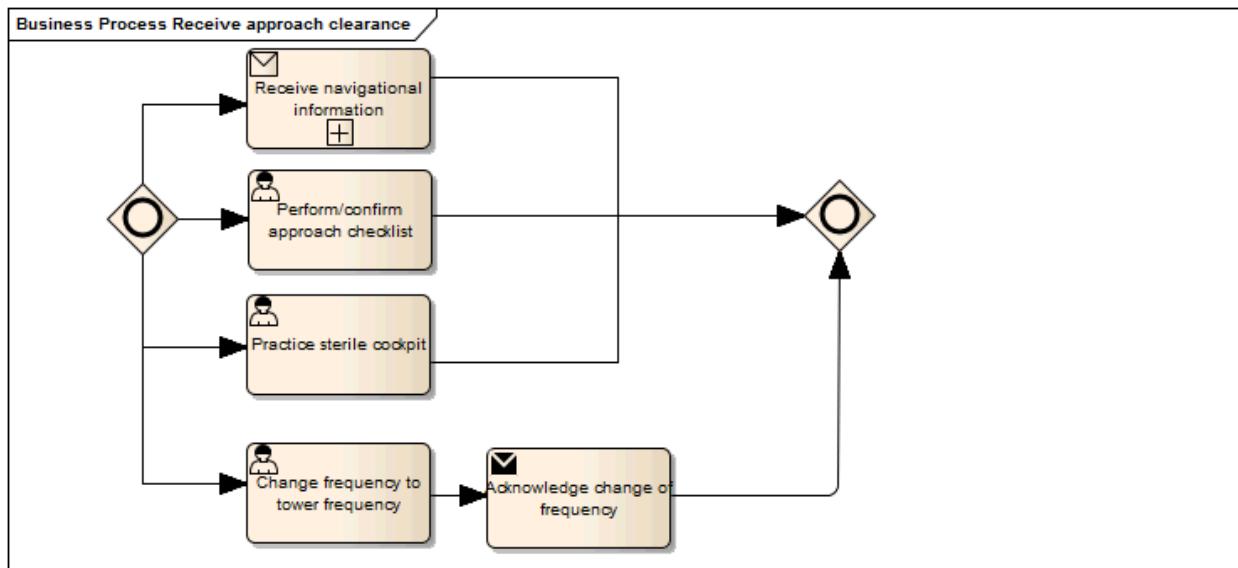


Figure: 41

**Receive navigational information** - (Business Process diagram)

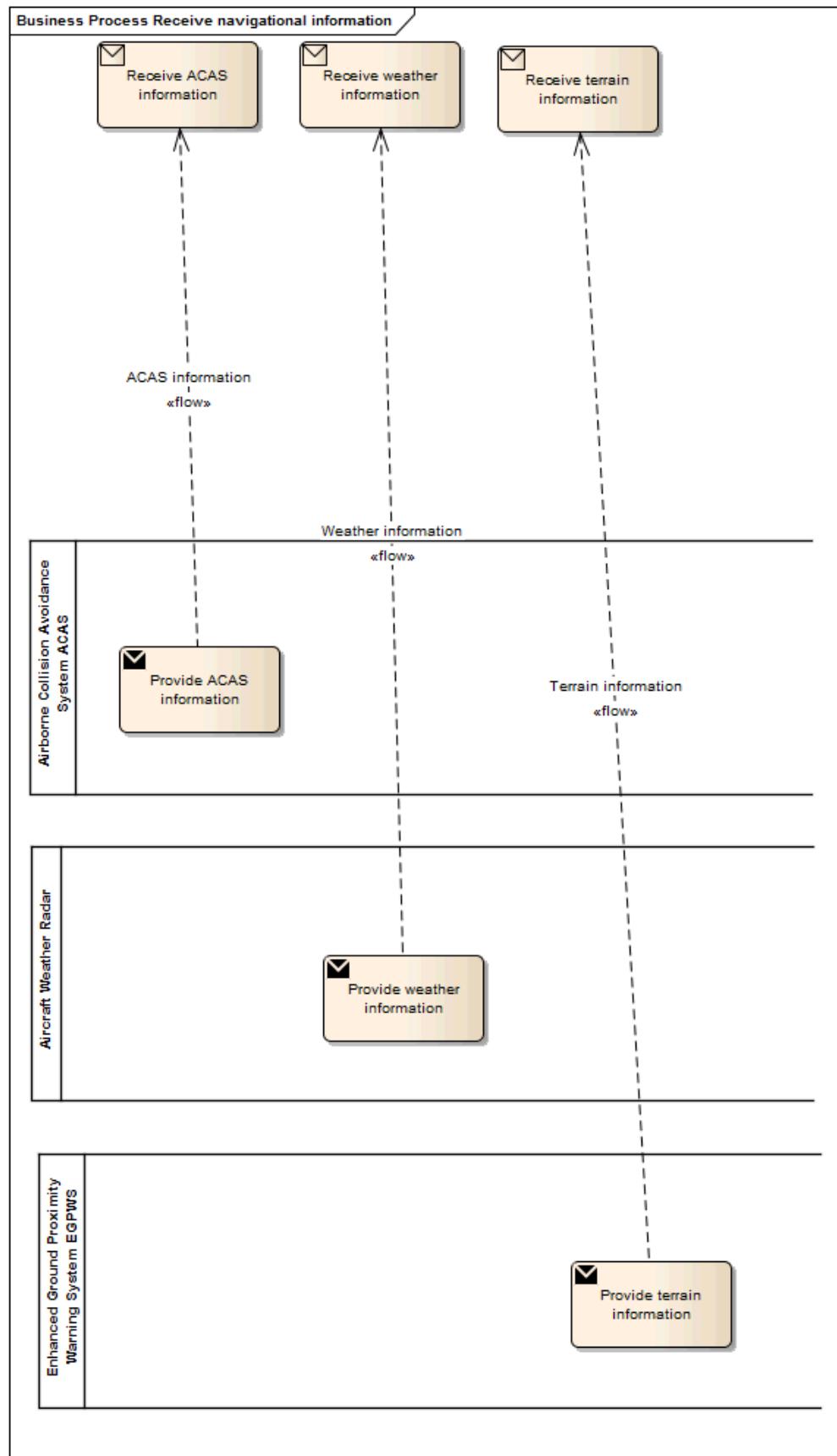


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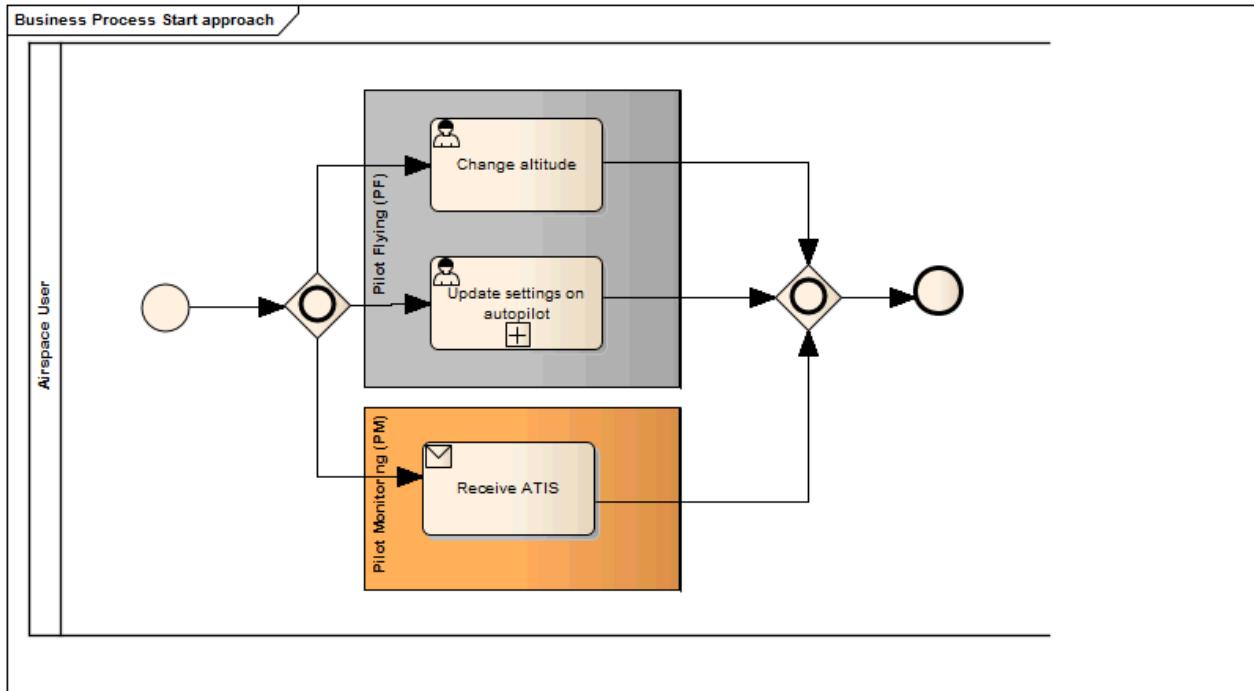
**Start approach - (Business Process diagram)**

Figure: 43

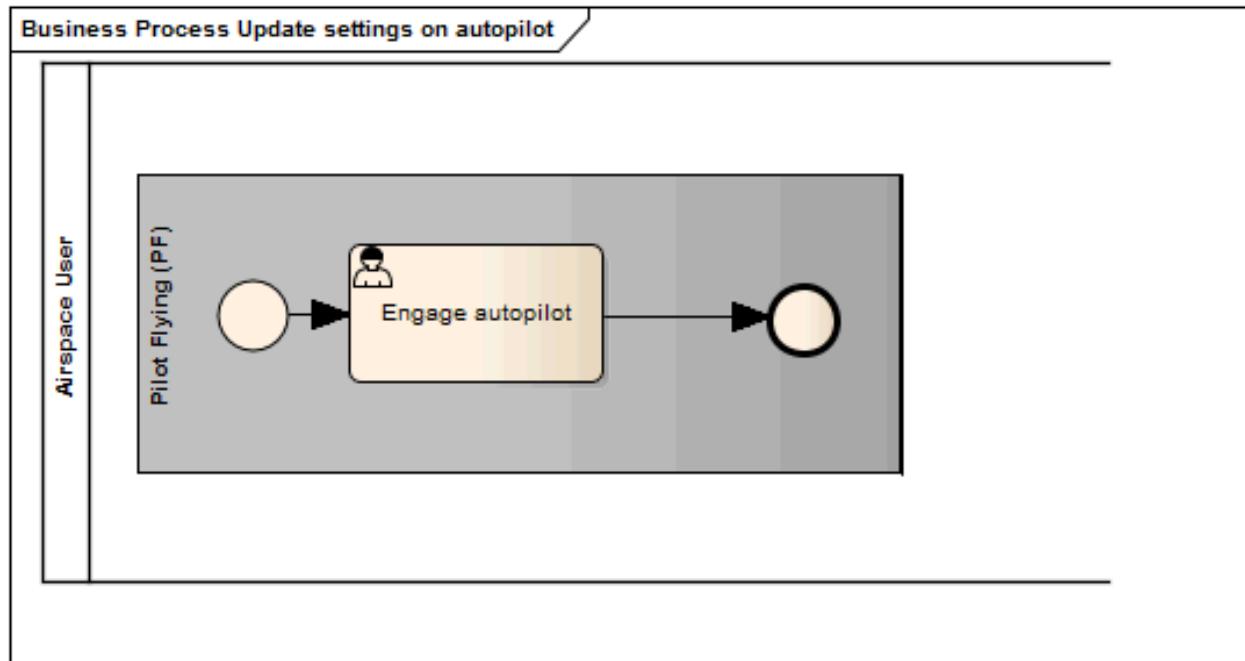
**Update settings on autopilot - (Business Process diagram)**

Figure: 44

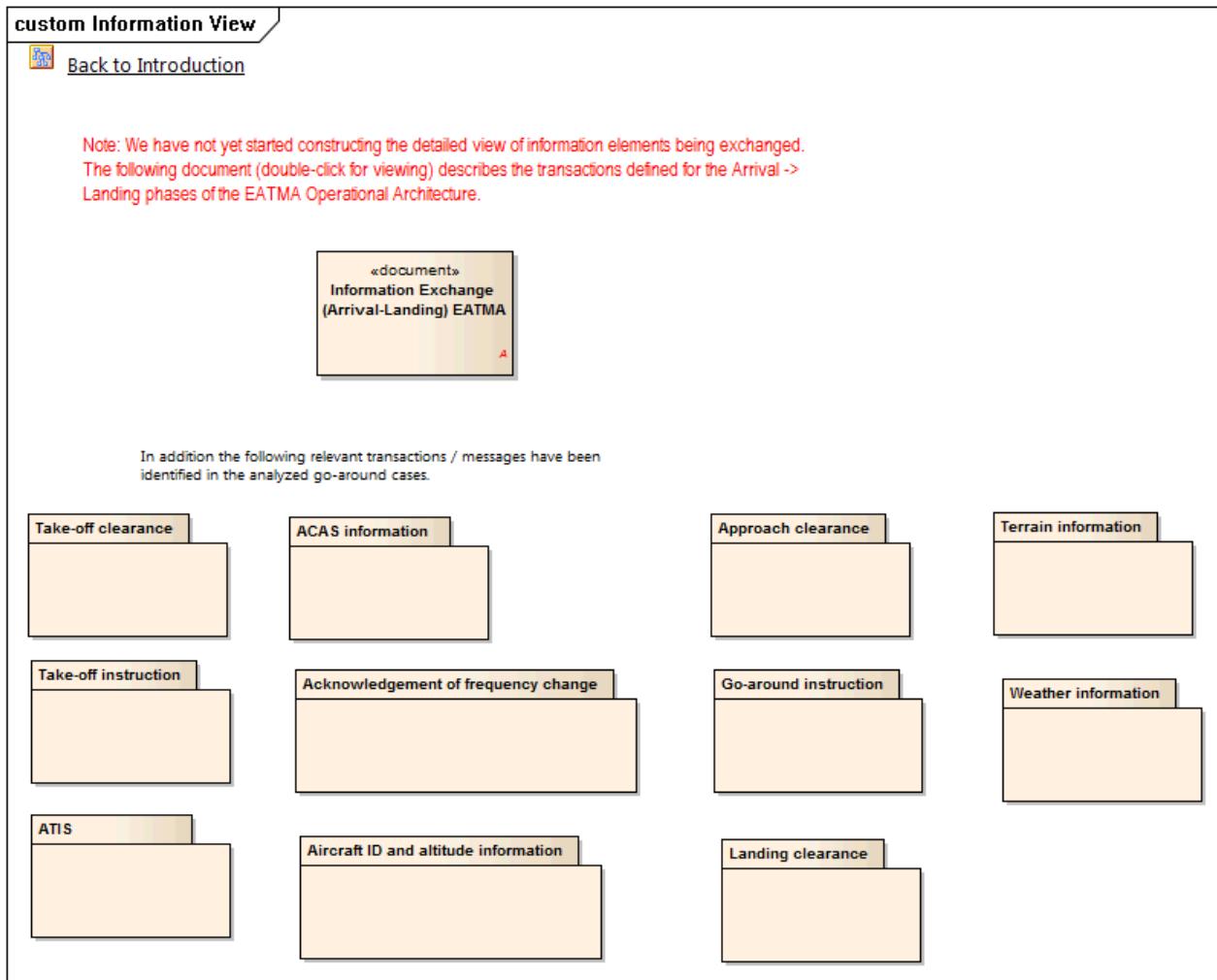
**Information View - (Custom diagram)**

Figure: 45

**Take-off clearance - (Class diagram)**

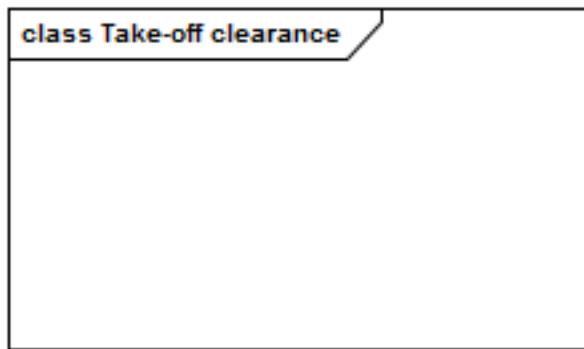


Figure: 46

**Take-off instruction** - (Class diagram)

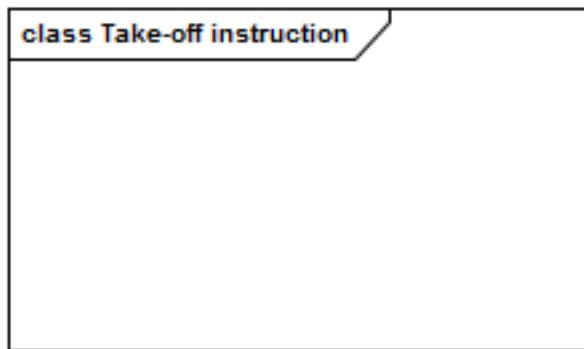


Figure: 47

**ATIS** - (Class diagram)

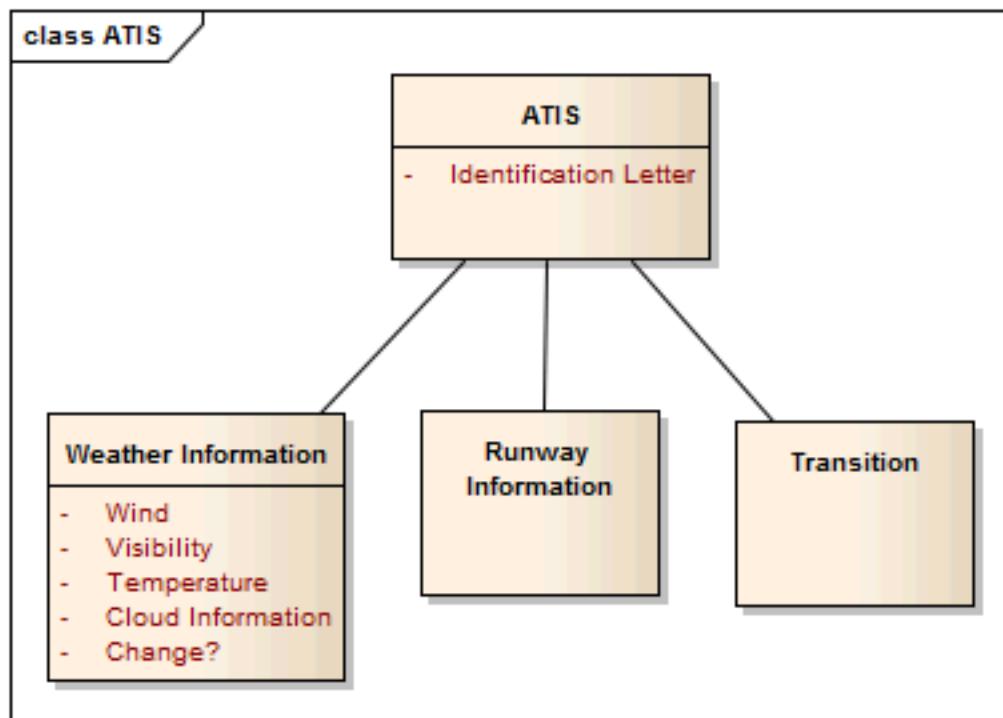
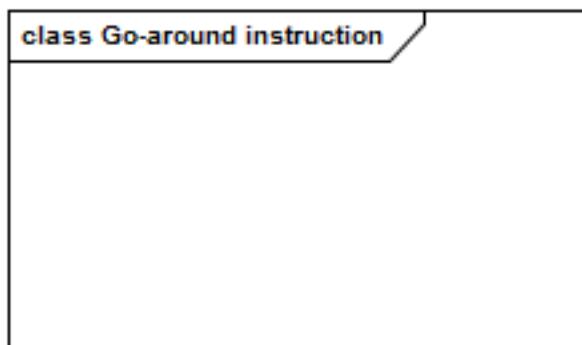


Figure: 48

#### Go-around instruction - (Class diagram)



*Figure: 49***Resilience View - (Custom diagram)**

**custom Resilience View**

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Note:  
Click on packages below to see their content.

**Case Arlanda**

**Case Frankfurt (under construction)**

Resilience Patterns are patterns that emerge from Resilience Indicators. These current Resilience Patterns (and Resilience Indicators) are extracted from the Arlanda case:

 [Resilience Patterns](#)

*Figure: 50*

### State Machine - (StateMachine diagram)

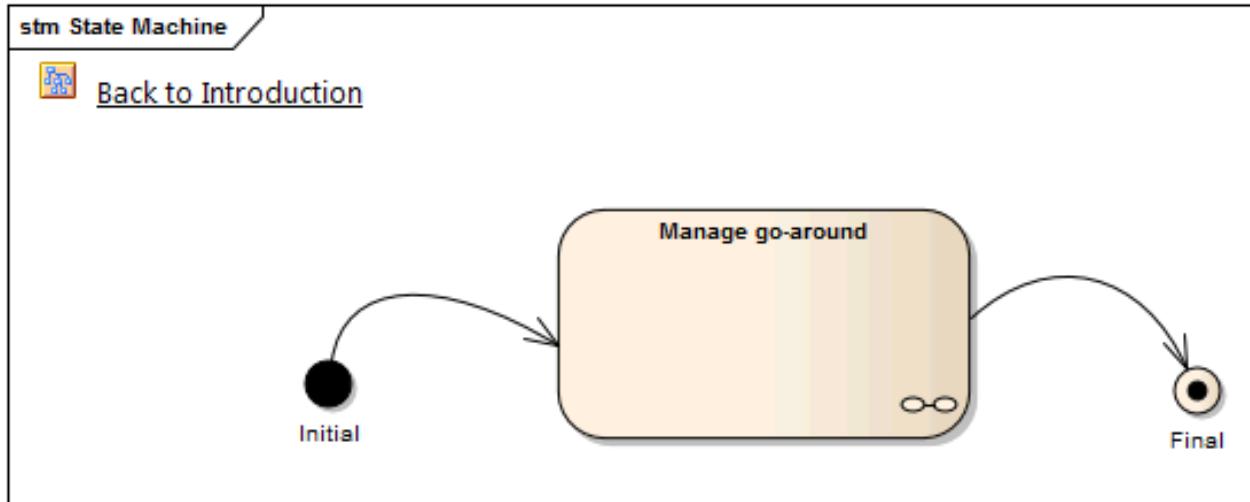


Figure: 51

### Manage go-around - (StateMachine diagram)

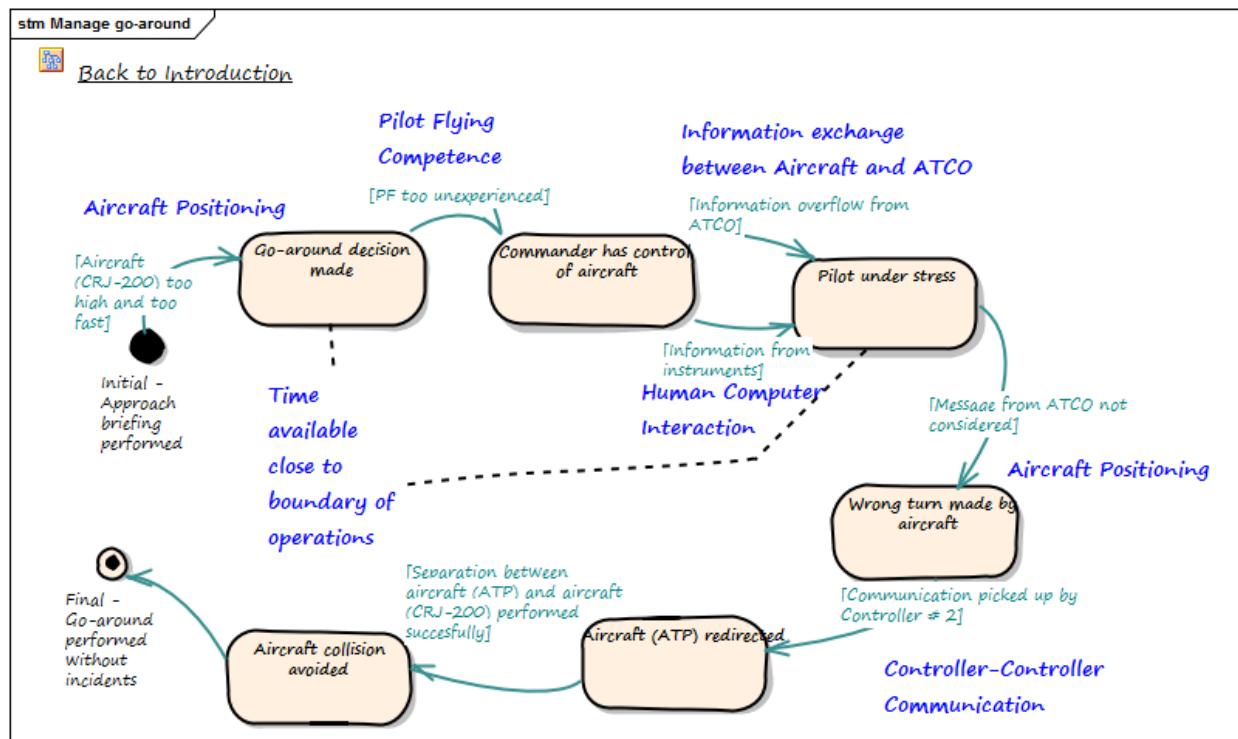


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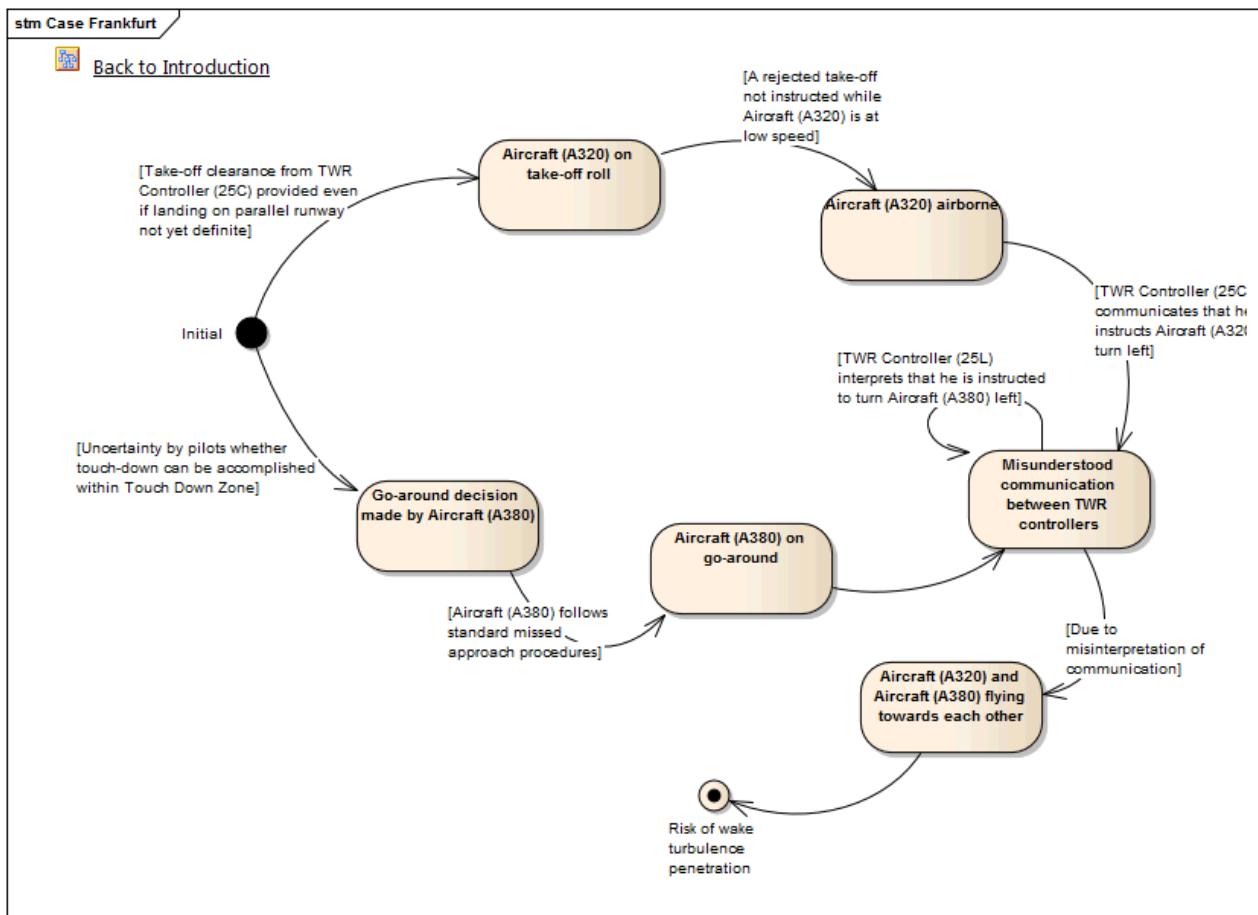
**Case Frankfurt - (StateMachine diagram)**

Figure: 53

**Resilience Indicators (under construction) - (Custom diagram)**

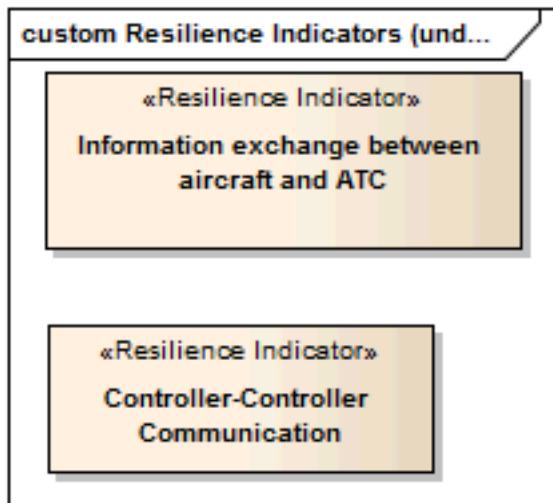


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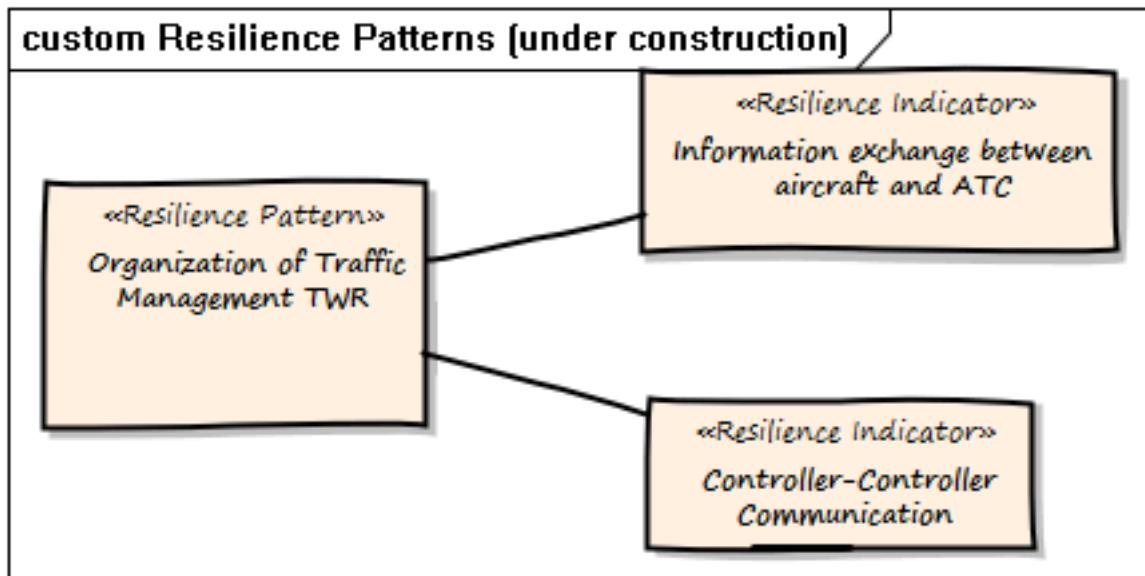
Resilience Patterns (under construction) - (Custom diagram)

Figure: 55

Arrival-Landing (EATMA) - (Collaboration diagram)

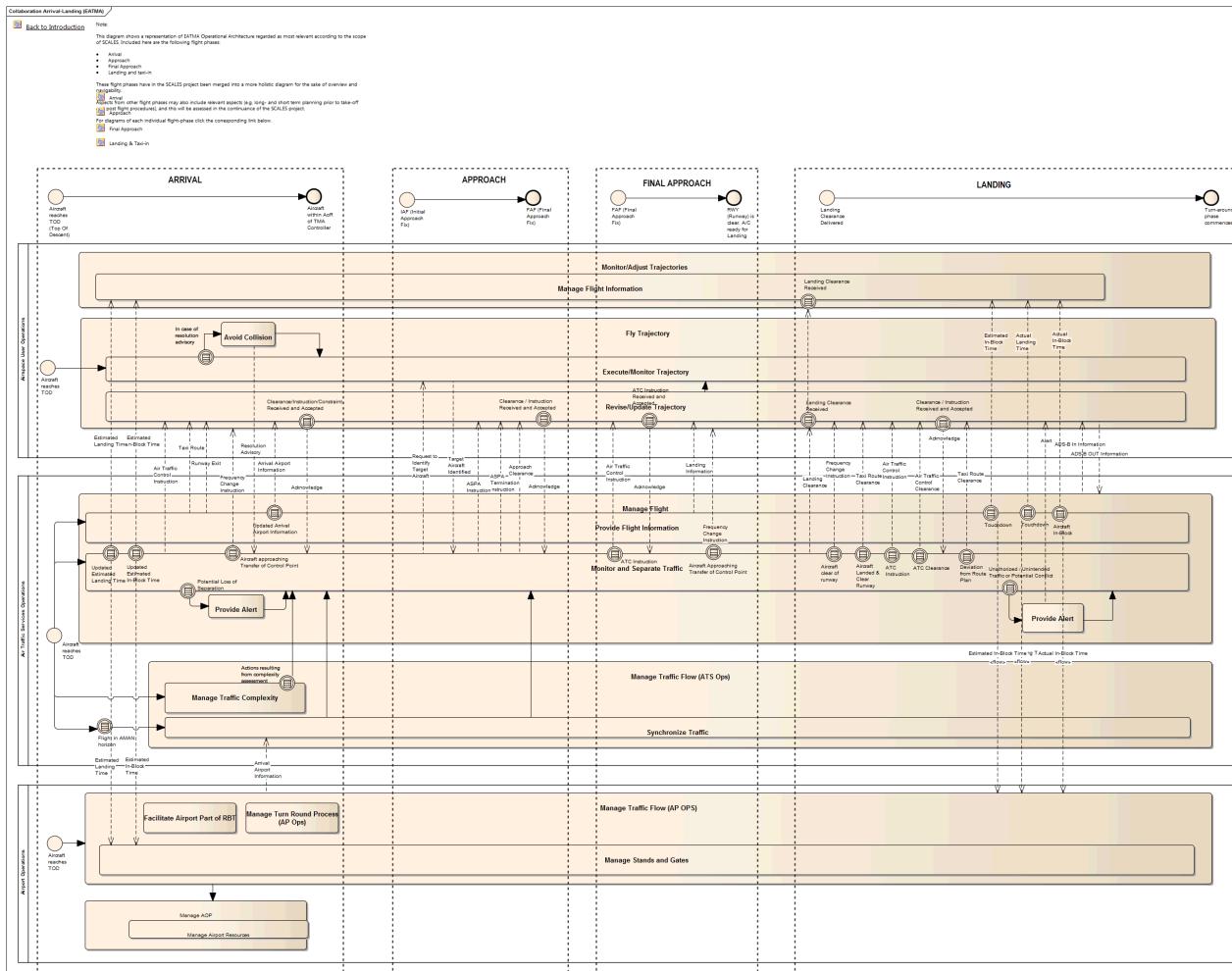


Figure: 56

### Arrival - (Collaboration diagram)

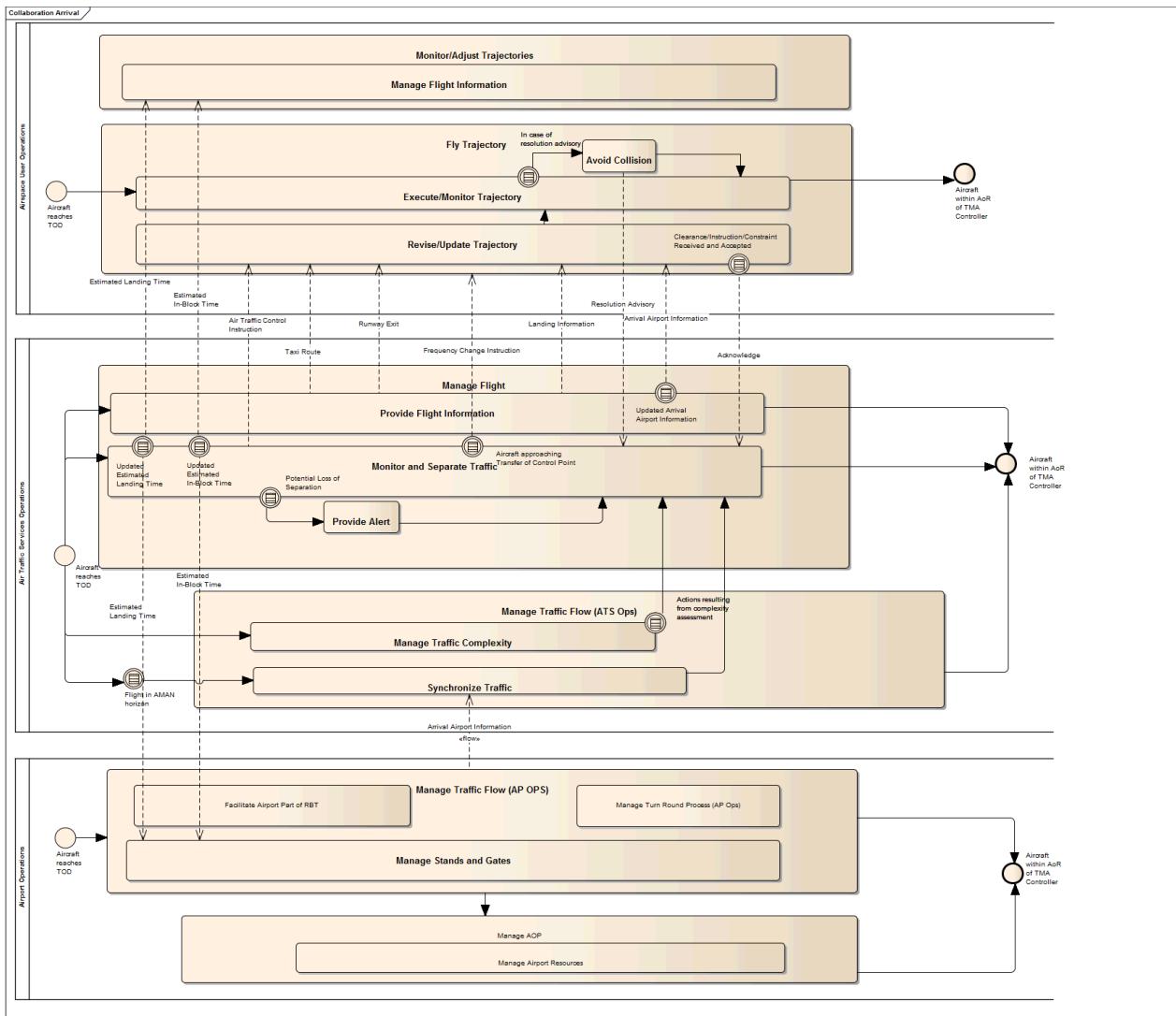


Figure: 57

**Approach - (Collaboration diagram)**

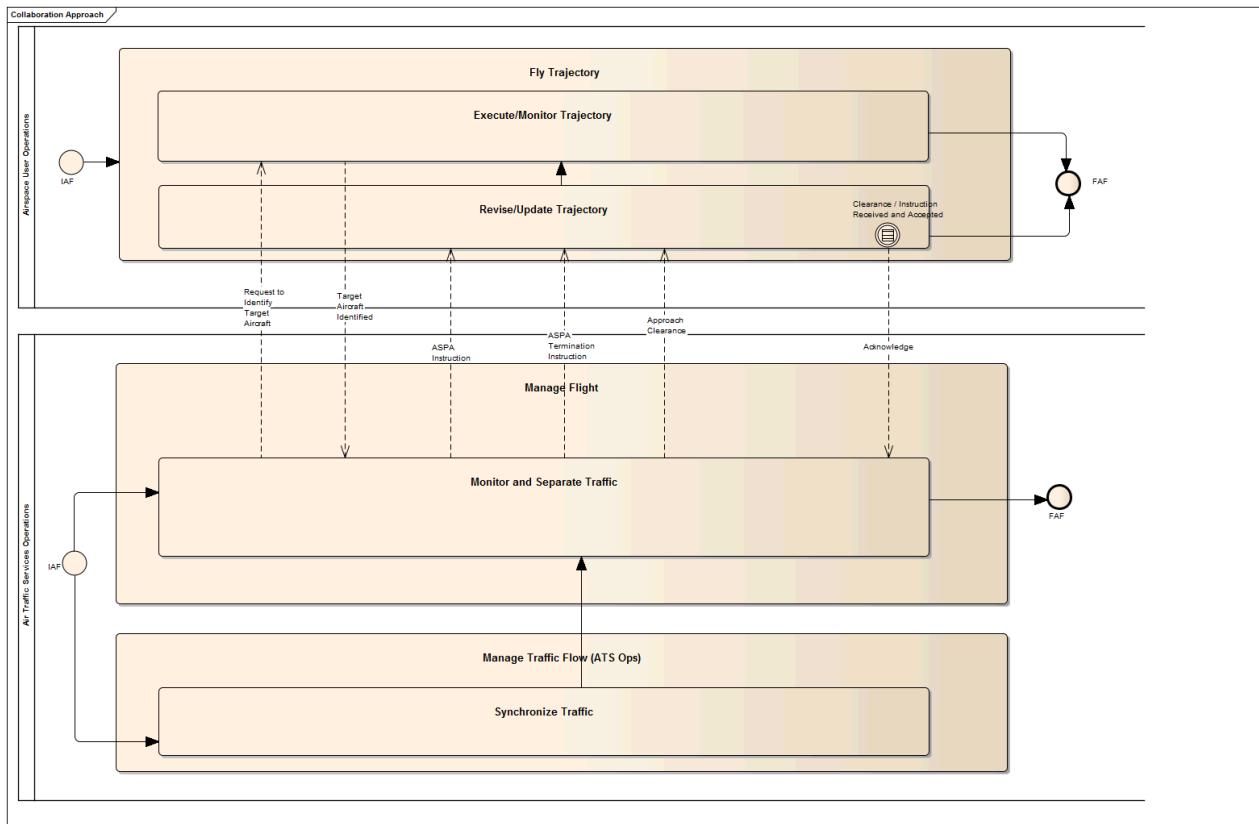


Figure: 58

### Final Approach - (Collaboration diagram)

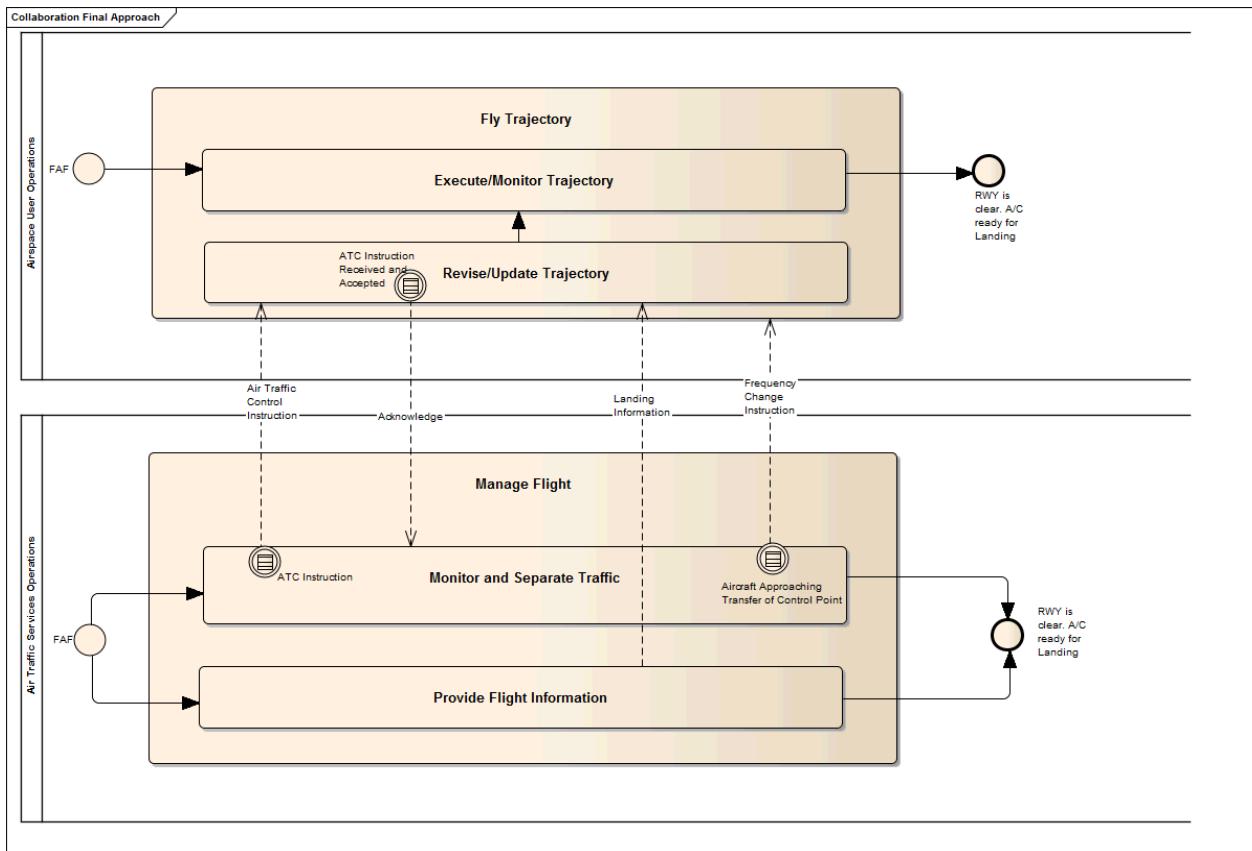


Figure: 59

Landing - (Collaboration diagram)

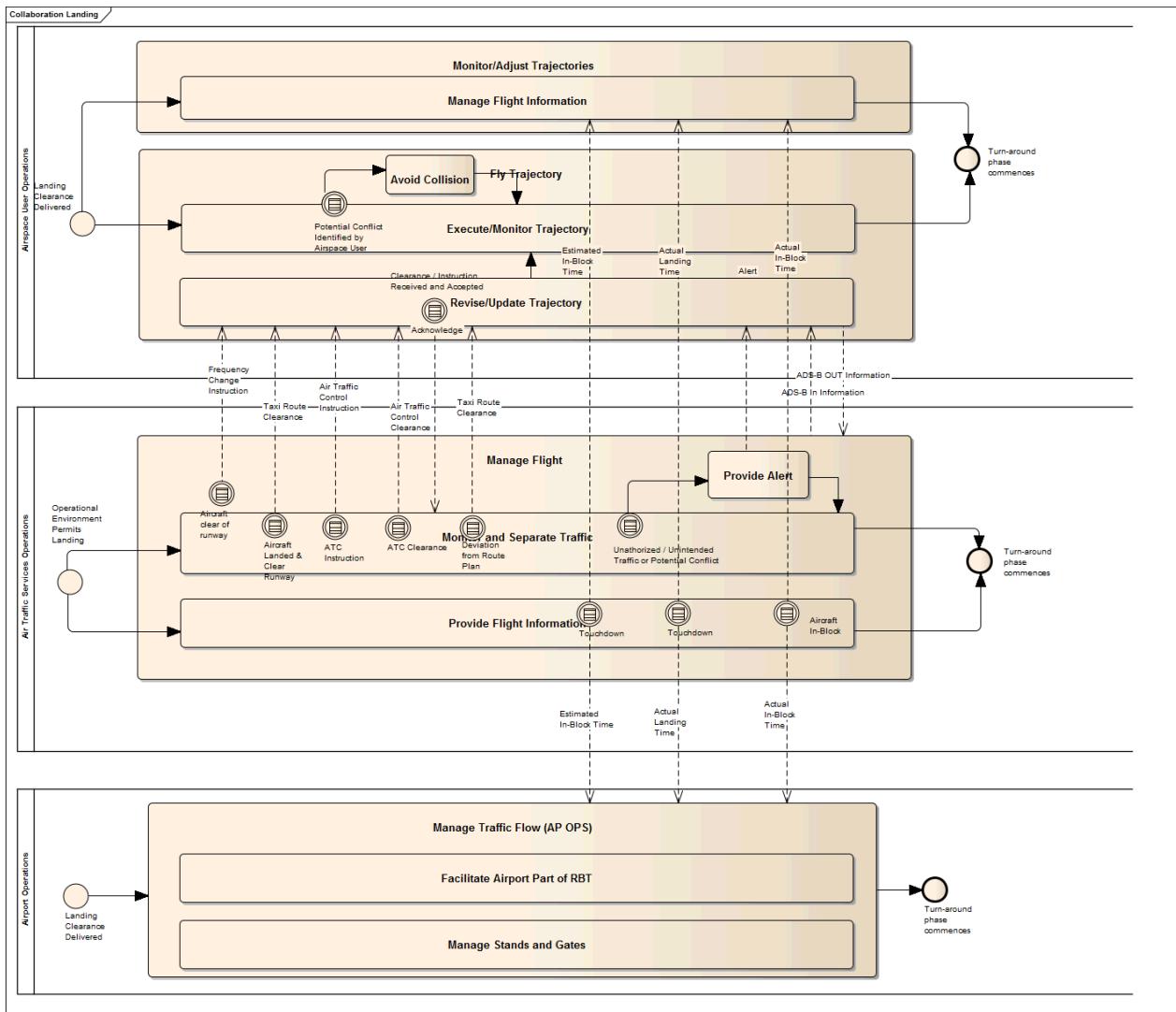


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