Acronym	Acamo

Active Aircraft Monitor

Requirements

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Chapter 1

Project Drivers

1.1 Purpose of the Project

1.1.1 Vision Statement

This project aims at developing an application that shows the active aircraft in range of the ADS-B receiver.

1.1.2 Project Outcomes

The Java application reads ADS-B messages.

The Java application decodes ADS-B messages.

The Java application transforms ADS-B message data into aircraft data.

The Java application displays decoded message data and aircraft data.

1.1.3 Learning Objectives

After having completed this project, as student, you can ...

- develop and integrate Java classes and interfaces.
- identify and solve domain problems through advanced Java programming.
- develop rudimentary graphical user interfaces with Java.

1.2 Stakeholders

1.2.1 Project Team

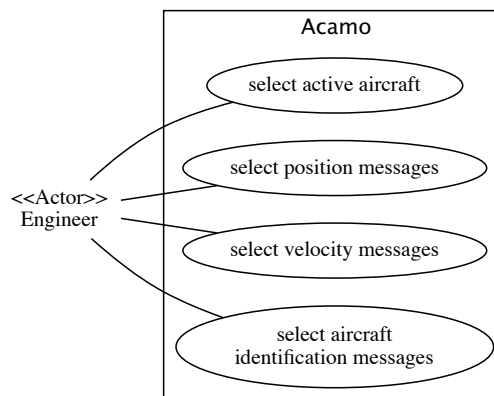Various members and roles.

1.2.2 Product Users

Local Flight Control Engineer, User. Priority: **Key User**.

Chapter 2

Functional Requirements

2.1 Data Model and Data Dictionary

2.1.1 Use Case Diagram

2.2 Acamo Functional Requirements

Acamo.F.10 Select Active Aircraft

Feature   In order to get an overview of the local flight traffic, as I flight control engineer, I want to be able to observe the aircraft that are currently active.

Scenario

Given the application does not show the active aircraft

When I select to observe the active aircraft

Then the application should show the active aircraft

Active aircraft sent any arbitrary new ADS-B message within a time span of 4 minutes.

Scenario

Given an ADS-B message for aircraft ICAO 02A1A2 at time t

When an ADS-B message is received from aircraft 02A1A2, and the current time is less than or equal to $t + 240$ sec

Then aircraft 02A1A2 is an active aircraft, and shall be shown in the list of active aircraft

Scenario

Given an ADS-B message for aircraft ICAO 02A1A2 at time t

When no more ADS-B messages are received for ICAO 02A1A2 after $t + 240$ sec

Then aircraft 02A1A2 is an inactive aircraft, and shall be removed from the list of active aircraft

Feature   Each active aircraft shall be shown with the following information:

- ICAO of the aircraft
- Timestamp of the last activity
- Call Sign of the aircraft if available
- Most recent 3-dimensional position with latitude, longitude and altitude
- Most recent velocity with horizontal and vertical speeds, and heading

Feature   The application shall show the active aircraft upon application startup.

Scenario

Given the application is off

When I start the application

Then the application should show the active aircraft

Acamo.F.20 Select Position Messages essential

Feature In order to get an overview of the local flight traffic, as I flight control engineer, I want to be able to observe the decoded incoming position messages.

Scenario

Given the application does not show the position messages

When I select to observe the position messages

Then the application should show the position messages

Feature Each position message shall be shown with the following decoded information:

- ICAO of the aircraft
- CPR format
- CPR encoded latitude
- CPR encoded longitude
- Altitude

Acamo.F.30 Select Velocity Messages essential

Feature In order to get an overview of the local flight traffic, as I flight control engineer, I want to be able to observe the decoded incoming velocity messages.

Scenario

Given the application does not show the velocity messages

When I select to observe the velocity messages

Then the application should show the velocity messages

Feature Each velocity message shall be shown with the following decoded information:

- ICAO of the aircraft
- Horizontal speed
- Vertical speed
- Heading

Acamo.F.40 Select Aircraft Identification Messages essential

Feature In order to get an overview of the local flight traffic, as I flight control engineer, I want to be able to observe the decoded incoming aircraft identification messages.

Scenario

Given the application does not show the aircraft identification messages

When I select to observe the aircraft identification messages

Then the application should show the aircraft identification messages

Feature Each aircraft identification message shall be shown with the following decoded information

- ICAO of the aircraft
- Call Sign of the aircraft

Chapter 3

Non-Functional Requirements

3.1 Look and Feel Requirements

Acamo.NF.10 Graphical User Interface (GUI)   *essential*

Feature   The application user interface shall be realized as graphical user interface.

Feature   The GUI window shall be organized in terms of four tabbed panes, one for each of the previously defined use cases.

3.2 Performance Requirements

Acamo.NF.20 Timing   *essential*

Feature   The list of active aircraft shall be updated at least once per second.

3.3 Implementation-Specific Requirements

3.3.1 Process

Acamo.NF.50   Test Driven Development   essential

In order to ascertain sufficient testing of the product, the implementation must be carried out following a test-driven development approach.

3.4 Maintainability Requirements

Acamo.NF.70   Documentation   essential

In order to ascertain high understandability, the source code must be self-explanatory.

Acamo.NF.80   Cohesion and Coupling   essential

In order to support high maintainability, the modules of the system must be realized with high-cohesion and low coupling.

Acamo.NF.90   OO Design Principles   essential

In order to support high maintainability, the other well-known principles of good object-oriented design must also be applied.