Detailed Design Description (DDD)

Terma case

Document Identification: F-DDD-2014-V1

Company F:
IVAN GRUJIC, 10454
LARS NIELSEN, 10765
LARS JUHL LUNDE, 10423
SERGIU-VLAD TALNACI, 201400122
LASSE BRØSTED PEDERSEN, 10769
FATEMEH SADAT KIAEERAD, 201210732

February 19, 2014

Contents

1 Revision history

Date	Ver. No	Author	Contact	Description
17-Feb-2014	1.0	-	-	Initial version

2 Stakeholders

Name	Role	Contact
Stefan Hallerstede	Customer	sha@iha.dk
Company G	Subcontractor	201302499@iha.dk
Company F, Training department	Trainers	201210732@post.au.dk

3 Subcontracter Information

A subcontractor will be used to develop and manufacture the pod and any additional climate control protection as described in Requirement 29 and 41 in the document F-SRS-2014-V1 . The subcontractor will be Group G.

4 Scope

4.1 Identification

4.2 System-overview

The goal of the system is to protect the aircraft from enemy incoming missiles by deploying flares and chaffs. It also provides threat information to the information computer, which interacts with the pilot. It is possible for a technician to load the system with chaffs and flares. During the preparation phase before the missions, the system informs the technicians about the current amount of chaffs and flares present on the aircraft.

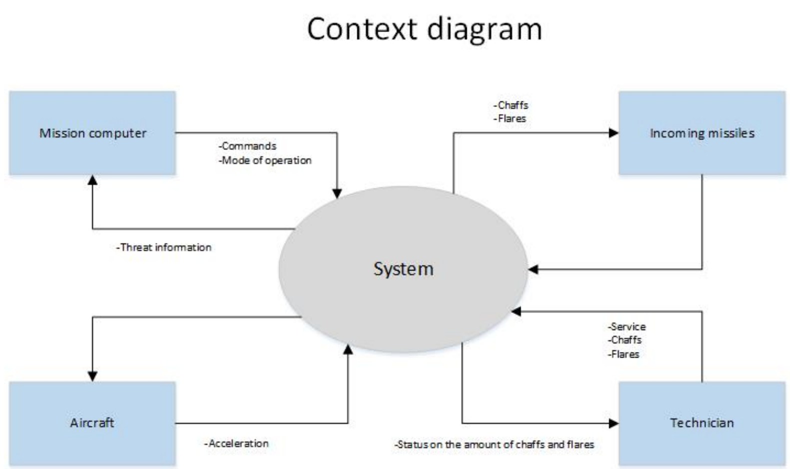

Figure 1: Context diagram

4.3 Document overview

5 System-wide design decisions

System-wide design decisions for the system were made as part of the preliminary design effort. The team evaluated potential system-wide design issues and conducted analysis on how the system and its components would behave under different environmental conditions. TODooo . Write more stuff here

States of the system The system will have different states depending on what is set by the mission computer. The system has three distinct states:

- Automatic: The system automatically detects and deploys the payload witouth the pilots interaction
- Semi-automatic: The system detects the enemy missile but it asks for the pilots consent before deploying the payload
- Manual: The pilot has to select the desired payload and deploy it himself. Relevant constraints: The system has a built in safety feature which will prevent deployment of the payload when the plane is not airborne. Detection and action upon incoming threats We are using the missile warning system (MWS) to detect incoming missiles. Incoming missiles are considered an input in this design where the payload

deployment system will respond to this input by deploying the payload if the missile is close enough to the aircraft. The payload is located in the pod that is mounted on the aircraft.

Components:

- Pod The physical dimensions of the pod cannot exceed 0.5X0.5X5 meter. The pod will have the same color as the rest of the aircraft in order to blend in with the environment. The pod will have a correct aerodynamic shape in such a way that it will create as little drag as possible so it will have minimum effect on the aircrafts speed.
- Cockpit unit To prevent dispensing the payloads on the ground we will request sensor input from the mission computer that will make the system aware if the plane is in flight.
- MWS
- Dispenser
- Magazines

After listing all the data. We justify that we use a cockpit unit that works with all of the data and acting on inputs from the missile warning system.

6 System architectural design

6.1 System components

6.2 Concept of execution

Figure. 2 provides an overview of the signals and protocols used in the system. The aircraft communicates with the cockpit unit using MIL-STD-1553-B. The same standard is used between the cockpit unit and the missile warning system (MWS).

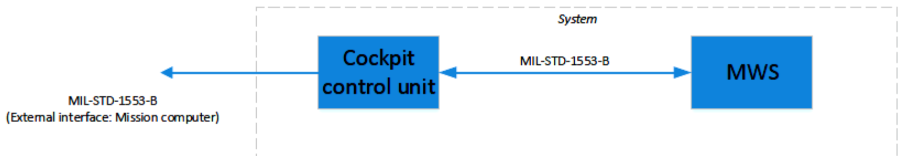

Figure 2: System signal overview

Figure. 3 provides an overview of the components comprising the system. The system has two major parts; the cockpit unit and the pod. The pod contains the MWS and components for handling and dispensing the payload.

6.3 Interface design

6.3.1 External interfaces

- Interface identification and diagrams.
  blaa
- Project-unique identifier of interface
  blaa

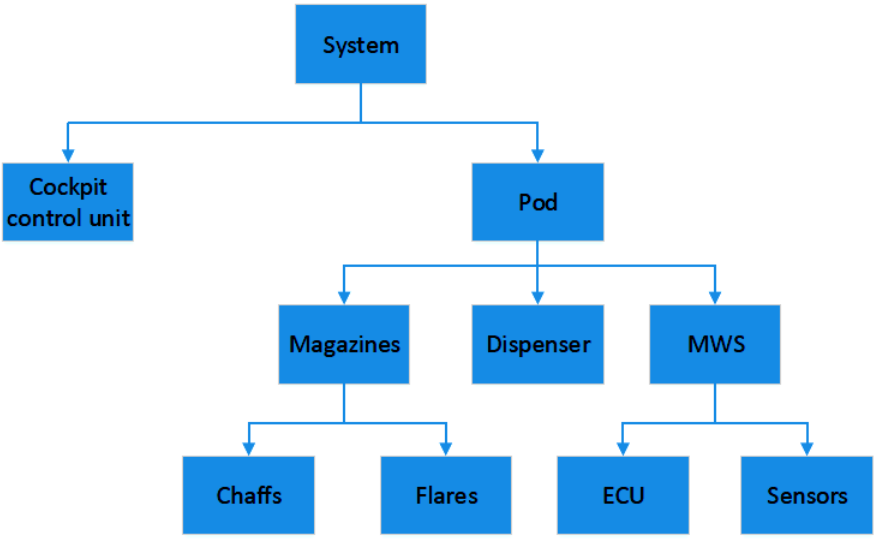

Figure 3: Hierarchical overview of system

6.3.2 Internal interfaces

This section describes the internal interfaces. The system interfaces can be seen on figure **??**. The internal interfaces are:

- I-IF-MWSCTRL
- I-IF-DISCTRL
- I-IF-PODPWR

I-IF-MWSCTRL

Interface name	**Identification**	**Endpoint A**	**Endpoint B**	**Standard**
MWS Control	I-IF-MWSCTRL	Cockpit unit	MWS	MIL-STD-1553-B

Some description...
The data

- Threat data (MWS → Cockpit unit)
  - Direction relative to north
  - Size
  - Velocity
- Aircraft navigation data (Cockpit unit → MWS)
  - Altitude
  - Heading
  - Position data

The physical layer is defined by the MIL-STD-1553-B standard.

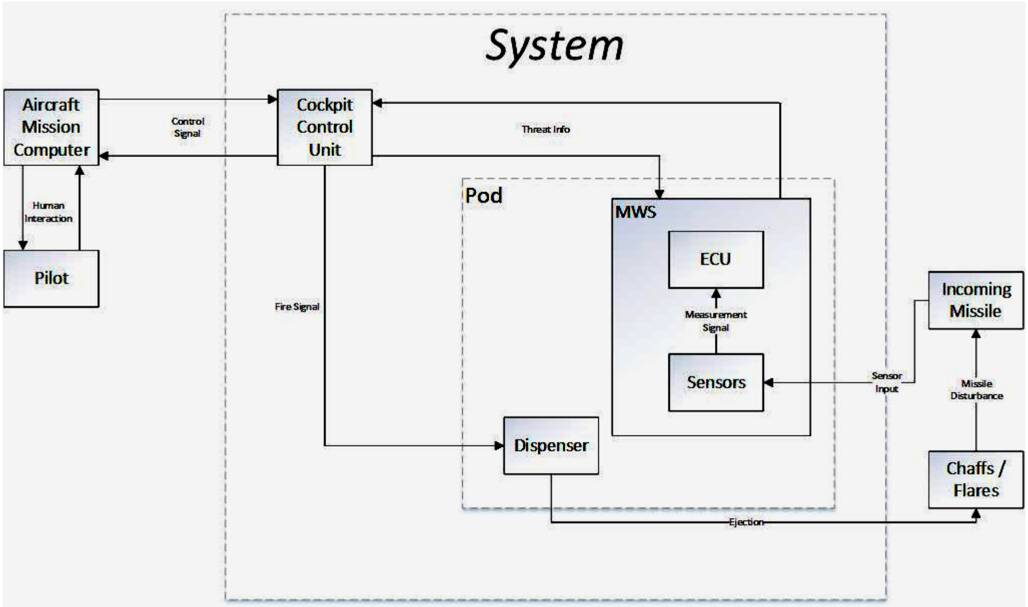

Figure 4: Signal Flow Diagram

I-IF-DISCTRL

Interface name	Identification	Endpoint A	Endpoint B	Standard
Dispenser Control	IF-DISCTRL	Cockpit unit	Dispenser assembly	MIL-STD-1553-B

Some description...
Something about data:

- direction to fire
- what to fire (chaffs/flares)
- pattern to fire
- fire command

The physical layer is defined by the MIL-STD-1553-B standard.

I-IF-PODPWR

Interface name	Identification	Endpoint A	Endpoint B	Standard
Pod power signal	IF-PODPWR	Cockpit unit	Dispenser assembly and MWS	N/A

This analog signal connects from the cockpit unit to the dispenser assembly and the MWS in the pod. When asserted, this signal enables power to the dispenser assembly and MWS. When not asserted, the power is off.

7 Requirements traceability