ABS-Automotive(ISO-26262) | First Draft- Oct-12-2017

Software Configuration

Management Plan for Anti-lock

braking system in Automobiles

Engineering Safety Critical Systems

ISO-26262 (Fitash-ul-Haq, Mohammad Abbas, Ahsan Shabbir, Ali Raza)

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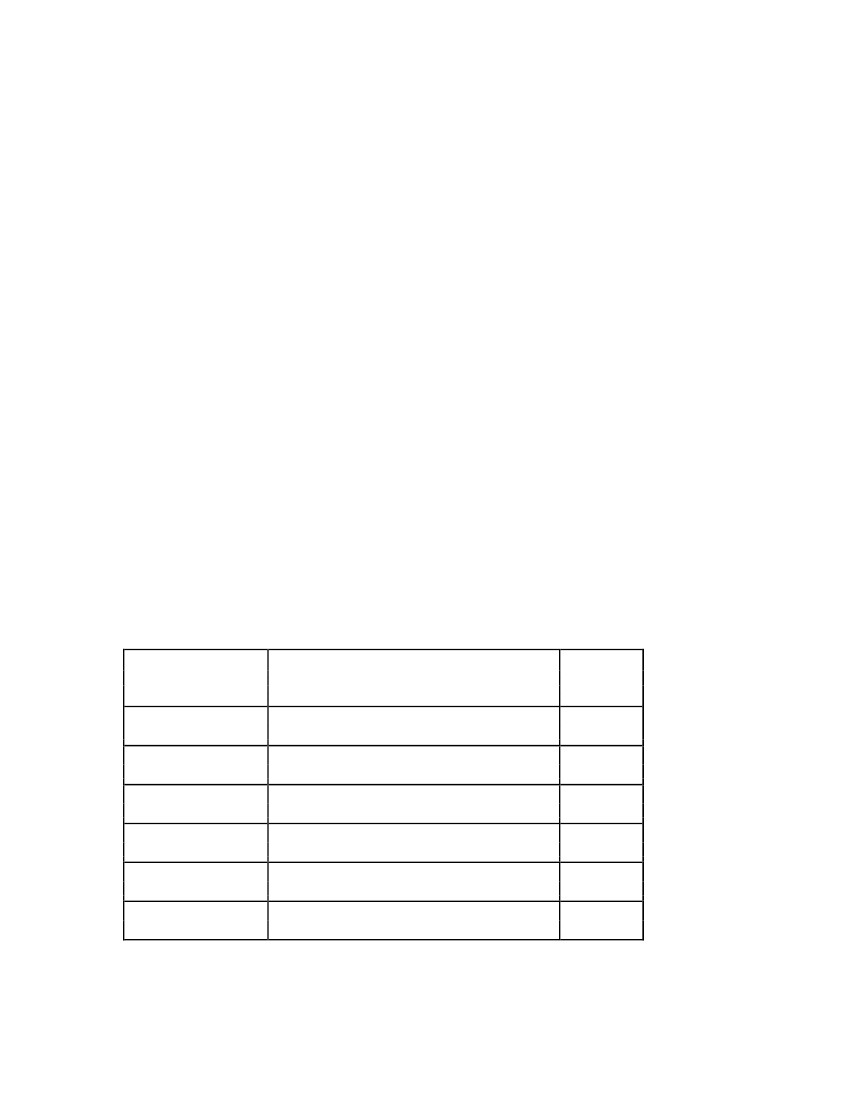
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Software Configuration

Management Plan for Anti-lock

braking system in Automobiles

1. Overview

1.1 Scope

The following plan complies with the instruction set provided in ISO-26262 standard. It is part of a series

of four plans our team documented to make the system design more flexible and understandable with each

plan satisfying a specific requirement. This document is the software configuration management plan for

ABS system in cars. The SCMP handles any change being made during and after development of ABS

systems whilst any change shall pass through all other plans. Other plans are also attached along.

2. References

This standard shall be used in conjunction with the following publications:

IEEE Std 1042-1987 (Reaff 1993), IEEE Guide to Software Configuration Management.

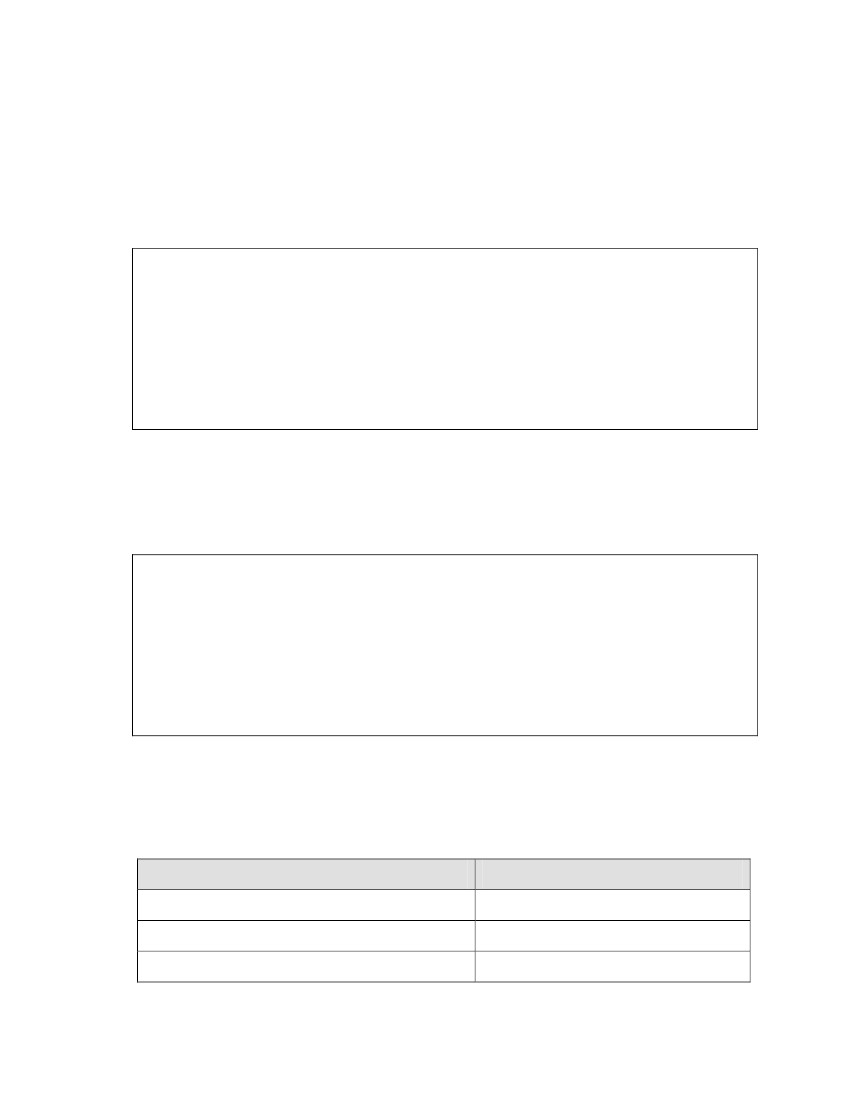
ISO 26262: https://www.iso.org/obp/ui/#iso:std:iso:26262:-1:ed-1:v1:en

3. Definitions and acronyms

3.1 Definitions

The definitions below describe specific terms as used within the context of this standard.

4



(How?) Identifies tools and physical and human

resources required for execution of the Plan

SCM schedules

SCM resources

SCM plan maintenance

Description

Describes the Plan’s purpose, scope of application, key 4.1

terms, and references

(Who?) Identifies the responsibilities and authorities

for accomplishing the planned activities

(What?) Identifies all activities to be performed in

applying to the project

(When?) Identifies the required coordination of SCM

activities with the other activities in the project

3.1.1 Control point (project control point): A project agreed on point in time or times when

Identifies how the Plan will be kept current while in

effect

4.2

4.3

4.4

4.5

4.6

5

SCM management

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specified agreements or controls are applied to the software configuration items being developed, e.g., an

approved baseline or release of a specified document/code.

3.1.2 Release: The formal notification and distribution of an approved version.

3.2 Acronyms

The following acronyms appear within the text of this standard:

CCB

CI

SCM

configuration control board

configuration item

software configuration management

ABS

FTA

PHA

PHL

SSAP

SHA

ECU

CAN

SSHA

Anti-lock Braking System

Fault Tree Analysis

Preliminary Hazard Analysis

Preliminary Hazard List

System Safety Assessment Planning

System Hazard Analysis

Electronic Control Unit

Controlled Area Network

Subsystem Safety Hazard Analysis

4. The Software Configuration Management Plan

The classes that will be covered in this plan are stated in Table 1.

Table 1—SCM classes of information

IEEE Std

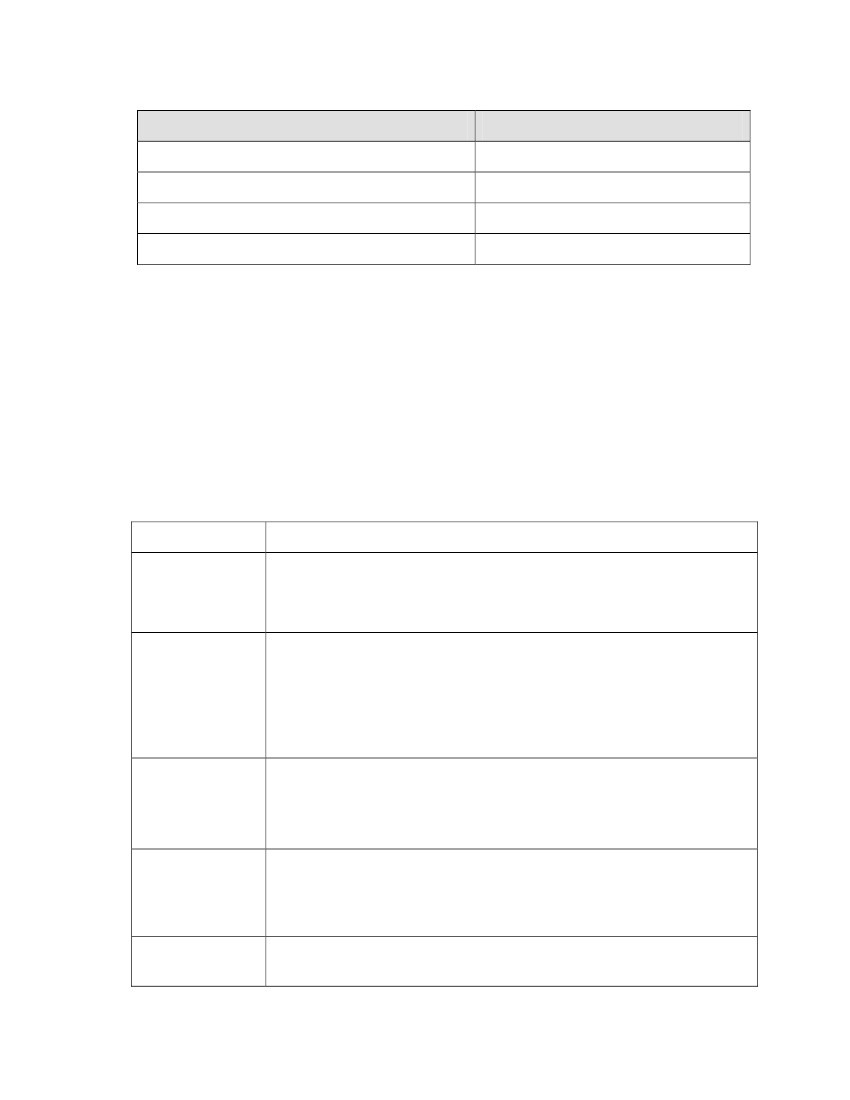
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reference

Class of information

Introduction

SCM activities



4.1 Introduction

5 days

1 Week

3 days

Estimated Completion Timeframe

6

Requirement Engineering

Project Planning

Analyzing COT for ABS-system

Milestones

Table 3 Milestones

Where our planning phase have been divided into three categories including Functional Safety assessment

plan, Safety plan and Verification and Validation Plan (V&V). See documents attached with same names.

The milestones to be achieved are also shown in Table 3 below.

Testing

Analyzing static code

Development

Designing

Requirement Engineering

Planning

Table 2 work breakdown

Our project is broken down into a number of phases stated in table 2.

4.1.1 Work breakdown

System should disable ABS if speed is below 20 km/h and vice versa

System should reduce acceleration gradually upon applying breaks

System should shift to normal breaks if ABS fails

System should prevent from sudden wheel lock on applying breaks

System should notify driver and display signal light for ABS failure

System should run diagnostic test for ABS failure on ignition

Table 1 Requirements

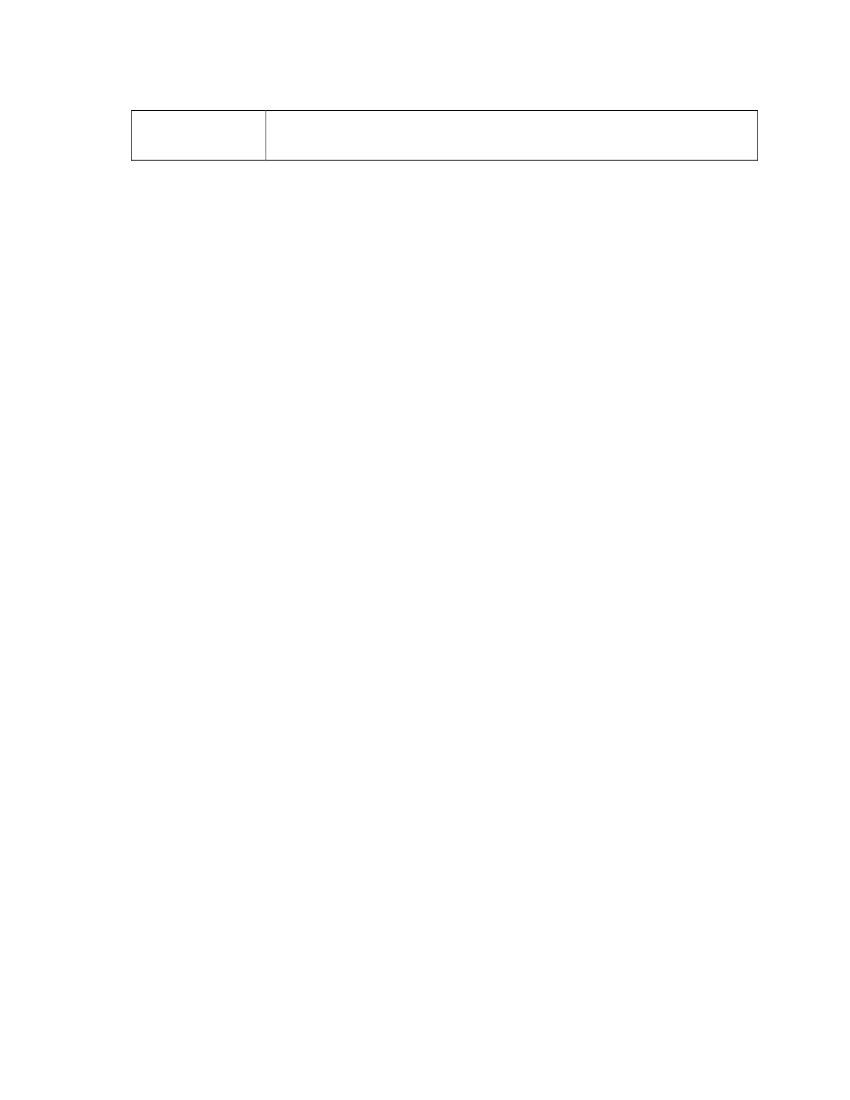
Software configuration management plan determines the changes that can be made during and after

development of a system. It keeps track of changes and deals with what and how of evolution. The

objectives of our project are stated in Table 1. Any requirement change that isn’t related to these

requirements will be called out of scope and will be excluded from project.

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Milestones

Team Member

7

Working project team member, who analyzes, designs, develops, tests and

improve the project.

Key provider of requirements and recipient of project deliverable and

associated benefits. Deliverable will directly enhance the stakeholders’

business processes and environment. Majority of stakeholders for this project

will be agency leads, CIO’s, and project management representatives.

Stakeholder

Committee

Steering

Provide assistance in resolving issues that arise beyond the project manager’s

jurisdiction. Monitor project progress and provide necessary tools and

support when milestones are in jeopardy.

Provides overall management to the project. Accountable for establishing a

Project Charter, developing and managing the work plan, securing

appropriate resources and delegating the work and insuring successful

completion of the project. All project team members report to the project

manager. Handles all project administrative duties, interfaces to project

sponsors and owners and has overall accountability for the project.

Project Director

Has budget ownership for the project and is the major stakeholder and

recipient for the project deliverables.

Provides executive team approval and sponsorship for the project.

Description

Project Sponsor

Role

4.2.2 SCM responsibilities

The organization deals with safety assessment of Anti-lock braking systems for automotive systems. All

the actors along with their responsibilities have been stated in section 4.2.2.

4.2.1 Organization

The software configuration management consists of following sections.

4.2 SCM management

6 weeks

4 weeks

2 weeks

4 days

Estimated Completion Timeframe

Deployment

Testing

Analyzing

Designing

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Need for change

All of these phases are approved by Functional Safety Assessment plan and Validation and Verification

plan and then are developed by the development team.

4.3.2.1 Requesting changes

The change is requested through a template consisting of following elements











Name of the component being changed

Date of request

Presumed impact of change

Verification, implementation, and release of a change

Urgency for change

The request is also documented in DOORS.

4.3.2.2 Evaluating changes

The request for change forwarded to Validation and Verification plan and is analyzed to see what impact

it has on system.

4.3.2.3 Approving or disapproving changes

If the change is approved, it is added to the DOORS, from where it awaits for the development phase. It is

rejected if vice versa.

4.3.3 Configuration audits and reviews

See Validation and Verification plan for audits and reviews.

4.3.4 Subcontractor/vendor control

Anti-lock braking systems isn’t manufactured by a single vendor, it consists of COTs. These COTs are

verified by Validation and Verification plan and are then proceeded to next iteration. The COTs are

carefully examined because they can cause problems while integrating to system.

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4.3.1.3 Acquiring configuration items

OEM

The OEM is responsible for providing systems that’s under test. This is

beyond the scope of our class project but it is included in stakeholders.

4.2.3 Applicable policies, directives, and procedures

The policies, directives and procedures for the SCM plan are according to ISO 26262. All the constraints

that are applied are taken from the standard as well.

4.3 SCM activities

4.3.1 Configuration identification

The Anti-lock braking system consists of following software modules

 ECU

 Translator from electric pulses to digital signals

 Ignition timing

 Staged injection

 Speed limit analyzer

 Brake-fuel analyzer

 Safety check

 Pulse rate of paddle’s pressure checker

The safety assessment of above modules have been discussed in Verification and Validation plan.

4.3.1.1 Identifying configuration items

The CI’s that are to be delivered have been stated in the section above. The baseline that is considered

while development are schedule, cost and scope baselines. These baseline are affected by each change in

software after deployment and while development of the system too. Any development of change is

system is managed under ISO 26262 to keep the system under scope and base line maintained. These

baseline documents along with system have to be approved by Validation and Verification plan (see

attached documents).

4.3.1.2 Naming configuration items

This modules specifies how versioning of system is controlled. We have allocated all of the CI’s in

DOORS. DOORS is a requirement management tool that keeps track of all versions and requirements. It

makes traceability possible for complex systems.

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All the CI’s are distributed among different computers to protect data against any disaster and to share it

with other stakeholders. While requirements can be handled, protected and acquired through DOORS.

DOORS database enables shared user administration that allows sharing of data among stakeholders too.

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4.3.2 Configuration control

The configuration control have following phases,





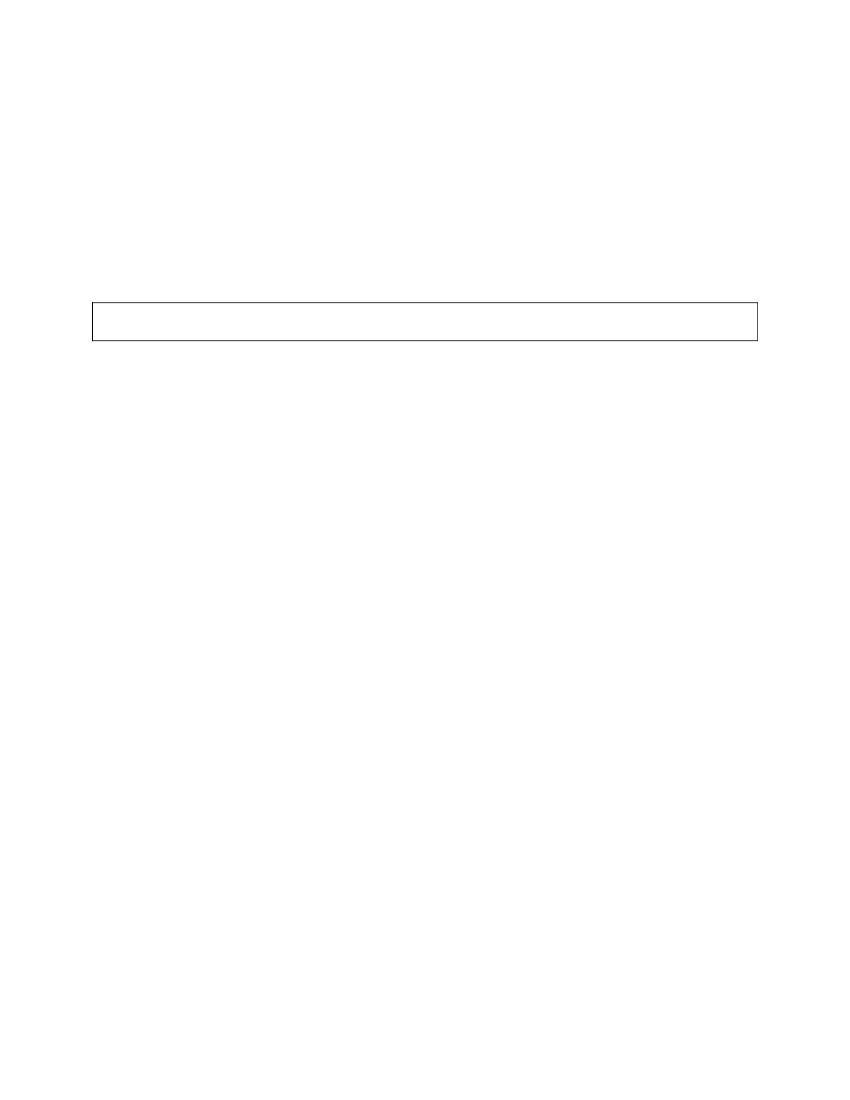




Identification and documentation of the need for a change

Analysis and evaluation of a change request

Approval or disapproval of a request



4.6 SCM plan maintenance

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Our Software Configuration management plan follows ISO-26262 to conform that our work product is

legal and applicable on specific automotive systems.

6. Conformance to the standard

We have to omit some sections intentionally that were related to deployment. As our scope is limited yet,

we can’t state those sections. However designing is complete, we can add rest of the sections as well.

5.1 Downward tailoring

Our Software Configuration Management plan follows ISO 26262 for automotive systems. Our goal was

to do Software configuration management of Anti-lock braking system. We divided it into sections

(explained above) that provides flexible management of any change that occurs during or after

production. We have explained how, what, when and where of SCM in ABS. Roles have been assigned

appropriate responsibilities and process is simplified by following a structure that ensures everything is

according to what was expected.

5. Tailoring of the plan

It consists of how’s and what’s. Appropriate actors are assigned to cater the change. Validation and

Verification plan can be consulted to see what is the change and how can it be catered.

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MATLAB/Simulink

DOORS





Table 4 Tools

Any Configuration to be made shall be made acquaintance with specific tools and techniques viable for

the solution. Our used tools are show in Table 4.

4.5 SCM resources

The prime purpose of this plan is to regulate configuration management. Any milestone to be achieved

should be tagged with deadline and all the dependencies shall be noted down in DOORs.

4.4 SCM schedules